Optimizing Your Perioperative Supply Chain:
A Guide to Improvement Projects

OHA ONTARIO HOSPITAL ASSOCIATION

ACKNOWLEDGEMENTS

This guide was developed collaboratively using the experiences and expertise of clinical and non-clinical hospital professionals in Ontario who have undertaken clinical supply chain improvement projects within their organizations.

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INTRODUCTION: THE CLINICAL SUPPLY CHAIN IMPROVEMENT JOURNEY

As one of the most common surgical procedures in Canada, a straightforward laparoscopic cholecystectomy can be completed in less than an hour. But when the circulating nurse must leave the Operating Room (OR) in search of a new endo specimen retrieval bag because a labeling error had the cart loaded with the wrong size, things can change quickly. She searches the OR sterile core only to find its stock depleted.

With the patient still on the operating table under anesthetic, calls must be made, other clinicians taken from their work to help and eventually the right size of endo specimen retrieval bag is found. Now the schedule has been shifted and the next surgery must begin late. What's more, staff members have lost confidence in the supply chain and some clinicians have already taken to stockpiling supplies to ward off another shortage.

Some surgical departments function in this manner because the time and effort it would take to overhaul an entire supply chain system is daunting. Others might function well, but just want to benefit from further efficiency. Whatever the reason, change can start small and incrementally. In fact, several of the hospitals whose experiences serve to inform this book began with modest supply chain goals.

Surgical supply chain projects can focus on a single aspect of the supply chain, such as procedure card review, or they can be part of a larger systemic review that will overhaul your processes and improve everything from patient outcomes to departmental spending.

To help hospitals embrace these opportunities, the Ministry of Finance, with the support of the Ontario Hospital Association (OHA), launched the Operating Room Supply Chain (ORSC) Pilot Program in 2007. The objective of the program was to enable the implementation of earlier work recommended by the Ontario Ministry of Health and Long-Term Care's Surgical Process Analysis and Improvement Expert Panel. The panel made recommendations to improve surgical efficiencies, which included perioperative supply chain best practices.[1]

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1   a)   http://www.ontla.on.ca/library/repository/mon/12000/256887.pdf Surgical Process and Improvement
           Panel Report
     b)   http://www.fin.gov.on.ca/en/bpssupplychain/documents/orsc_pilot.html ORSC Program details

The ORSC program was launched to identify and achieve benefits through select projects within Ontario hospitals. The clinical and non-clinical leaders of these projects, supported by a network of subject matter experts, worked together to document the experiences of the project hospitals and to develop tools that would help with implementation. That work led to the creation of this guide. The result is a new tool designed to help other hospitals successfully navigate their own supply chain improvement journeys.

Designed by front-line staff for front-line staff

This guide has been developed to help executives and a cross-disciplinary team of hospital staff to be successful in their own clinical supply chain transformation. The techniques presented in the guide were designed by front-line staff for front-line staff to support efforts in continuous improvement.

The successful and ongoing supply and replenishment of product and equipment to Ontario's clinical service areas involves multiple processes and functions. It is also the result of a number of different systems and departments working together. Based on the advice and experience of peers who have gone through their own transformations, this guide is intended to help hospitals save time, reduce errors and implement experienced-based improvements to operating room and clinical service supply chain processes.

ORSC improvements can range from foundational process improvement work to integrated system implementations. The projects described in this guide focus on the foundational ORSC projects, which provide the basis to support a larger system implementation initiative for a supply chain going forward.

Contacting hospitals that have undertaken a supply chain improvement project is recommended. Key contact information is available from the OHA upon request.

How to reduce costs and create opportunities

Clinical supply chains typically suffer from some of the following symptoms:

- Non-standardized and manual process for surgical supply management;

- Lack of reliable data to support metrics analysis and measurement of supply chain activities;

- Too much clinical time spent on materials management activities;

- Insufficient and ineffective communication between the operating room (OR), medical device reprocessing (MDR) and materials management;

- Excessive, duplicate and obsolete inventories; and,

- Outdated surgical pick lists and procedure cards.

Successful clinical supply chain projects improve service levels and support the delivery of better patient care. And by developing and implementing better clinical supply chain practices, hospitals can reduce operating costs.

This guide provides experienced-based opportunities for:

- Increasing patient safety and staff satisfaction, along with increased clinical staff time with patients;

- Reducing product-related errors;

- Increasing staff time savings for OR, MDR and materials management;

- Obtaining accurate information to support case costing;

- Streamlining business processes and improving opportunities for process automation;

- Reducing stock-outs and an overall improvement in inventory accuracy for OR procedures;

- Reducing inventory carrying costs; and,

- Improving the ease of training for new staff.

When the ORSC Pilot Program outcomes were reviewed by a third party, the majority demonstrated a return on investment in less than two years. Many found significant one-time savings simply by reducing duplicate inventory and any inventory obsolescence; and ongoing or annualized savings included a reduction in carrying costs and a reduction in staff overtime costs, given that processes had become more efficient.

What's in the guide?

This guide focuses primarily on the business processes of providing medical surgical products to the surgical suites and the operating room sterile core. The same principles and leading practices can and should be employed in other areas of the perioperative environment focused on less invasive practices such as the cardiac catheter laboratories, the cystoscopy and endoscopy suites, and even diagnostic imaging and radiology areas. To capture all of these areas, the guide will refer generally to clinical services and the clinical supply chain.

While each hospital supply chain has unique characteristics and circumstances, all share a number of common fundamental elements. Improvements in these key areas can provide a starting point for any clinical supply chain optimization.

This guide outlines optimization, management, and sustainability elements in the following areas:

- **Procedure Card Management:** Managing procedure cards and pick lists for surgical cases.

- **Data Optimization:** Managing medical-surgical product and supply information.

- **OR Inventory Optimization:** Managing inventory, product replenishment and physical storage space.

- **Product Selection and Standardization:** Managing the selection of products.

These four areas form the guide's key chapters. Each provides an understanding of the topic as well as some practical steps to undertaking an improvement project within the focused area. The chapters can be used as stand-alone tools to facilitate a specific improvement or collectively for a more thorough project. For example, a team could use just the procedure card management chapter to guide a project seeking to remove old procedure cards. A more elaborate project could see a team using the data optimization chapter, where the item master file is cleaned together with a procedure card review to provide a basis for accurate data on the procedure cards, and possibly enable case costing to be tracked.

Regardless of the size or type of initiative undertaken, the guide stresses the importance of good project management throughout. A fifth chapter, dedicated to project management, offers guidance on project planning, implementation, measurement and sustainability, as well as project team formation and governance.

An increasing number of hospitals in Ontario use information technology (IT) and information management (IM) systems to support their clinical supply chain processes. While IT and IM are mentioned, the guide chooses to focus on manual processes and foundational improvements that can be undertaken regardless of any IT or IM enhancement or implementation. IT and IM systems can assist supply chain optimization, but refining the business processes and product flow, and changing human behaviour are also critical to optimizing clinical supply chains.

What are the challenges?

Undertaking an ORSC project does not come without some challenges. The guide identifies and suggests strategies for addressing typical challenges such as:

- Resistance to change

- Clinical staff's lack of trust in supply chain services

- Operational funding for additional and ongoing supply chain support

- Capital funding for required for such things as shelving and technology

- Lack of adherence to standards of infection control.

The guide also provides advice on establishing a strong communication and change management strategy to overcome challenges and create acceptance for the changes that come with an efficient supply chain system.

Based on current advice and leading practices

Successful implementation starts with obtaining the best and most current advice on leading practices. The approaches and experiences of the ORSC projects that inform this guide were grounded in research from industry leaders and supply chain practices. This guide helps hospitals synthesize these insights as well as point them to recommended sources for ongoing research.

Resources used in the development of this book include:

- ORSC Pilot Program

- OR supply chain white paper publications

- OR manager websites and publications to learn from other industry experts that have globally-celebrated successes

- The Association for Healthcare Resource and Materials Management (AHRMM)

- The Association of periOperative Registered Nurses (AORN)

- Healthcare Information and Management Systems Society (HIMSS)

- Healthcare Supply Chain Network (HSCN)

- Operating Room Nurses Association of Canada (ORNAC)

- Hospital's OR manager

- Hospital's OR business manager.

This guide addresses foundational projects, identifies the challenges to overcome, and provides the tools and resources required to complete the improvement initiative. It provides the practical advice that will help Ontario hospitals get started with confidence and to successfully complete their transformations to more efficient and clinically effective supply chains.

Chapter 1. Procedure Card Management

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CHAPTER AT A GLANCE

Clean, concise and accurate procedure cards facilitate the flow of supplies to the surgical area. More than improving efficiency, good procedure cards enable accurate product management, and most importantly, allow clinicians to focus on patient care.

Seeing frequent overstock, placing a high number of calls to MDR requesting additional items for a case cart, and experiencing too many clean returns are just a few indications that a hospital's procedure cards may be due for review.

In addition to introducing readers unfamiliar with procedure card management to its fundamentals, this chapter explores ways to form your team, assess your current state and design a suitable solution based on your requirements. It also examines how to implement your change and develop training to support it.

While this chapter is designed to help you create improvements in procedure card management, it is also meant to enable the measurement of those improvements. By following the processes and gathering pre- and post-implementation data, you will be able to present a more compelling case for further improvements as well as build support for ongoing maintenance and training of your improved system.

Ideally, hospitals should move towards a generic pick list and procedure cards, where procedure cards should be managed electronically. Through integration with the materials management system, clean accurate product data should populate your OR information system item dictionaries. For hospitals that do not have this integration, or where a completely manual process is in place, a procedure card review and redesign can still be completed.

1.1 UNDERSTANDING PROCEDURE CARD MANAGEMENT

Why is procedure card management important?

Procedure card management is the logical creation and reorganization, as well as the active monitoring and maintenance, of a standardized set of procedure documents. Rather than being hard copy documents or actual Kardex file cards, procedure cards tend to exist mainly as part of a clinical services data system. Since many hospitals began automating procedure cards in the 1990s, clinicians have been adding to these documents but seldom are any completely optimized or reorganized.

As with any component of the clinical supply chain, a lack of structured, standardized processes can lead to inaccurate information that, over time, will cause inconsistencies and errors. These in turn cost the supply chain both money and time. Procedure card management must have a policy to manage the content, approval and creation of procedure cards.

A well-managed procedure card program will support clinicians by reducing case times and turnover times. This helps to free up more time for patient care, which can improve staff and patient satisfaction.

What is the difference between a procedure card, a preference card and a pick list?

Some of the difficulty inherent to procedure card management comes from how other lists in the system, namely the pick lists and preference cards, are used.

Procedure cards detail all the supplies required for a case and their quantities, including consumable products, reusable products, instrumentation and equipment. They also contain specific OR setup instructions. As such they are used by various staff for various reasons. While this chapter focuses on the supply chain aspects of procedure cards, clinical staff is one of its key users. Typically procedure cards are owned, managed, and maintained by the surgical services program. Ideally, there should be one procedure card for each procedure. It should list a handful of 'surgeon-specific requests' (see sidebar) but most

of the card should be the same every time that procedure is performed. If a surgeon's needs are extremely divergent, a preference card should be generated for that surgeon.

Preference cards are often procedure cards that have been customized to the needs of a single surgeon. Some clinicians choose to work from preference cards as it is more straightforward in meeting the needs of the surgeons. As such, surgeons only see their own preference cards and often remain unaware of what their colleagues are using. However, if procedure cards were used more often, it would be easier to see where the opportunities for standardization can occur.

Pick lists identify the items that must be picked both from MDR (medical device reprocessing) and from the sterile core. The pick list is usually found as the last component on a procedure card and is organized according to item storage location to help the person assembling the case cart. Once the MDR items have been loaded and the case cart sent to the sterile core, a clinician will use the supplies stored in the sterile core to complete the list. See this chapter's *Appendix C* for an example of a pick list.

How should procedure cards function?

Procedure cards typically reside in an OR clinical information management system, (usually the OR scheduling system) or in some cases, in a manual, paper-based Kardex system (this is where the name procedure 'cards' originated).

Although procedure card development and maintenance is clinically based, activities associated with product management, picking and delivery are very much a core supply chain function. As such, the same leading practice concepts of inventory and product optimization should be applied.

When a procedure card is developed, the individual items are selected from the dictionary and associated with the card. Hospitals that have integrated their enterprise resource system (ERP) or materials management system and their clinical information system may either maintain consumables or all items in their item master files. They also receive electronic updates to their clinical dictionaries on a daily basis. This consolidates the maintenance of item master files to one system and ensures accurate synchronization of information between systems.

Surgeon-specific requests: Best practices for your procedure card
The procedure cards will typically detail all the supplies required for a case and in what quantities, including consumable products, reusable products, instrumentation and equipment.

You'll find exceptions when a specific procedure or patient requires specialty products and/or instrumentation. This is a one-time requirement known as a surgeon-specific request. Here, items are not added to the procedure card, but are associated with the procedure either electronically or manually.

The items on procedure cards fall into several categories including, disposable supplies, reusable drapes and linens, hardware, instrument trays, individual instruments, implants (e.g., screws and plates sets), and other sets (e.g., power tools and rigid scopes). In most clinical information systems, these items must be maintained in one or more item dictionaries.

If you have a large number of unique procedure cards for a single procedure, you should cross-reference these for redundancies.

Do your procedure cards need to be improved?

Before building your solution, it is important to understand whether changes are needed to your procedure card system and if so, to what extent. A high functioning procedure card system should facilitate the flow of supplies to the surgical area. If you have a large number of unique procedure cards for a single type of procedure, for example, you should cross-reference these for redundancies. Other indications your procedure cards are in need of attention could include:

1. **Frequent overstock.** Are storage locations in MDR and OR sterile core overstocked? Is there obsolescence and waste?

2. **Too many calls to MDR.** Are there daily calls to MDR from the OR requesting additional items to supplement case carts?

3. **Too much picking from sterile core.** Are you picking more than 10% of case cart items in the sterile core?

4. **Too many clean returns.** Do you use less than 90% of case cart items after a procedure?

5. **Data inconsistencies.** Are there inconsistencies between the supply chain inventory item master file and the OR case cart items in the areas of nomenclature, product information, and missing items?

6. **Inefficient case cart preparation.** Are OR clinicians and staff not satisfied with the level of case cart preparation?

7. **Increased conflict.** Are there concerns among materials management, MDR and OR such as last-minute requests or non-availability of product when required?

8. **Delays.** Are there case start delays?

9. **Nurse effectiveness.** Is the circulating nurse spending too much time outside of the OR theatre during a procedure?

10. **Inaccuracies.** Are budgets inaccurate and supply costs escalating? How accurate is your case costing? Is it even available?

What are the benefits of proper procedure card management?

The main objective of a procedure card system is to ensure the right products are available at the right time to support the provision of quality patient care. Other benefits supporting clinical outcomes include:

- Improving data management and reporting capabilities;
- Reducing the amount of time spent calling MDR for additional supplies;
- Providing information to improve clinical practice and pursue standardization;
- Reducing supply costs;
- Reducing the number of SKUs stored in different locations;
- Improving service levels;
- Supporting case costing; and,
- Facilitating conflict-checking for equipment and supplies in the organization's information systems.

Improving your procedure card system will also benefit MDR and materials management by supporting accurate and efficient case picking, which in turn will reduce inventory carrying costs as well as reduce product waste due to obsolescence. Some other benefits, from an MDR and materials management perspective, include:

- Providing the mechanism for producing a bill of materials;
- Providing a mechanism for efficient inventory control;
- Reducing time for re-stocking of clean returns;
- Reducing time spent responding to last-minute requests; and,
- Improving staff satisfaction.

Additionally, optimized procedure cards could facilitate off-site case cart assembly, which is an increasingly attractive and viable option for many hospitals.

TIP: How procedure cards can support case costing.
In ORs where clinical documentation exists, case costing is derived from the use of the items listed in the procedure card. Typically costs can be associated to the products listed. Once the procedure is complete, the nurse can update the quantities for items used and add additional items such as implants.

1.2 PLANNING YOUR PROJECT

Forming your project team

Start by forming a steering committee that has a clear and concise project charter. The charter should state your objectives and ensure these are aligned with the organization's goals. Form a steering committee that will provide guidance on project progress and manage any conflict between groups, if required. To start, the steering committee will help to define the project team.

See *Chapter 5: Project Management* for more details on forming your project team.

The project team's main goal will be to use its combined expertise and knowledge of supply requirements for each procedure to investigate opportunities for standardization. Of course this will be done with input from surgeons (ideally, a surgeon sponsor for each service could facilitate these discussions within their service.) And MDR should always be included as part of the team since it has a good understanding of the items that are frequently returned unused, as well as the supplementary items being requested to the case cart.

Since clinicians typically own the procedure cards, the project team's core will consist largely of clinical service leaders (i.e., nurses), but other groups must be represented. All departments, business functions and external partners that will or could be affected by the procedure card project should be represented on the team. In forming your team, you should consider inviting representatives from the following areas:

- **Clinical departments:** Clinical leaders, charge/resource nurses by service, clinical supply coordinators, surgeon sponsor by service.

- **Business functions:** Booking clerks, perioperative materials manager, MDR, as well as representatives from procurement, finance, system administration, and IT.

- **External partners:** Representatives from shared service organizations and from third-party logistics firms.

Identifying your project stakeholders

It is important to know who your stakeholders are and what part they will play in designing a procedure card solution that will not only function well, but be universally accepted. Stakeholders can sometimes be part of the steering committee, sometimes part of the working groups, and sometimes engaged as required throughout the project.

Senior Management. This group can provide support, approval and conflict resolution but will want to know the benefits of the improvements for the organization.

Surgeons. They will buy in if it is clear the project will support their ability to perform their procedures without supply issues and delays.

Clinicians. As champions for change, clinicians will directly benefit from improvements and will drive the project tasks.

IT department. It can provide system knowledge and support automation.

Materials Management, Purchasing, Shared Service Providers and Finance. These groups will support inventory optimization efforts.

MDR department. It will be directly affected and will benefit through reduced costs and effort.

External partners. Consider how shared service organizations and outsourced processing centres may contribute.

Surgeons will buy into the project if it is clear it will support their ability to perform their procedures without supply issues and delays.

A standardized training program should be developed and deployed for all new staff and any changes to process should be communicated to existing staff.

Ensuring your project's success

Before moving ahead, your project team should discuss and agree on the following points:

1. Senior management must be involved and agree to minimize surgeon-specific preferences, where possible, and drive standardization.

2. Surgeons must support the initiative and be involved in the solution.

3. Senior leadership must support and participate at a steering committee level.

4. Resource nurses on the project team must be seen as agents of change.

5. Included in the project scope must be MDR's operational requirements and how changes will be made to procedure cards.

6. Criteria must be developed for inventory management such as categorizing stock, non-stock and consignment products based on historical usage.

7. A product evaluation and standardization committee should exist and be part of the process.

8. 'Just in case' behaviours must be minimized. A general rule is that 80% of the time, you should be using 90% of the items on your cart.

9. Policies and procedures should be developed for ongoing procedure card maintenance processes (consider, who will update cards, how often and by what process).

10. As part of an adequate change management plan, a standardized training program can be developed and deployed for all new staff and any changes to process can be communicated to existing staff.

Before starting your procedure card review, you should also be certain to have allocated clinical resources to support your project. A detailed project plan with realistic timelines and estimated levels of effort for each project role will ensure tasks are identified and managed. Staff will need to be relieved of their daily OR duties to be able to focus on this activity without interruption.

1.3   ASSESSING YOUR CURRENT STATE

Establishing your starting point

To effectively measure the improvements you hope to make, you must collect a set of baseline metrics to understand your current situation. Not only will these serve to show the project team where improvements are required, they can also be used at key points during the project, and following its implementation, to compare points of progress and to justify project investments.

Some baseline metrics to consider include the following:

- Number of clean returns monthly
- Number of case delays due to unavailable product or equipment
- Amount of time nurses are leaving the OR to pick supplies or find missing items
- Amount of time spent on case cart picking
- Number of SKUs stored in MDR and the OR core
- OR inventory value
- Number of procedure cards, overall
- Number of procedure cards, per service
- Value of inventory that becomes obsolete per year
- Number of items opened but not used on a monthly basis
- Case cart item utilization
- Number of calls to MDR for additional items
- Number of common procedure cards as well as the number of unique ones
- Measure of surgical case product usage by item
- Number of clean returns per day by procedure.

TIP: Use an MDR call log to measure item usage.
The volume of calls to MDR for supplementary supplies should be logged by MDR for a period of time to capture a normalized case load. To be useful in terms of editing procedure cards, the log should include the item description and the procedure with which the item is associated. Clean return items should also be documented by MDR and the same information recorded.

How to take a 'snapshot' of your usage pattern

1. Select a one-month period (or a period of time that would capture most high volume procedures).

2. Log any calls during this period for additional items and supplies requested by the OR and make certain you capture the procedures (and cases) with which these items are associated.

3. Also during this period, ask the OR nurses to indicate at the end of the procedures the items on the pick list that were not used.

4. The pick lists for these procedures should be compiled and cross referenced with clean return data.

Examining your current processes

To document and track current processes, develop a table detailing all process flows. Start with the procedure booking and follow the supply chain processes through to post procedure. Each process should be mapped out and include descriptions of the roles and the people performing these. See this chapter's *Appendix A*, for a sample process flow.

Examine the how, when, why and who for each process. Any steps or activities that do not provide value should be removed from the process. Processes to be reviewed can include the following:

- Surgeon's office booking procedure (see Figure 1 below)
- Hospital booking procedure
- Conflict checking process
- Attaching the procedure card to the booking
- Reviewing and validating the booking information by the clinicians in the OR
- Sending the procedure cards/pick lists to the MDR
- Generating pick lists in the MDR
- Picking process
- Case cart delivery process
- Validating correct supplies on the case cart
- Picking process for items picked in OR core
- Process for requesting additional supplies not on the case cart
- Clean return process
- Process for procedure card review and updating.

Figure 1: Sample table examining the current process of procedure booking.

Process ID	Event	Process Title	Process Description	Output	Metric
#001	Procedure Booking	Surgeon's Office Booking	Surgeon's office fills in a manual form to request a procedure to be booked Faxes to hospital OR booking office	Hard Copy Request for Booking (RFB)	25 RFB received per day at booking office 25% require correcting

Steps to measuring your current processes

Focus on high volume procedures. Start with a focus on high-volume surgical procedures and the surgeons who perform them. Identify the procedures that make up 80 percent of the OR case volume and the surgeons who perform 80 percent of these procedures. This '80/80 rule' can apply to most procedures, unless extremely specialized.

Once you have created a list of the OR's high-volume procedures, choose a manageable number, anywhere from five to 10 procedures, and begin collecting usage data for the items used in each surgical case.

Track your target. Assign the circulating nurse and/or scrub nurse to record the following (unless electronically available):

- Items picked from procedure card that are used
- Items not on the procedure card that were added
- Items opened and used off the back table
- Items opened and unused
- Source of the picked item (OR or MDR).

Collect data. The length of the data collection period will vary depending on case volume and how often an item is used. It may take five cases or more, but stable usage patterns for all the different surgical tools and materials should emerge. Once you are confident that you have captured sufficient data, you can discontinue observations. Some OR information management systems will have tools for 'exception noting' but these require the nurse to note added or unused items intra-operatively. This then can provide an electronic report showing the exceptions over a period of time. Exception noting is very useful in determining which items should be edited on the procedure card.

Classify the data. Items may be classified into the following general categories:

- Disposable supplies
- Reusable/linen supplies
- Instrument trays
- Individual instruments
- Implants
- Other sets and trays (power tools, screw sets).

Summarize the data. The summarized data should be displayed as follows:

- Percentage of items picked from the procedure card that were used.
- Percentage of picked items that were added to the procedure card.
- Percentage of opened items that were used.
- Percentage of opened items that were not used.

Additional considerations during your review.

- **Look at technology.** Complete a technology review to determine system requirements, enhancements as well as the limitations of the current systems.

- **Look at instruments.** Assess your instrument trays and sets to standardize and reduce the number of pick items as well as the opening of multiple items. Identify and reduce, where possible, the number of one-of-a-kind items.

Measuring the accuracy of your product data

The product data, regardless of where it resides, must be optimized, standardized and all relevant information populated in item master files or dictionaries to support a procedure card review. This will facilitate standardization and enable you to eventually synchronize data between systems.

You should review your item master files and determine the number of characters available in the clinical system for product description. Also determine what additional fields are available for the user to populate. Character limitations in the clinical system may require the use of abbreviations in the product description field. A standardized approach to nomenclature for the product description as well as any abbreviations should be agreed upon by all project stakeholders (starting with nurses) while updating the procedure cards.

For more information on optimizing product data, see *Chapter 2. Data Optimization.*

Examining your inventory storage locations

Procedure card management is only one component of the clinical supply chain. To truly benefit from a procedure card review and redesign, you have to look at the balance of items that reside and are picked in the OR core, as well as those stored and picked in the MDR.

Items that have a high rate of utilization, meaning those almost always used for a particular procedure, should reside in the MDR and be picked as part of the case cart. Items that are seldom used may be better suited to a core location where they could be picked as part of the preference portion of the procedure card, or picked as needed.

When an item's storage location is changed, it is important to immediately update this information in the materials management system and the clinical information system. Doing so will ensure that the items have accurate location information generated on the procedure cards, making it easier to find the items and facilitate accurate replenishment.

To find the best location for an item, analyze its usage over a two-year period. Track minimum to maximum usage by extracting this data from your system. The ERP or materials management system should be the source of this information for all stock products. You can obtain the utilization data of non-stock products through the purchase history information in the ERP or finance system.

For more information see *Chapter 3. OR Inventory Optimization.*

Reviewing your procedure codes

Procedure cards are linked to procedure codes. If procedure codes do not reflect the actual procedure or have information missing, wrong items can be on the procedure card or even missed altogether. Procedure codes should be reviewed periodically and non-active codes (not used in a year) should be considered for elimination.

TIP: Clean returns compromise sterility.
Having infrequently used product on your pick list will increase the number of clean returns. Besides the wasted effort involved in returning these items to their storage location, the excessive handling can compromise sterility.

TIP: Avoid multiple locations for the same items.
Having multiple locations for the same item can increase effort and cost in the replenishment process. Core items that are specific to a service should be close to where those services are located. Put generic items used by most services in a more central location.

When reviewing procedure codes, all the same principles apply in terms of developing policies and procedures, e.g., limit code creation to a select few people; develop and provide training material for those maintaining the codes; and provide resources for ongoing maintenance.

Ideally, if the procedure booking is completed online by the surgeon's office, the hospital has more control over procedure codes and related information. In this instance, the surgeon's office would select pre-defined codes from the procedure master files. This eliminates subjective 'free texting' of procedure descriptions and the manual selection of the related procedure card.

Examining your OR product usage rates

Revise your procedure cards according to usage rate, noting that here 'usage' is defined as the use of at least one of any number of the individual items included on the case. To achieve item usage rates approaching recommended standards, revise the procedure cards using the following method:

- Identify items used 80% to 100% of the time. Add these items to the pick list and designate these as items 'To Be Opened'.

- Identify items used 60% to 80% of the time. Add these items to the procedure and designate these as 'Do Not Open – Hold/PRN'.

- If an item is used less than 60% of the time and is readily accessible from an alternative supply source (such as specialty/core stock, suite stock, etc.), delete it from the pick list and add it to preference portion of the card.

- If you are 'exception noting' during procedures (i.e., identifying items added and items not used), the OR system could provide utilization reports of supplies by procedure. If not, a manual process for noting additional items and items not used should be employed for a period of time until it is determined that a robust and reflective sample of data is collected.

TIP: How to determine whether an item should be on a procedure card.

After sufficient data has been collected for a surgical procedure, compare the item usage data to the items indicated on the procedure card or pick list. To determine whether items should remain on a procedure card, conduct the following:

1. Identify low-usage items (those used less than 50% of the time, for example).

2. List the lowest to highest quantity used during each surgical case in the data collection phase.

3. Disregard the highest number.

4. Identify the second highest number as the quantity that should be indicated on the procedure card for that item. (For items deemed necessary in an emergency, it may be appropriate to disregard this process and exercise clinical judgment to determine the quantity indicated on the procedure card.)

5. Determine, from a clinical perspective, if the list of low-usage items could feasibly be removed from the procedure cards.

6. Delete the low-usage items that can feasibly be removed.

7. Determine an alternative storage location for low-usage items to ensure availability when these items are requested for a case (e.g., retrieve from OR sterile core, place on specialty/core stock, add to OR suite stock, or supporting traveling totes/carts).

1.4   DESIGNING YOUR SOLUTION

Defining your solution

By developing process requirements, you can ultimately define a future state model that considers the most efficient and seamless way of performing daily tasks while supporting and facilitating the clinical requirements. Working group sessions, facilitated by the project manager, should encourage participants to be open and interactive, and to discuss all ideas for the future. This process should not be influenced by current limitations, i.e., system limitations, lack of resources, or behavioral barriers.

When defining your solution, remember that not all OR systems are equal. Become an expert on your specific system and understand the benefits and constraints of that system as you build an inventory of procedure cards.

New designs must always keep the end user in mind. Although both materials management personnel and clinicians require product information, the nomenclature must be understood by everyone. Many systems allow for specific and generic naming and sorting capabilities for translation and references.

And any new system must account for the need to make a global update when a product changes. It should be easy to add or delete items from the procedure cards. Keep this in mind for both the process developed and the potential system solution identified.

An ideal model should be clearly articulated. And before implementation, decisions as to the project priorities, as well as your organization's constraints, must be made. This will allow you to determine short-term implementation goals as well as decide what will need to be moved to another longer term project phase.

At a high level, the following leading practice concepts should be considered:

- The hospital uses one mechanism, either paper-based or electronic, to contain both its procedure cards and pick lists.

- The hospital is able to collect complete and accurate product usage data for each surgical case.

- For each case, the hospital is able to compare product usage data to the procedure card or pick list.

- Ideally, the data is in electronic format and electronic reports can be generated.

- Staff is assigned specific procedure card management roles and provided sufficient opportunity to ensure required changes are made in a timely manner.

- Exception noting is performed and used to measure actual product usage.

- Future state will include electronic product exception noting intra-operability.

- Synchronization of product information occurs between item master files and the clinical system dictionaries.

Assign specific procedure card management roles to staff members and provide them with sufficient time to ensure changes are made.

To gain a thorough understanding of your project's requirements conduct research on leading practices.

See this chapter's *Appendix B,* for a sample before/after procedure card.

Defining your requirements

Using the current state process flows you have identified under the *Assessing Your Current State* section of this guide, define your requirements using a spreadsheet to track each individual flow. The gap between the current state and the requirement should be clearly stated for each flow (see Figure 2 on next page). This will become the roadmap for developing the future state model, and will keep track of items that need to be addressed from a gap perspective.

Figure 2: Sample table showing requirement, gap and metric.

Process ID	Description	Requirement	Gap	Metric
#001	Surgeon's office booking process	All booking requests will be performed electronically in the OR system using standardized procedure codes	Electronic booking currently unavailable Impact: Errors/omissions on booking form Time gap between request and entry in system Excessive effort for booking clerks manually entering data	25% of total need correcting Average = 48 hrs Delay 2 hrs per Day

Defining your future state

The process of developing a future state model will take into consideration all steps completed so far in the planning phase of the project. Issues associated with the current state, the analysis of the most efficient way to do business, and the gaps between the two will be the basis for a proposed future state.

How gaps are addressed is typically an organizational decision. Often the approach and investment needed to address the gaps is a matter decided upon at the steering committee level. Indeed, eliminating gaps may require a significant investment, as is seen in Figure 3, on the next page. However, all costs need to be assessed to determine quantitative and qualitative benefits. Other gaps may just require an adjustment in process. Many factors need to be assessed to determine what elements of the requirements will be implemented, i.e. capacity, cost, technical ability, resources and return on investment.

Figure 3: Sample table showing the gap and the solution that addresses it.

Process ID	Description	Requirement	Gap	Solution
#001	Surgeon's office booking process	All booking requests will be performed electronically in the OR system using standardized procedure codes	Electronic booking currently unavailable	Electronic booking will be assessed for implementation, cost will be compared to cost of manual process, error correction

The agreed upon elements should be detailed in an implementation project plan when the planning stage is completed.

Managing change

As you design your solution, key change management elements must be kept in mind. Effective communications and training components must be included as part of the implementation strategy.

The design stage is also when you should obtain input and sign-off from project stakeholders on new processes, new roles and responsibilities and any new rules governing the use and maintenance of procedure code data.

1.5   IMPLEMENTING YOUR SOLUTION

Before you start the implementation stage of your project, it is important to have completed a number of key tasks. Among these, be certain that you have optimized your OR item dictionaries, or if you have interfaced these with item master files, be certain the data in the item master files is optimized (see *Chapter 2. Data Optimization*). Also, be sure you have reviewed and standardized procedure codes to reflect the actual procedure and the associated products.

Loading data into the system

To start the implementation, you will have to decide what method to use when making changes to the procedure cards. The IT department, or possibly the application vendor, can facilitate an electronic means for loading the new database of optimized and edited procedure card data into the clinical system from either a database or spreadsheet file. Consult with either the OR system vendor or the system administrator and the IT department to understand your options (some systems have tools for this purpose).

Ideally, all data should be prepared and loaded into the OR system at once, but there should be an understanding of the impact on functionality and other data outputs of the system. If you are considering making changes manually, be aware that this is very time consuming and it might be difficult to maintain daily operations while the information is being entered.

Converting data: non-interfaced and interfaced scenarios

Scenario 1: *Materials management system item master files are not interfaced with OR system item dictionaries.*

If changes are made to the nomenclature, product attributes or picking locations of products in the OR system, the materials management item master files will be different than the OR system files. This can cause confusion when re-ordering product, replenishing products and picking products. It is imperative that the materials management group be involved in all aspects of any proposed changes so that they can plan and execute the changes concurrently.

Scenario 2: *Materials management system item master file is interfaced with the OR system item dictionaries.*

Any individual product nomenclature changes, attributes or location changes will need to be made in the materials management item master files first, allowing the updates to come across the interface to the OR item dictionary. This should be complete before the procedure cards are updated to ensure synchronization of the data.

The loading of the re-designed procedure cards can occur incrementally or all at once. Determine if there are any electronic tools to facilitate this process. Manual updating, depending on the number of cards, could take months to complete. It is more efficient to invest in a means of loading data as quickly as possible to minimize the data change management process.

Checking your data upload

After an upload, take a random selection of procedure cards and compare the codes and descriptions to your database or spreadsheet to ensure the data was migrated without information loss or change to the data.

A methodology that supports a picking system, usually organized by the location of the item within the physical storage space, will provide efficiencies.

Managing change during implementation

As you implement your solution, key change management elements must be kept in mind. Effective communications and training components are included as part of an implementation strategy.

At this stage, it is important to communicate new processes, new roles and responsibilities and any new rules governing the use and maintenance of the procedure card data.

A training plan should be in place to ensure existing and new staff members understand the process. The plan should include a review of an accepted and structured procedure and must also be provided for staff picking the case cart items. A methodology that supports a picking system, usually organized by location of the item within the physical storage space, will provide efficiencies. Be sure to emphasize picking the items on the pick list and checking off each item, as opposed to picking by memory, which can lead to errors.

1.6 MEASURING AND SUSTAINING IMPROVEMENTS

Controlling access

To maintain accuracy and consistency, access to procedure card data should be limited to a small number of people. This can be challenging since each service within the OR will usually have one person or more responsible for the development and maintenance of the procedure cards.

Planning ongoing maintenance and training

Procedure card optimization takes time. Staff responsible for procedure card maintenance must be provided with regularly scheduled time to complete this critical activity. Managers should budget time for staff to make procedure card maintenance a regularly scheduled task. Changes and updates should occur in the system as they happen to avoid manual 'write ins' or corrections. If procedure cards are not updated in a timely fashion, picking errors are likely to recur until the information has been corrected. Taking the time to conduct proper maintenance up front will prove easier than correcting errors after the fact. As the procedure codes change, existing and new staff members should be trained to understand these changes.

Measuring your project's impact

In many cases, data collection and measurement is a manual process and is often deferred due to the amount of work involved. Accurate procedure cards will enable a less chaotic environment, a reduction in product management effort, cost savings and most importantly, it will allow clinicians to focus on patient care.

It is of utmost importance, however, to be able to demonstrate these improvements by collecting data, at least for a period of time. This will help to build on success and provide compelling reasons to embark on the next project. Typically, procedure card management will result in the following benefits:

- Reduction in clean returns, restocking and/or wastage
- Reduction in case delays due to product or equipment non-availability
- Reduced turnover times
- Reduced amount of time nurses are leaving the operating theatre
- Reduced case cart picking times
- A potential reduction in SKUs[1] stored in MDR and the OR core
- Enabled inventory optimization.

---

1   SKU stands for stock keeping unit and is a number or code used to identify unique items.

Developing data for case costing and standardization

Ultimately, streamlined and accurate procedure cards will enable the hospital to move forward with a comprehensive case costing program and support future standardization efforts. In addition to providing required information for reporting internally or externally, the data yielded by properly managed procedure cards can be used to determine cost per case, cost per case per surgeon, and provide invaluable information to support standardization efforts.

This data provides the tool for dialogue and analysis to determine reasons for cost variability. There will always be a certain degree of variability based on technology, a surgeon's ability to use the technology, and the clinical requirements per patient. However, there is an opportunity to understand and quantify these differences through a standardization process.

Measure the following metrics to build a case for support on standardization:

• Number of common items used per surgeon by common procedure
• Number of unique items used by surgeon for common procedures
• Cost variability of common procedures by surgeon.

TIP: Look to standardize across services
Beyond a structured format and regular maintenance, the clinical and supply chain team can benefit from forming a committee that actively pursues opportunities for standardization of procedure cards across services. Ideally, the pick list portion of the cards could be standardized by procedure, and the differences by surgeon could be shown on the preference portion of the card. For more information on product selection and standardization see *Chapter 4. Product Selection and Standardization.*

1.7 APPENDICES

Appendix A: Sample Process Flow from OR Supply Chain Project

Hospital XYZ Operating Room Supply Chain (ORSC) Project: ORSC Process

Booking Clerk – OR

Surgeons' Offices Functions	Procedure Booking Function	Other Linked Functions

P1 Patient referred to Surgeon

P2 Online SBR created with patient demographics, diagnosis, procedure, number of hours required, and time of surgery (if known) for elective cases

P3 SBR saved and procedures enter ORSOS Entry Pending Queue in SHR

P4 Online SBR created for change

P5 Changes to booking(s) requested

DP1 Was change requested via SHR?

DP2 Was it a change or cancellation?

DP3 Was request made prior to 10:00am day before surgeries?

P6 Time change, or procedure change requested

P7 Request goes unnoticed as no system prompt re: Changes and Surgery Pending queue not reviewed

P8 OR Schedule List manually adjusted by OR Front Desk Clerk

P9 OR Front Desk Clerk contacts End Users

P10 Weekly online viewing of ORSOS Entry Pending Queue for following week's surgeries

P11 Booking requests printed from ORSOS Entry Pending Queue in SHR

P12 Procedures booked in ORSOS 1 week in advance using Block Schedule and printout of booking requests

DP4 Are there any changes/updates?

P13 Verbally confirm bookings with surgeon's offices 1 week in advance i.e. order of procedures, cancellations, information, patient time of procedure

P14 Booking(s) adjusted in ORSOS

P15 OR Schedule List printed 1 week in advance

P16 OR Schedule List printed and forwarded to OR Clinical Coordinator

P17 OR Schedule List collected from Front Desk drawer

DP5 Are changes/updates required?

P18 Adjustments made in ORSOS during course of week

P19 OR Schedule List filed for other adjustment notes to be documented during the week

P20 Daily review of notes on OR Schedule List

P21 Daily online viewing of Procedure Date Change, ORSOS Entry Pending and Cancelled Queues for next day's surgeries

P22 Daily check of messages and faxes for changes/updates to procedures for next day's surgeries

DP6 Are there any changes/updates?

P23 SBRs printed for surgeries

P24 Book new surgeries, adjust procedure dates, fill cancelled surgery times with new bookings in ORSOS

P25 19 copies of final OR Schedule List printed and delivered to OR Desk Clerk for posting in ORs by 10:00am for following day's surgeries

P26 Resource Nurses review Final OR Schedule List daily for information

P27 13 copies of final OR Schedule List printed and delivered to Day Surgery for pick up by units and Processing by 10:00am for following day's surgeries

P28 OR Schedule List faxed to Pre-Admit

P29 Trigger in ORSOS, printing of Preference Cards for next day's surgeries, on printer in Processing

Go To: 1 Instrument Auto

Go To: 2 Instrument Auto

P30 Block Schedule received

P31 Changes to bookings requested via phone from Pre-Admit Clinic e.g. intubation, universal precautions required

P32 OR Schedule List reviewed daily by Coordinator for next week's surgeries

DP8 Are changes required?

P33 Order of procedures adjusted according to Surgeon's schedule, change inpatient rooms available

P34 OR Schedule List reviewed by OR Clinical Coordinator and Anaesthesiologist to ensure proper utilization (no overbooking)

DP9 Are changes required?

P35 Adjustment(s) documented on OR Schedule List

P36 OR Schedule List signed off by OR Clinical Coordinator and Anaesthesiologist 6 days before surgeries

P37 OR Schedule List forwarded to Anaesthesia Admin Asst. for distribution to Anaesthesiologists

P38 Anaesthesiologists pick operating rooms – names written on List

P39 Anaesthesia Admin Asst. e-mails OR Front Desk Clerk with room picks for documenting on white board

P40 OR Schedule List placed in drawer at OR Front Desk

P41 OR Admin. Asst. and Chief of Surgery create Block Schedule template

P42 Block Schedule template to OR Clinical Team Manager for approval

DP7 Are there any changes/updates?

P43 OR Admin. Asst. and Chief of Surgery adjust template

P44 OR Admin. Asst. e-mails template to Service Chiefs

P45 Service Chiefs allocate blocks to Surgeons based on template

P46 Service Chiefs e-mail OR Admin. Asst. allocation details within 10 days

P47 OR Admin. Asst. inputs information into Block Schedule template

P48 Block Schedule e-mailed to OR Clinical Team Manager for approval

DP10 Are there any changes/updates?

P49 Block Schedule e-mailed to OR Admin. Asst. for adjustment

P50 OR Admin. Asst. forwards Block Schedule via fax to >100 End Users at least 12 weeks in advance

P51 OR Admin. Asst. forwards Block Schedule via e-mail to >100 End Users at least 12 weeks in advance

P52 OR Admin. Asst. forwards Block Schedule photocopies to >100 End Users at least 12 weeks in advance

Page 1

```
                                                              GYAVR-RA)

SURGERY DATE:  22/03/2010   START TIME:  12:00 AM   ROOM:
PATIENT NAME:  Manage Preference Cards             AGE:    DOB:
SURGEON NAME:
PROCEDURE:  ANTERIOR VAGINAL REPAIR
```

POSITION

```
POSITION: LITHOTOMY - ALLEN STIRRUPS
PREP: BETADINE        **ATTACH HIS "TABLE" (FOOTPIECE) TO BED
GLOVES: 7 1/2 ALOE       COGENT HEADLIGHT WITH LIGHT SOURCE IN ROOM
```

DRAPES

```
TVT PACK
TOWELS X 1 PKG.
GOWN -A9041 X 2
GOWN- A9515 X 1
BASIC SET
MINOR BASIN
```

OR SUPPLIES

```
PEANUTS
25 GA NEEDLE (1.5 INCH)-MITTON-SPINAL CUPBOARD
#18 2 WAY 5CC CATHETER
10CC SYRINGE
# 11 BLADE


DRESSING:  VAG PACKING,SM ABD PAD, NET PANTS
```

INSTRUMENTS

```
RUSSELL:WEIGHTED SPECULUM
        LONG PACKING FORCEP
        T-CLAMPS

MITTON: D&C SET FOR WEIGHTED SPECULUM & LONG PACKING FORCEP
        1 PKG T-CLAMPS
```

MEDS

```
MARCAINE 0.25% 1:200,000
FLAGYL CREAM
GENTAMYCIN 160 MG IN 100 CC'S SODIUM CHLORIDE
```

INVENTORY

Item Description		Srg	A#1	A#2	Comments
(ORMAIN,1002780	) SUT VCP269H 2-0 VICRYL ON CT-2	3			AVAILABLE
(ORMAIN,1002754	) SUT 884H 0 CHROMIC GUT CT2 27	2			VAG CLOSURE-PICK BOX
(ORMAIN,1002821	) SUT 632G 3-0 SILK ON X-1 CUT	1			LABIA-PICK BOX
(ORMAIN,0062422	) ELECTROSURG PENCIL 88-000001	1			
(ORMAIN,1007225	) SUT Y377H 2-0 MONOCRYL ON UR5	4			REPAIR

Appendix B: Procedure Card Samples from Bluewater Health Hospital – Before and After

After ORSC Project – Procedure Card sample 1

```
                                                              (GYAVR-RA)

SURGERY DATE:   23/08/2011    START TIME:  12:00 AM   ROOM:
PATIENT NAME:   Manage Preference Cards              AGE:      DOB:
SURGEON NAME:
PROCEDURE:   ANTERIOR VAGINAL REPAIR
```

INVENTORY

Item Description		Srg	A#1	A#2	Comments
(ORSUTURE,53708955	) SUT VCL+ 2-0 SA CT2 27IN COAT	3			
(ORSUTURE,53708636	) SUT CR GUT 0 CT2 27IN ABSRB	2			VAG CLOSURE-PICK BOX
(ORSUTURE,53725661	) SUT MCP377H 2-0 MONOCRYL PLUS	4			REPAIR
(OR STOCK,53725748	) PEN/A/VAC DISP ICM-000-0198	1			
(OR STOCK,0096598	) TVT PACK	1			
(OR STOCK,53708509	) GOWN SRG 2XL IMPERVS REINF	2			
(OR STOCK,53708514	) GOWN SRG LRG IMPERVS NREIN TWL	1			
(OR STOCK,53713541	) SPNG PNUT 20IN 3/8IN SML XRY	1			
(OR NONSTK,53704641	) NDL HPO 25GA 1.5IN REG BVL STR	1			
(OR STOCK,53713378	) CATH URTH BDX IC 18FR FOLY 2WY	1			
(OR STOCK,53712371	) SYR 10ML SLTP MEDCL	1			
(OR STOCK,53696183	) BLADE SCPL 11 C STRL	1			
(OR CORE,53696291	) DRSG TRANSP 12X10CM TGDRM	1			
(OR STOCK,53708563	) PCG WND 3YDX.2IN GZE STRIP	1			
(OR STOCK,53708931	) PAD DUPAD 23X12CM ABD STRL	1			
(OR STOCK,53700623	) BRIEF INCNT LRG XL WNGS PANT M	1			

INSTRUMENTS

Item Description		Srg	A#1	A#2	Comments
(INSTRUMENT,0114223	) OR TOWEL STERILE GREEN	1			
(INSTRUMENT,0113465	) OR TRAY MINOR BASIC	1			
(INSTRUMENT,0113471	) OR MINOR BASIN	1			
(INSTRUMENT,0113297	) OR SPECULUM WEIGHTED	1			
(INSTRUMENT,0113168	) OR PACKING FORCEP GYNE	1			
(INSTRUMENT,0113331	) OR T-CLAMPS PK 4	1			
(INSTRUMENT,0113295	) OR SPECULUM GRAVES LONG	1			POST REPAIR ONLY-USES BOTTOM 1/2 ONLY

MEDICATIONS

```
MARCAINE 0.25% 1:200,000
FLAGYL CREAM
GENTAMYCIN 160 MG IN 100 CC'S SODIUM CHLORIDE-PRE-MIXED FROM
PHARMACY
```

NURSING INSTRUCTIONS

```
PREP: BETADINE
CAUTERY: 30 COAG
POSITION: LITHOTOMY; ALLEN STIRRUPS; FOOTPIECE FOR PER TABLE;
HEADLIGHT
DRESSING: LG VAG PACK, SM ABD, MESH PANTS
```

After ORSC Project – Pick List sample

Page 1

```
Proc Date: 23/08/2011  Start Time:        () Room:
  Patient: Manage Preference Cards       Procedure: ANTERIOR VAGINAL REPAIR

         Doctor:
  Procedure(s): GYAVR       ANTERIOR VAGINAL REPAIR

  Inventory: INSTRUMENT INSTRUMENTS          (PHANTOM)

Location       Stock #    Stock Description          MANU #        QTY
---------      -------    ------------------         ------        ---
INSTRUMENT     0113295    OR SPECULUM GRAVES LONG                   1
                          POST REPAIR ONLY-USES BOTTOM 1/2 ONLY
INSTRUMENT     0114223    OR TOWEL STERILE GREEN                    1
SPD A2         0113471    OR MINOR BASIN                            1
SPD B2         0113465    OR TRAY MINOR BASIC                       1
SPD D3         0113297    OR SPECULUM WEIGHTED                      1
SPD D5         0113331    OR T-CLAMPS PK 4                          1
SPD E5         0113168    OR PACKING FORCEP GYNE                    1

  Inventory: OR CORE      BWH-0046 - OR STERILE CORE

Location       Stock #    Stock Description          MANU #        QTY
---------      -------    ------------------         ------        ---
03E01          53696291   DRSG TRANSP 12X10CM TGDRM   1626W         1

  Inventory: OR NONSTK   OR NON STOCK (PHANTOM)

Location       Stock #    Stock Description          MANU #        QTY
---------      -------    ------------------         ------        ---
OR NONSTK      53704641   NDL HPO 25GA 1.5IN REG BVL STR  305127    1

  Inventory: OR STOCK    BWH-0042 SPD OR

Location       Stock #    Stock Description          MANU #        QTY
---------      -------    ------------------         ------        ---
01D03          53696183   BLADE SCPL 11 C STRL       371111        1
02B02          53700623   BRIEF INCNT LRG XL WNGS PANT M  706M      1
02D01B2        53708563   PCG WND 3YDX.2IN GZE STRIP 4857          1
03D01A1        53708931   PAD DUPAD 23X12CM ABD STRL 87059         1
04C03          53713378   CATH URTH BDX IC 18FR FOLY 2WY  0165SI18  1
06D02          53708509   GOWN SRG 2XL IMPERVS REINF A9041         2
60             53708514   GOWN SRG LRG IMPERVS NREIN TWL  A9515     1
A 4            0096598    TVT PACK                   SMA30TVBHE     1
A04400         53712371   SYR 10ML SLTP MEDCL        301604        1
G 1            53725748   PEN/A/VAC DISP ICM-000-0198  ICM-000-0198 1
M06200         53713541   SPNG PNUT 20IN 3/8IN SML XRY  74712       1

  Inventory: ORSUTURE    BWH-0060 - OR SUTURES

Location       Stock #    Stock Description          MANU #        QTY
---------      -------    ------------------         ------        ---
01D05          53708636   SUT CR GUT 0 CT2 27IN ABSRB  884H         2
                          VAG CLOSURE-PICK BOX
```

Appendix C: Pick List Sample from Bluewater Health - After

After ORSC Project – Pick List sample

```
                                                              Page 2


Proc Date: 23/08/2011   Start Time:        () Room:
  Patient: Manage Preference Cards         Procedure: ANTERIOR VAGINAL REPAIR

          Doctor:
  Procedure(s): GYAVR        ANTERIOR VAGINAL REPAIR

  Inventory: ORSUTURE    BWH-0060 - OR SUTURES

Location      Stock #      Stock Description         MANU #           QTY
---------     -------      -----------------         ------           ---
02B04         53708955     SUT VCL+ 2-0 SA CT2 27IN COAT   VCP269H      3
03B02         53725661     SUT MCP377H 2-0 MONOCRYL PLUS   MCP377H      4
                          REPAIR
_____ MEDICATIONS _____

MARCAINE 0.25% 1:200,000
FLAGYL CREAM
GENTAMYCIN 160 MG IN 100 CC'S SODIUM CHLORIDE-PRE-MIXED FROM
PHARMACY
_____ NURSING INSTRUCTIONS _____

PREP: BETADINE
CAUTERY: 30 COAG
POSITION: LITHOTOMY; ALLEN STIRRUPS; FOOTPIECE FOR PER TABLE;
HEADLIGHT
DRESSING: LG VAG PACK, SM ABD, MESH PANTS
```

Chapter 2. Data Optimization

ONTARIO
HOSPITAL
ASSOCIATION

CONTENTS

CHAPTER AT A GLANCE

Having access to accurate and timely information is critically important in a health care setting. Inaccurate information can be harmful to every function it touches. While data optimization is an important part of supply chain optimization within a hospital, it is a key element to creating efficiencies in the perioperative environment, given the enormous volume of medical supplies, specialty products, implantable devices, and consumable supplies it requires. Moreover, having access to good data is also key to developing accurate case costing and effectively managing implant recalls.

Without standardized, accurate data, it will be difficult for you to properly implement other clinical supply chain improvements. As automation and integration occur, the errors in your data will prevent the flow of transactional information and impede your system's ability to synchronize data. Ideally, you should bring a systematic and standardized approach to data optimization.

For it to be successful, data optimization requires the participation of multiple and varied groups, both internally and externally. As such, this chapter also provides guidance on how to identify stakeholders and plan your project, as well as how to assess your current state and design your solution; how to implement your change; and how to develop training to support it as well as how to measure the benefits of the improvements you have made.

2.1 UNDERSTANDING DATA OPTIMIZATION

What is data optimization?

Data optimization is a logical, step-by-step process for improving the quality of the data stored in the item master files—the database that is at the heart of the hospital supply chain. These files are a catalogue of the product information hospital employees need to manage frequently purchased goods and services. To function properly, item master files must be accurate, consistent and orderly. The item master file is where data optimization begins.

Item master files are typically housed in the organization's enterprise resource planning (ERP) system, and/or in the materials management system. In some instances, the item master file could be contained in a paper-based storage system.

Depending on the process and the technological sophistication of your organization, the item master file can be a single file that resides in one system or many different files in several different systems (this chapter considers both scenarios). The project team should know where the hospital's item master file is located and how it is kept synchronized.

The ideal solution calls for a single item master file to serve all hospital departments. It should also be integrated with all other systems that require the information. (In the fall of 2011, ECCnet Registry, Canada's healthcare product registry (CHPR), managed by GS1 Canada, will be the source for standardized medical surgical product data provided by the suppliers and accessible by hospitals for populating their item master files.)

Why is data optimization important?

Without a firm foundation of quality data, hospitals can have difficulty performing basic data transactions and generating the reports required for tactical and strategic decision making. Also, business processes can become less efficient and more labour intensive. Having quality data, on the other hand, is essential for the efficient day-to-day operation of the supply chain (see Figure 1). Good data helps to plan, implement and measure supply chain improvements. It also supports clinical practices, ultimately enhancing patient safety and reducing medical errors.

Consignment Replenishment Cycle Example
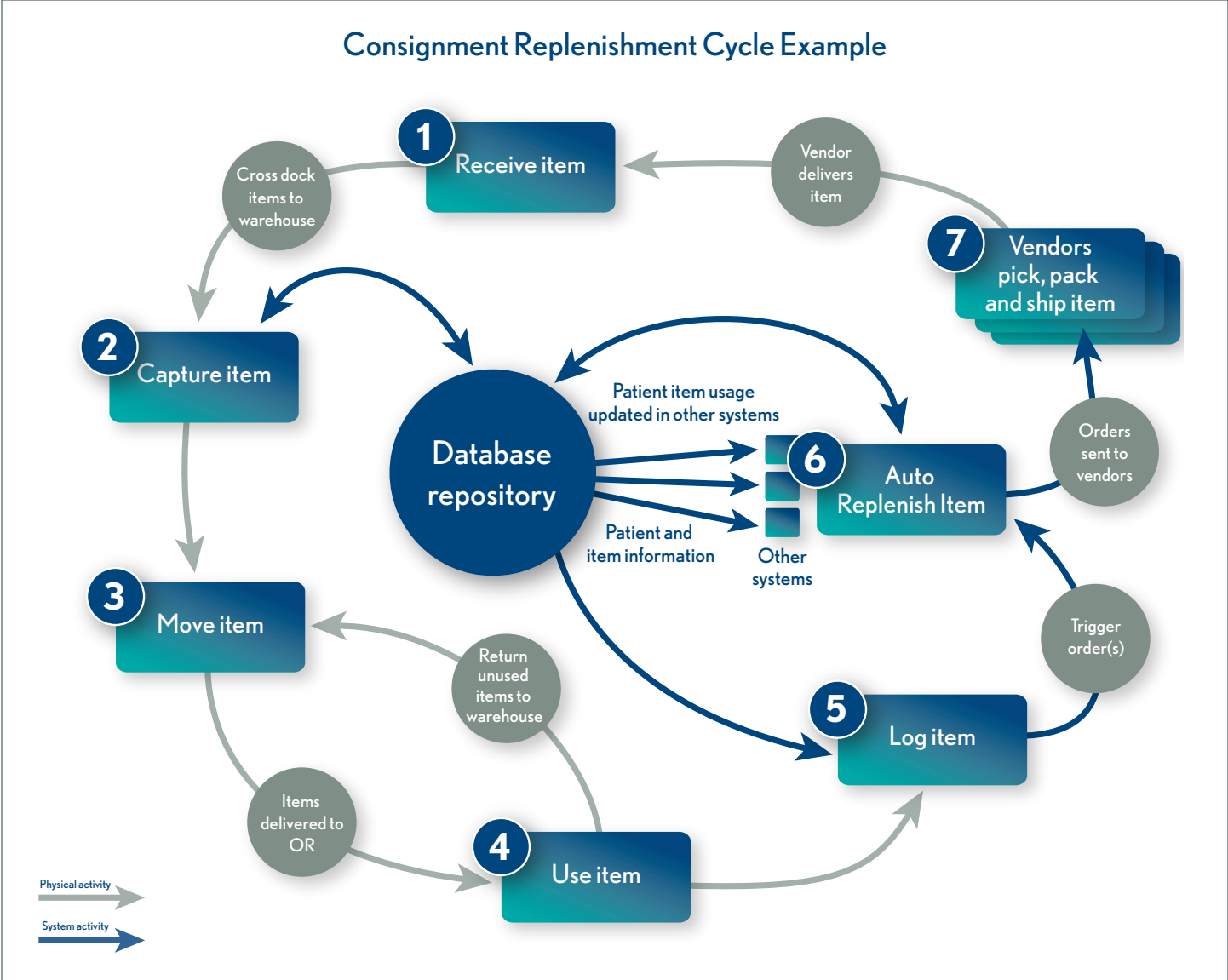
Figure 1: Data connects at various points within your organization and well beyond its walls, weaving a dynamic and complex web of information whose core strength is derived from the integrity of the data itself and how well that integrity is maintained. (Source: St. Michael's Hospital)

What causes poor data management?

Managing data is usually last on any department's list of priorities, often neglected in favour of activities yielding more tangible physical and financial gains. As a result, the quality of the data in many hospital supply chains is less than desirable, and its management an afterthought.

Staff responsible for the set up of new items should not be left to decide intuitively as to the structure of an item description, what fields are to be populated, or what attributes are to be associated with the item. Leaving this to the individual invites different interpretations of what is important. Over time, these differences can become so prevalent that maintaining the item master files will be overwhelming, at which point users will choose to simply fix associated errors rather than tackling the larger task of optimizing the files.

Common issues associated with data management include:

- Lack of external and internal data standards such as nomenclature, data structure, and little or no use of globally standardized product identifiers, such as the GS1 Global Trade Item Number (GTIN);

- Resource constraints where time is not scheduled or dedicated for file maintenance;

- System restrictions where character availability or limited fields prevent relevant information from being associated with an item; and,

- Lack of control over data files and over who is allowed to make changes.

Does your data need to be optimized?

While not exhaustive, the following list includes some typical indications that there are problems with the way in which the data in your hospital's item master file is managed:

1. **Non-standardized naming conventions.** Is there a lack of consistency in the names used for products and their attributes across the hospital's internal item master files and databases/applications? Between the hospital and its shared service provider? Between the hospital and its suppliers?

2. **Duplicate entries in the item master file.** Does the item master file have multiple entries, with slightly different descriptions or product numbers, for the same product?

3. **Obsolete entries in item master file.** Does the item master file contain entries for products that the supplier has discontinued or that the hospital has stopped using?

4. **Difficulty finding and ordering the correct product in item master file.** Do unclear descriptions, confusing abbreviations and a series of duplicate and/or obsolete data records make it difficult to find products in the item master file and place orders in a timely manner?

5. **Excess supply of seldom-used items or lack of storage space due to inaccurate historical usage data.** Do you have too many items in your storage location that you use only once in a while, e.g., less than once a year? Do you lack storage space for the items you really need to have on hand?

6. **High rate of obsolete products.** Does your storage location contain a high percentage of products that have passed their expiry dates?

7. **Takes too long to find the items you need.** Is it difficult to find the items you need when you need them because the labels on the items do not match the storage location labels?

8. **High levels of off-contract purchases.** Does your hospital frequently pay expensive off-contract rates for products that are already being purchased under an existing contract?

9. **High levels of invoice exceptions.** Does staff in accounts payable, receiving, and materials management spend too much of its time investigating and correcting exceptions?

10. **Receiving wrong items or wrong quantities of product when ordered.** Do you order a box of items and receive a single item? Do you have a high quantity of returns to either inventory or suppliers?

11. **Manual data entry errors.** Do you manually enter changes when a product is added, modified, inactivated or deleted? Does your hospital's process for manually entering data include validating the accuracy of the data?

Improved data accuracy reduces the chances of surgery delays due to stock outs, or because the wrong product was delivered.

What are the benefits of optimizing your data?

The largest gain that comes from optimizing your data is improved care. Hospital data that is accurate, current and comprehensive supports a high-quality and safe perioperative environment because clinicians spend less time ordering, locating and managing products, and more time on patient care.

Other benefits come in the form of improved accuracy. This can enable the implementation of technology that not only paves the way for reduced errors and less frequent stock outs but also for efficiencies in procurement and payment. These in turn can reduce supply costs, improve inventory management and replenishment, and contribute to a more productive workplace that will improve staff satisfaction. Most importantly, improved accuracy reduces the chances of surgery delays due to stock outs, or because the wrong product was delivered.

Data optimization also has broader applications. Figure 2, below, illustrates some of the benefits of accurate data. Essentially, all clinical supply chain improvements start with good data and therefore any procedural (including case costing), departmental, organizational, regional, systemic, or provincial improvements involving the use of medical-surgical products relies on a foundation of accurate, verifiable, consistent, and optimized data.

Data optimization facilitates many supply chain elements

| Performance Measurement (including case costing analysis) |
| System Interfaces & Data Synchronization |
| Procedure Card Review |
| Consignment Management |
| Automated Replenishment Stock, Non-stock and Consignment |
| OR Inventory Optimization |
| Electronic Ordering with Suppliers |
| Electronic Contract Management |

Figure 2: Opportunities arising from data optimization.

2.2 PLANNING YOUR PROJECT

As you begin planning, look for project management support to ensure all elements are organized and timelines are met. It is important to note that data optimization requires a unique skill set that may not exist within your hospital. You should also consider policy and procedure development, training and organizational support and how these elements will help to sustain the changes you are planning after implementation.

Key steps in a data optimization project

1. **Start the project.** This includes assembling the project team, determining stakeholders, and determining project risks.

2. **Assess your current state.** Assess your data systems and processes to gain a clear understanding of all the elements and how they work together. Identify how many item master files exist in the organization, determine which applications, departments/stakeholders, and vendors use the information, and determine the interfaces that occur between applications. This can be accomplished by extracting a sample to evaluate the state of the data, its integrity (i.e., its accuracy and completeness) and the extent of optimizing required.

3. **Design your solution.** Start by conducting research on leading practices and contact other hospitals/peers that have undertaken this type of project. Then, **define your requirements**. This step will help you establish how your medical-surgical data and item master file can best support your clinical and non-clinical business needs. It will also help you establish what will be the master source for all the data, the interfaces between applications, and which departments and vendors will be involved. You should also optimize your solution for your hospital. In other words, you should know what your hospital can undertake. For example, can you optimize the item master file in one system, or will you do it across multiple systems? Will it be optimized just within the hospital or will optimization include shared service organizations and/or vendor relations and maintenance of files? And finally, **map your solution**, that is, develop a model (i.e., diagram) that shows what the solution will look like. This model will provide the members of the project team with a clear direction for the task ahead. It will also serve as a tool for engaging stakeholders and encouraging their support and participation.

4. **Implement data optimization.** Optimize the data, identify the owners, develop training, develop a governance structure, etc.

5. **Maintain and sustain.** Ensure a data governance structure is used to continuously maintain quality data, and that ongoing training is developed to support the changes you have made.

Please refer to *Chapter 5. Project Management* for more information supporting some of the steps described above.

Think Ahead: Global GS1 standards for the health care supply chain.

A global movement is underway in the health care supply chain to adopt and implement data standards that will support patient safety and improve supply chain management. A growing number of companies, hospitals and health care organizations have chosen the GS1 system of standards to help them improve collaboration with their supply chain partners.

The Canadian health care sector is moving towards global, standards-based product and location identification through the Global Trade Item Number (GTIN) and the Global Location Number (GLN), respectively. The sector also identified the need for a national project registry. ECCnet Registry, Canada's healthcare product registry for medical surgical products, is a single point of access between health care trading partners providing access to accurate, perpetually updated information.

In Ontario and across Canada, group purchasing organizations (GPOs), shared service organizations (SSOs), hospitals and product suppliers are working collaboratively with GS1 Canada to implement standards and registries for health care. Health care providers implementing supply chain projects that rely on valid, accurate product data should engage GS1 Canada in the early stages of their project.

The Ontario Hospital Association has formally endorsed GS1 Canada's standardization efforts and the implementation and adoption of health care supply chain standards.

For more information about GS1 Canada and its standardization initiatives, see this chapter's *Appendix B: Quick Reference Guide to GS1 Standards* or go to www.gs1ca.org.

Forming your project team

Start by forming a steering committee that has a clear and concise project charter. The charter should state your objectives and ensure these are aligned with the organization's goals. Form a steering committee that will provide guidance on project progress and manage any conflict between groups, if required. To start, the steering committee will help to define the project team.

See *Chapter 5: Project Management* for more details on forming your project team.

Since this data optimization project will mostly impact clinicians, the project team's core should consist of clinical service leaders (i.e. nurses), but other groups must also be represented. All departments, business functions and external partners that will or could be affected by the data optimization project should be represented on the team. In forming your team, you should consider inviting representatives from the following areas:

- **Clinical departments:** clinical leaders, clinical supply coordinators

- **Business functions:** MDR (medical device reprocessing), procurement, finance, IT (information technology), etc.

- **External partners:** representatives from shared service organizations, GS1 Canada, and from third-party logistics firms.

Identifying your project stakeholders

Knowing who your stakeholders are and the key role they will play is an important part of designing a solution that will not only function well, but be universally accepted.

Determine the internal and external stakeholders of the project. They may include key vendors, department heads and users of the data. It is possible that additional stakeholders may be identified throughout the course of the project, e.g., system owners, additional vendors, etc.

> **TIP: Form a representative team.**
> Your project team should include representatives from every department that could be affected by the data optimization project. Remember that changes made in the item master file will be reflected universally throughout the organization.

Making changes to the item master files can impact a significant number of departments within the hospital. For example, a decision could be made to change the description of an item as part of a data optimization activity within one department, but once loaded into the item master files, other departments accessing the ERP system for that product will see a description they do not recognize. To avoid this, make sure all affected departments are represented at the nomenclature workshops. An analysis of the number of items that are purchased or used by more than one department is required to identify all stakeholders.

Ideally in the OR, integration between the OR information system and the ERP system would allow for incremental updates of item master file data to flow across to the OR system. In this scenario, it is common for incremental updates to be sent electronically every day from the ERP system to the clinical system.

Although this integration is the most efficient way to manage data changes between systems, it can be problematic if you do not take all users into account. Consider an OR system that generates procedure cards electronically. Here, changes made in the ERP item master file will come across to the OR item dictionary, which in turn will be reflected on the procedure cards. But if the MDR staff is unaware of these changes, it can cause significant issues when picking case carts. In this instance, when changes are made to item descriptions, be sure to change storage location labels in the MDR department.

Bearing in mind the breadth and scope of a data project, some of your stakeholders may include the following:

Senior Management. This group can provide support, approval and conflict resolution but will want to know the benefits of the improvements for the organization.

Surgeons. They will be more likely to adopt the new processes, if it is clear that the change will support their ability to perform their procedures without supply issues.

Clinicians. As champions for change, clinicians will directly benefit from improvements and will drive the project tasks.

IT department. It can provide system knowledge and will support automation.

Materials Management, Purchasing, Shared Service Providers and Finance. These groups will support data optimization efforts.

MDR department. It will be directly affected and should benefit from improvements with cost and effort reductions.

External partners. Consider shared service organizations, group purchasing organizations, third parties, and GS1 Canada, who can provide external support or data.

MDR will be directly affected and should benefit from data improvements through cost and effort reductions.

Ensuring your project success

Appropriate communication and training plans will be an important determinant to ensure your project's success. These should be developed to ensure that users of the data are not only aware of the potential changes to come, but also trained in how to work with and sustain the improvement.

Start by designing a project plan detailing realistic timelines and levels of effort for each project role (allowing for staff to take time from their regular duties to perform project work). This will ensure tasks are identified and managed. See this chapter's *Appendix C* for a sample project plan.

2.3 ASSESSING YOUR CURRENT STATE

TIP: Review your system.
Data optimization projects should begin with a detailed review of system structure to ensure the optimized data is built with the correct number of characters, and the elements are broken down appropriately. IT and other relevant data owners from various departments should participate in the system review.

TIP: Working with groups
Working group sessions could be facilitated by a project manager to assess the current state. All stakeholders should be represented to ensure all relevant systems and processes are included in the analysis.

Assess the current state of your data systems and processes to gain a clear understanding of all the elements and how they work together. All your current systems and processes should be mapped. This will help you clearly define preliminary requirements and identify gaps that should be addressed by your solution.

Reviewing your systems and processes

A system review involves identifying how many item master files exist in your organization and determining which applications, departments or stakeholders, and vendors use the information. It should also look at the flow of the data, i.e., where it is coming from and where it is going.

A process review is where the project team maps the current state. It should examine the 'How, When, Why and Who' of each process, and look to eliminate steps and activities that do not add value.

Processes to review may include the following:

- Data structure and nomenclature definition process
- New product 'setup' process
- Changing, adding, deleting or inactivating data process
- Process for communicating product data changes
- Process for changing storage location labeling post change
- Process for ongoing data change management
- Process for data synchronization between systems
- Suppliers process for communicating product data changes.

Conducting a current state assessment

To conduct a current state assessment, your team must collect information from various sources and properly document its findings. In your assessment, consider the following steps:

1. Identify systems across your organization (and/or within your shared service organization) that contain item or product information and determine whether the management of the files can be handled internally by the hospital, externally by a shared service organization, or both.

2. Meet with appropriate stakeholders to identify all relevant item master files. For each item master file, determine its purpose, who maintains it and who has access to it.

3. Determine if and how data is shared between item master files.

4. Document how your systems store, manage and transact data. Determine how data attributes are captured currently within your systems, including field sizes, formats (alpha/numeric) and any business rules or data translation rules that are used within the system to manage data.

5. Document all data storage processes, including item set up and attribute capture.

6. Review all current policies and procedures for data management and integrity.

When assessing your current state, meet with stakeholders to identify relevant item master files. For each item master file, determine its purpose, who maintains it and who has access to it.

2.4 DESIGNING YOUR SOLUTION

You can start to design your solution by conducting research on leading practices and by contacting other hospitals/peers that have undertaken this type of project. Through your research you will be able to determine the best master source for all your data as well as understand the interfaces between applications, and which departments and vendors will be involved.

Then you can develop a map of your solution that will provide the project team with a clear direction of the tasks ahead. This map can also serve as a tool for engaging stakeholders and encouraging their support and participation. It can also be used to develop internal policies and procedures for data management.

Prior to developing internal policies and procedures for data management, you should clearly define your requirements. These will guide the project in terms of what each stakeholder group needs to perform their part of the process and meet their business objectives.

Beyond that, requirements also serve to illustrate how data is used by all stakeholders. In knowing this, your project is less likely to make changes that prevent a stakeholder from obtaining specific information. The following section examines each stakeholder's data requirements in more detail.

Defining your requirements

Your research on leading practices and processes will allow you to determine the specific requirements most relevant to your organization. Among these, you are likely to have found requirements in some of the following areas:

☑ Procurement	☑ Clinicians and End Users
☑ Strategic Procurement Data	☑ Product Management
☑ Logistical and Inventory Control	☑ Data Governance and Ownership
☑ Systems and Applications	☑ Policies and Procedure
☑ Workflow	☑ Training
☑ Vendor	☑ Reporting
☑ Regulatory	☑ Other

Procurement Requirements

To create purchase orders, send electronic orders and create receiving transactions, both the hospital and the supplier will need data they can understand. If the data is incorrect when the purchase order is generated, all subsequent transactions will create exceptions that will need to be manually investigated and corrected. Having accurate item master file data also supports other financial transactions associated with invoicing and payment.

Strategic Procurement Data Requirements

The item master file is a source of information that facilitates strategic decision making. Optimized data within the item master file can support analysis and management of supplier performance and provide consistent usage data to identify cost-saving opportunities.

Logistical and Inventory Control Requirements

The data contained in the item master file plays an essential role in all areas of supply chain logistics. Procurement and receiving, for instance, would not be possible without accurate product and supplier information. Similarly, replenishment of end-user storage units requires PAR-level data, and warehouse replenishment depends on minimum/maximum-levels and shelf location data. There are other efficiencies to consider as well. An optimized item master file that includes, for example, the product-attribute information that appears on a product label, would provide greater efficiency and create a process less prone to error, resulting in improved patient safety.

Systems and Applications Requirements

In health care, data is typically managed at a departmental level rather than at an organizational level. As a result, hospitals tend to have disjointed database systems, each using different data storage systems, different naming conventions and different product description fields. When designing your solution, be sure to consider interfaces with external partners, e.g., shared service organizations. Data management and control can be significantly improved by adopting a standardized data format and synchronizing all product information with a central item master file, which ideally could be synchronized with a national product registry, such as ECCnet Registry, managed by GS1 Canada.

> **TIP: Accurate transactions can lead to supplier discounts.** Health care organizations must execute their procurement transactions accurately and on schedule according to supplier contracts in order to obtain the highest possible service levels from suppliers and capture early-payment supplier discounts.

Workflow Requirements

Each department and business function will be required to adopt the same data management policies and procedures. The procedures should be embedded in appropriate processes and workflows that all departments can follow. There are two ways for organizations with decentralized data systems to consolidate their data. One is to create a single centralized item master file and the other is to create a logical data repository to which multiple databases are linked and where all the data can be synchronized.

Vendor Requirements

Vendors are the primary suppliers of the product information contained in item master files. The data elements they supply include catalogue numbers, Global Trade Item Numbers (GTINs), pricing information (e.g., list pricing, agreement or contract pricing), packaging strings and default lead times. Suppliers also provide necessary information about themselves, including name, address, contact data and standard payment terms.

Regulatory Requirements

Health Canada, through its Therapeutic Products Directorate and Establishment Licensing Unit, regulates the sale of medical devices. Medical device manufacturers are responsible for maintaining the licensing status of their devices.

However, hospitals are required to document their use of these devices. In particular, the hospital purchasing system must store medical device class and license number information at the item master file's 'item level'. The hospital purchasing system must also store supplier establishment licensing information, including the supplier license number and the medical device classes for which the supplier is licensed.

Clinicians and End User Requirements

Clinicians and other end users require products to be available when needed. They should also be stored neatly in a specified location and be easily identifiable. The use of standardized product descriptions, standardized product

categories and identifiers like the GTIN will significantly reduce the time spent searching for items in product catalogues and storage locations. Embedded in barcode symbology, the GTIN ensures one product or packaging size is not confused with another.

Product Management Requirements

Physical goods are typically classified by the inventory management and asset or expensing models applied to them. In an item master file, there are two types of product data.

The first type, which includes product description, supplier catalogue number, GTIN, and price, has to do with the item itself. The second type has to do with how the item is classified and managed by the hospital's supply chain, i.e., is it stock (kept in inventory), non-stock or direct (ordered directly from the supplier and delivered to the department), or consignment (products that are owned by the supplier until used)? For each product classification, specific supplementary data elements such as serial numbers, lot numbers, stock room data and PAR levels are also needed.

All items ordered on a regular basis, whether stock, non-stock or consignment, should be assigned to a storage location that is entered in the item master file. This supports location-based item scanning with associated order generation, allowing the system to determine the item's source.

Data Governance and Ownership Requirements

In an ideal solution, your hospital would have a single item master file connected with ECCnet Registry. This item master file would be housed in the hospital's ERP system.

It would be programmed to automatically 'push' updated product information received from ECCnet Registry to other hospital databases, such as the item dictionary files in the clinical information systems. This future state would require connecting the ERP system to all of the other information systems involved.

TIP: Everyone should know about item name changes. If you are considering nomenclature changes that will affect clinicians, it is important to involve them in the changes and provide adequate training. Nomenclature not easily understood by clinicians can compromise patient safety.

TIP: Understand who maintains consignment data. The perioperative department should be clear about who will maintain consignment data. Data maintenance requirements agreed to with your shared service organization might only add items that are ordered a specific number of times in a year. Consignment items like implantable screws and plates might not qualify. As such, they may not be loaded automatically even if the shared service organization is maintaining its end of the item master file.

During the planning of data optimization projects, it is important to give all stakeholders the opportunity to provide input. The information systems and information technology departments need to be involved in the development of the data management strategy as they will be able to provide an understanding of how the data must be structured as well as the technical limitations of its systems.

Policies and Procedure Requirements

Once your hospital has optimized its item master file it will need a structured policy to manage the database and monitor compliance. But until a central registry is available and integration between systems occurs, data updates and maintenance must be performed manually. This can be extremely time-consuming and several employees from different departments must be involved to keep the data current and consistent.

Typically, item master files are managed by the same staff responsible for sourcing and procurement. They may be employees of a shared service organization, from your hospital's own purchasing department, or both. Clinical systems data, on the other hand, tends to be maintained by staff within the individual clinical departments. Regardless of who has been appointed to perform which updates, you should have organizational policies and procedures in place to structure and govern the process.

Training Requirements

A training plan should ensure everyone who manage the data, and are working with the various systems, follow a standard procedure. Any major change to nomenclature must be communicated to end users so they can recognize the products when searching electronically. Remember, if product descriptions change, shelf labels must also be changed to reflect the new description; otherwise there will be discrepancies between what is in the electronic information and what is on a shelf label or any other paper-based description.

Reporting Requirements

Other reporting vehicles will be affected when data is changed. Consider what existing reports are used in the organization, e.g., financial reports, case costing.

Other Requirements

There could be other requirements specific to the organization, departments and project. If, for example, an organization intends to implement electronic data capture in the future as part of its data management strategy, the item master files would require data fields for additional data elements, such as the GS1 GTIN.

Mapping your solution

Once the project team has identified your hospital's current data systems and processes and achieved a clear understanding of your requirements, the next step is to map a solution. This provides a visual means for all stakeholders to review, discuss and agree on the proposed model.

When designing your solution, consider how you will incorporate supporting technologies and how you will link information systems to allow for automated data synchronization. Knowing this in advance will eliminate time-consuming manual processes and reduce the potential for data error in the future.

With your requirements now defined, you can look to understand which data attributes (e.g., vendor code, weight, usage analysis) should be collected and maintained in the item master file to support the improvements.

When designing your solution, you must assess system capabilities and limitations, including the number of available fields and the number of characters allowed in each field.

TIP: Items to consider when designing your solution:
- Is there variability in the number of characters between systems? If so, decide on how to manage this?

- Do you have to standardize abbreviations and shorten descriptions by reducing the number of characters?

- Review available fields and decide which fields will be populated.

- Know which fields and attributes will be used to support the impending supply chain improvements.

- Understand the standard data attributes currently available (such as the attributes listing developed by GS1 Canada) and use them to help you design your solution.

TIP: A shared understanding of the future state eases implementation.
Collaborative agreement among all stakeholders on the future state facilitates change management and ease of implementation.

2.5 IMPLEMENTING YOUR SOLUTION

Implementing data optimization is best understood in terms of two phases. The first requires extracting a data sample and optimizing it to establish a standardized set of naming conventions. When this first part is complete, you will only have standardized data in a single database. The second phase involves populating other databases with the accurate data. This synchronizing of data must be done both internally with other departments and databases, and externally with vendors and shared service organizations.

Optimizing a data sample

1. **Extract a sample from your item master files.** Pull the data for all items purchased by the OR (associated with the OR cost center) in the last 24 months from the ERP system. This procedure should be performed across each site and consolidated to one file. The extract should include:

    - Description
    - Vendor information
    - Product code
    - Manufacturer's code (if available)
    - GTIN (if available).

    You can extract into a spreadsheet file using a database as this will make searching and sorting much easier.

2. **Sort the sample data.** Start by grouping all the descriptions that are the same and saving the file. Sort it again in a new version, this time by supplier, and save the file. Now sort it a third time by product/manufacturer's codes. Eliminate (or 'scrub') the item data that is duplicated until you have accurate file containing all your products listed only once.

3. **Determine the quality of data.** You can do this by measuring the following:

    - Items not purchased within period specified and slated for inactivation.

    - Discontinued items. (Is there still product on the shelf? If so, can it be returned to the vendor? Have clinicians been notified that the product will no longer be ordered?)

- Items that are missing or require updating of descriptions, packaging strings, vendor product codes, etc. (You will know this if the purchase history shows a purchase, but the item is not catalogued in the item master file.)

- Items and vendors that are duplicated.

- Items that require updates to vendor names and addresses.

- Similar items that are purchased from multiple vendors.

- Items that are considered 'slow move' based on usage. (Is it required to be on site? It is used less than once a month? Can it be inactivated?)

TIP: Extract 24 months of historical data.
Usage/issue history is required for stock items, and purchase history is required for non-stock and consignment items. Extracting 24 months of historical data will ensure you have captured less frequently used item information.

Product Rationalization
Collaborate with stakeholders to define the basic characteristics of each product type (stock, non-stock, consignment, and slow- to no-move). Be aware that, as ERP systems have evolved, new options have become available for managing items. These options can influence whether an item will be stocked and distributed out of the regional warehouse or ordered directly by the clinical department and stored on site. To qualify for stocked status, an item should:

- Be available for purchase on contract;
- Have been approved as a standardized item;
- Have had a minimum of 13 to 16 inventory turns based on the unit of purchase within a 12-month period; and,
- Be used by a minimum of three departments.

As part of the analysis, you may decide to change non-stock items to stock, or stock items to non-stock. Product evaluation and value analysis committees should incorporate these criteria into their assessments of new products.

Please see *Chapter 3. OR Inventory Optimization for more information.*

Figure 3 (screen capture of a 50-column hospital item master file):

Shared Service/Hospital Information | **Item Status Information** | **Item Attribute & Element Information**

SHARED SERVICE OR HOSPITAL	HOSPITAL OR CAMPUS	"NEW", CHANGE" OR "INACTIVATE" EXISTING ITEM?	INVENTORY CATEGORY (STOCK, NON-STOCK OR CONSIGNMENT)	ITEM NUMBER (INTERNAL HOSPITAL NO.)	ERP/MMIS ITEM DESCRIPTION (OLD) *Full Description*	ERP/MMIS ITEM DESCRIPTION (NEW) *Full Description*	DESCRIPTIVE ELEMENT #1	DESCRIPTIVE ELEMENT #2	DESCRIPTIVE ELEMENT #3
				052442	ZENITH AAA ENDOVASCULAR GRAFT	^^^^^^^^			
				049009	SCREW SELFTAPPING 17MM AC CON	^^^^^^^^			
				057818	TORIC LENS	^^^^^^^^			

Expense/Account Code Information

DESCRIPTIVE ELEMENT #4	DESCRIPTIVE ELEMENT #5	DESCRIPTIVE ELEMENT #6	DESCRIPTIVE ELEMENT #7	DESCRIPTIVE ELEMENT #8	DESCRIPTIVE ELEMENT #9	DESCRIPTIVE ELEMENT #10	EXPENSE/ACCOUNT/MIS CODE	EXPENSE/ACCOUNT/MIS CODE DESCRIPTION	COMMODITY, CATEGORY CODE	COMMODITY, CATEGORY CODE DESCRIPTION	UNSPSC CODE	UNSPSC CODE DESCRIPTION
^	^	^	^	^	^	^	4607030					
							4602403					

Expense/Account Code Information | **Item Attribute Information**

EXPENSE/ACCOUNT/MIS CODE	EXPENSE/ACCOUNT/MIS CODE DESCRIPTION	COMMODITY, CATEGORY CODE DESCRIPTION	UNSPSC CODE	UNSPSC CODE DESCRIPTION	SERIAL CONTROLLED If "YES" = At Receipt. Otherwise "BLANK"	LOT NO. CONTROLLED If "YES" = At Receipt. Otherwise "BLANK"	EXPIRABLE ITEM? "YES" if applicable. Otherwise "BLANK"	Latex Content (L = Latex, NL = Non-Latex)	Purchasable? Yes if this item will be purchased at ANY time	Is ITEM on CONTRACT? "YES" if applicable. Otherwise "NO"
4607030										
4602403										
4603201										
4602901										
5603104										

Vendor Information | **Manufacturer Information**

VENDOR NAME	VENDOR CODE	GLN CODE *if Any*	VENDOR CATALOGUE NO.	UOP	UOI	CONVERSION RATE (PKG STRING)	MANUFACTURER GENERIC if Unknown	MANUFACTURER CATALOGUE #
COOK			TFLE-24-73-ZT					

Manufacturer Barcode Information | **Mdall Information**

UPC CODE (UOP)	UPC CODE (UOI)	HIBC CODE (UOP)	HIBC CODE (UOI)	GTIN CODE (UOP)	GTIN CODE (UOI)	MEDICAL DEVICE CLASS	MEDICAL DEVICE LICENSE NO.
MANUFACTURER	MANUFACTURER CATALOG						
SYNTHES (CANADA) LTD.	242.464						
MEDTRONIC OF CANADA	4076-52	N/A	N/A	N/A	N/A	01008850741015 901711040721BB L396021V	01008850741015 901711040721BB L396021V
ALCON	8065-9932-45	N/A	N/A	N/A	N/A	01103806599324 5510673560M	
BIOMET MICROFIXATION	159594	N/A	N/A	N/A	N/A	01050192797864 04	01050192797864 04
TELEFEX MEDICAL	183405240	N/A	N/A	N/A	N/A	01040267043014 61	N/A

TIP: A solution for serialized items.

If the project is to manage serialized items, the field that flags serialization must be recognized in the system to trigger certain checks and balances throughout the supply chain. If this flag is turned 'on', a serialized item cannot be received, replenished or used without the serial number being scanned or entered in the system. Other examples of attributes include: latex content, expiry controlled, special storage requirements, storage locations, etc.

Figure 3: This screen capture shows a 50-column example of a hospital's item master file. The data attributes collected here are based on that particular hospital's functional requirements. While you should let the objectives of your solution help guide your selection of attributes, many hospitals have found the following categories most useful:

1. Shared Service Organization/Hospital Information
2. Item Status Information
3. Item Attribute and Element Information
4. Expense/Account Code Information
5. Vendor Information
6. Manufacturer Information
7. Medical Device Information.

See this chapter's *Appendix D* for the larger scale version.

Data Attributes

Functional Areas:	Manufacturer Name	Manufacturer Code	Medical Class No.	Medical Device License No.	Vendor Code or GLN	GTIN	Lot/Batch Controlled	Serialized	Expiry or Expiry Flag	Commodity Code e.g. UNSPSC	Cube	Weight	Usage Analysis	Sourcing (Stock vs Non-Stock
Contract Management	✓	✓	✓	✓	✓	✓	x	x	✓	*	*	*	✓	✓
EDI					✓	✓	✓	✓	✓					
Inventory Optimization							✓	✓	✓	✓	✓	✓	✓	✓
Cart Optimization	✓	✓							✓				✓	✓
Bar Coding - External (Manufacturer)		✓			✓	✓	✓	✓	✓					
Bar Coding - Internal (Hospital Generated)		✓			✓	✓	✓	✓	✓					
Labelling		✓							✓					✓
Consignment Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Procedure Card Review													✓	✓
System Interfaces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓
RFID	✓	✓			✓	✓	✓	✓	✓					✓
Reporting/Metrics										✓			✓	✓

✓ = Required
x = N/A
* = Optional

Figure 4: This screen capture shows a sample table of attribute selection based on the requirements of your solution. The first column on the left contains specific supply chain improvement projects, or Functional Areas, and the row across the top contains a list of the item master file, Attributes. In undertaking a Procedure Card Review, for example, the data attributes you will be collecting will include Usage Analysis and Sourcing.

4. **Remove all 'miscellaneous' items.** Anything not associated with stock, non-stock or consignment items are considered out of scope for this project. These can include:

   - General office supplies
   - Repair and replace agreements
   - Maintenance or service agreements
   - One-time purchases.

5. **Check your sample.** Verify that all pertinent attributes and fields have been included in the extract:

   - Units of measure
   - Units of issue
   - Units of purchase
   - Packaging strings
   - Product codes.

Note that ANSI X12 EDI Allowable Units of Measure and Codes can be used for standardized approach to aforementioned fields.

Please see Figures 3 and 4 earlier in this section for samples of project types and data attributes.

6. **Collaborate with stakeholders to establish nomenclature standards.**
   To complete this step, you will need to understand the nomenclature requirements of the various item types: stock, non-stock, consignment, trays, single instruments, linen basins/hardware. If groups disagree over a description, side with the description that is closest to what is listed on the product packaging. One common identifier is the manufacturer's product code. Regardless of which distributor it is purchased from, the manufacturer's code will remain the same. It should always be used in the appropriate field.

   A review of nomenclature standards should be incorporated in the process as a guide. Consider reviewing the *Canadian Healthcare Product Description Standardization Implementation Guidelines*, published by GS1 Canada. And while standardizing is the goal, you should recognize that description variances are sometimes necessary depending on the clinical service and what information needs to be visible in the description.

To create nomenclature standards:

Start by standardizing naming conventions. Establish a structured set of naming conventions for the product data used throughout the hospital. This step is challenging because different hospital departments and suppliers often have their own names for the same products and product attributes.

Then create product descriptions. These should be straightforward and concise. It will make the item master file easier to use and simplify searches via keywords.

> **The following is a logical sequence of product descriptions that can be applied to all stock and non-stock items:**
> 1 Product type (noun)
>   2 Product name (adjective/product descriptor)
>   3 Common descriptive element/variant (brand name, size, side)
>   + Other descriptive elements/variants (colour, latex,
>   disposable/reusable, sterile/non-sterile)
>   + Further details (package type)

(NOTE: For tables showing examples of the typical categories of product that may be set up in the item master files, see Appendix A for this chapter.)

Remember that typically, these items will be part of a procedure card and pick list, so it is important that pertinent information (e.g., size) is not compromised or lost due to character limitations in the item dictionary. Ensure that clinical information is listed at the beginning of the description and therefore immediately visible.

This logical sequence may be unsuitable for consignment items, which often include a range of products, many with attributes requiring specialized descriptions.

7. **Rewrite descriptions.** Do so according to the solution you designed and the requirements you have identified.

   When rewriting descriptions, be sure to recognize and correct the following:

   - Incomplete vendor and/or product information
   - Non-standard vendor names
   - Vendor product numbers with missing information or additional characters
   - Improper product descriptions and/or abbreviations
   - Product descriptions that are not normalized or are missing attributes
   - Unclassified products.

   During the process of defining a supply chain's future state, consideration must be given to the requirements described earlier in this chapter. Appropriate business rules will have to be implemented to support these requirements.

8. **Identify obsolescence.** Look for items no longer available but that are listed as active manufacturer items. Update the item status to 'inactivated' or delete it from the item master file where possible. (Most ERP systems will only let you delete an item at certain intervals, which usually coincides with the end of a fiscal year.)

9. **Identify redundancies.** Look for similar products being purchased from multiple vendors across services, departments or facilities, and bring these to the attention of the purchasing department.

10. **Consolidate transactions.** Consolidate the transactional activity for each common item identified.

11. **Re-examine sourcing.** Based on your agreed-upon criteria, determine whether the item will be stock, non-stock or consignment. And following an analysis of usage or issue, purchase history and product rationalization, key decisions can be made about item sourcing. An item previously classified as a stock item could be reclassified as a non-stock item, and vice versa. The information derived from the analysis also supports decisions about vendors. Items previously sourced from multiple vendors could be contracted to a single vendor.

12. **Format the data.** Do so based on the requirements of the hospital's ERP system. Be sure that you have assessed all item master file information, especially pricing and lead time, and also ensure you have quality checked all your information.

13. **Apply your data rules to other databases.** At this point in the data optimization process, you have established a standardized set of naming conventions and optimized the data in at least one hospital database. Next, you must implement the same naming conventions and data optimization process across all of your hospital's databases, including the central item master file, all departmental item master files and all vendor item master files. Once this task is completed, it is time to synchronize the data. Note that where any product data will need to be integrated with clinical data, the product data will need to comply with Health Level Seven International (HL7) standards.[1]

Synchronizing your data

Internal Synchronization

In their executive primer entitled *Data Synchronization in Healthcare: A Solvable Problem,* authors William L. Rosenfeld and John L. Stelzer explain that, "Internal synchronization ensures that item and partner data are consistent throughout the organization. It enables humans and business applications to access and act upon information that does not vary from system to system, database to database, department to department, division to division, and so on."[2] To this end, they offer some of the following advice:

1. For each data storage location within the hospital, it is necessary to identify:

   • Every business application that uses any of the data elements;
   • Every point where any of the target information elements can be modified; and,
   • Every person and position that has the opportunity to modify the data.

Key rules for maintaining data consistency include:
• When an attribute is common to multiple products, describe it the same way every time it appears.

• Align all technology systems that hold descriptions (or through which information passes) to ensure that product descriptions remain the same (are not edited or converted to meet other system requirements). This extends to the systems of suppliers and other outside partners.

• Apply consistent rules for product descriptions at every point of data entry. (Generally, it is easier to maintain consistent data when there is only one point of data entry.)

• Apply consistent values for each data field. Using the same range of characters and exclude the use of others characters such as: $, #, @.

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1 HL7 refers to the seventh level of the International Organization for Standardization's (ISO) seven-layer communications model for Open Systems Interconnection (OSI). It is the application level.
2 Source for Internal Synchronization section: "Data Synchronization in Healthcare: A Solvable Problem"; An executive primer by William L. Rosenfeld and John L. Stelzer, Sterling Commerce, 2006.

2. Armed with this knowledge, you are now prepared to develop procedures that:

- Control who makes adjustments to the data and how they are made; and,
- Co-ordinate updates so that the adjustments occur across all your databases.

Data Loading

When data is optimized, all attributes are agreed to and it is populated in the spreadsheet or database, it is time to load the data back into the master item files. You will most likely require IT support to facilitate the automation of this task and ensure the files are not corrupted during the data load. You have two options when it comes to deciding which systems will be populated:

- **Option 1.** In this option, all applications that house item master file information will be uploaded with the optimized data separately. This requires a manual change management process to be initiated immediately to keep all systems in sync.

- **Option 2.** The second option is to build either full or limited interfaces between the ERP item master files and all other applications that require all or a portion of the same information. The optimized data can then be loaded into the one system with allowances for updates every 24 hours for incremental changes to the other systems. This option elects to keep the organization's various internal data stores in sync with a central data of record. Very often, the cost of developing the interfaces is minimal compared to the manual work of keeping distinct data bases synchronized.

External Synchronization

Once your system is keeping all of the target information elements in sync internally, you can start external synchronization, which is linking with suppliers and other external parties such as regional warehouses or shared service organizations. Here, both the buy and sell sides of the relationship must be synchronized, and both parties must be in agreement on the correct values for each of the information elements or attributes they wish to keep in sync.

There is a high likelihood that the two parties will find a number of discrepancies with the values each believes to be 'the truth'. The hospital and vendor must each agree on what the correct value should be for each information element that is found to be 'out of sync'. Once the GS1 Canada-managed ECCnet Registry is available, it may serve as the central source for accurate data, helping to synchronize data between suppliers and health care providers.

When synchronizing information, there are four categories of information 'truths':

- What is globally true for all subscribers (buyers).
- What is true for all subscribers in a particular industry or trading community.
- What is true for all subscribers in a particular target market (e.g., geographic area).
- What is variable for each relationship, i.e., from partner to partner.

For information that is not different for each party, the vendor usually establishes what the 'truth' should be since the vendor is the source of the item. For information that is specific to your hospital (e.g., price, saleable unit, allowances or charges, etc.), the values agreed upon are often negotiated and therefore will be different per hospital.
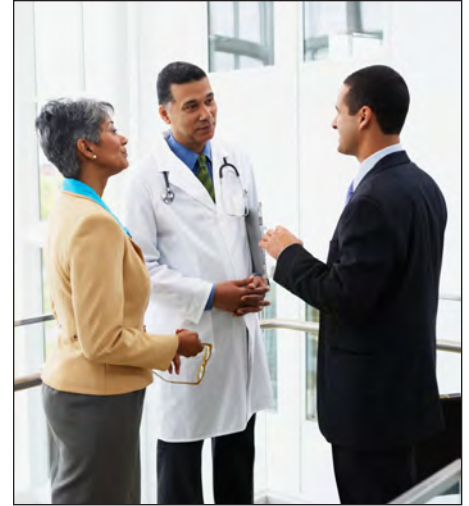
The hospital and vendor must agree on what the correct value should be for each information element that is found to be 'out of sync'.

Clinical Specialty Supply Chain Solution – Interfaces

Interfaces Overview

1. Misys CPR (UHN ADT) system will send HL7 TCP/IP real-time patient data to the CSSC system.
2. Real-time bidirectional control data feed required between Operating Room Scheduling Office System (ORSOS).
3. Real-time data feed from CSSC system to CathCor. The CathCor system will File Transfer data to the CSSC system at a pre-scheduled time.
4. File transfer will be required between the Paceart system and CSSC.
5. Optimal solution, a real-time bidirectional interface between Plexxus purchasing system and CSSC. Near real-time batch data feed every 60 minutes will meet the minimum criteria of the project.

Comments

It is the intent of this project to exchange data with the Plexxus ITS system. The CSSC RFP process will present the most feasible vendor solution for data exchange between the Plexxus system and the CSSC system, whether it is real-time data exchange or batch data file transfer exchange.

Figure 5: This figure illustrates the interfaces between systems from the hospital (by service) to the clinical supply chain system, through to the shared service organization (Plexxus) and its vendors. *(Source: University Health Network, Toronto)*

Ongoing synchronization between vendor and hospital

Once external synchronization is complete, you must ensure ongoing synchronization. See Figure 5 for an example. This involves the following:

1. The seller (the source) must always notify the buyer (the recipient) when there has been a change to one or more of the information elements that the parties are trying to keep synchronized.

2. Information between parties must be regularly updated either electronically (best) or manually.

3. When changes occur, the source must ensure the recipient understands, agrees with, and has implemented the change.

The mechanisms by which this source/recipient interchange takes place will vary by industry sector implementation. They range from a direct information exchange between sources and recipients to the use of a global registry for ID and standards policing. They may or may not include one or more intermediary service provider and allow for several of the internal functions to be handled in a hosted (rather than in-house) setting.

Regardless of how the source and the recipient connect with one another to keep their data stores in sync, each must complete the internal, external, and ongoing synchronization stages described above. With mechanisms in place to ensure that all internal data stores remain in sync, first within each organization, and second between each organization, the interchange approach can be initiated.

It should be noted that any data synchronization approaches that do not use some sort of central repository or product data utility rely solely on the willingness of all participants to voluntarily follow the standards established for that community. This 'honour system' approach has typically met with varying degrees of failure. Consider an approach that relies on a single central registry, such as ECCnet Registry. It will be easier to enforce adherence to agreed-upon standards.

Gains in efficiency as a result of this project should generally offset the effort in maintaining the data now and in the future.

Managing change during implementation

As you implement your solution, key change management elements must be kept in mind. Effective communications and training components should be included as part of an implementation strategy.

During implementation it is important to communicate new processes, new roles and responsibilities and any new rules governing the use and maintenance of the item master file. A training plan should be in place to ensure existing and new staff members understand the process to support and maintain the item master file.

2.6 MEASURING AND SUSTAINING IMPROVEMENTS

Measuring your project's impact

There are a number of metrics that can be used to determine the benefits of data optimization. It is important to determine the success of the project by obtaining baseline metrics at the start of the project, and once the project is completed to collect the same metrics. These should include:

- Number of records extracted and number deleted
- Number of items optimized
- Reduction/inactivation of SKUs/catalogued items
- Number of times item master files were reviewed on an ongoing basis.

Sustaining the change

Change management and ongoing maintenance

During the data optimization process, from the time the data is extracted for optimizing until it is loaded back into the item master file, there will be an ongoing need to add or modify item information. Therefore, it will be necessary to implement a temporary procedure with stringent controls to track the changes and update the files according to the new data management nomenclature and format.

When the data optimization process is concluded, an ongoing data maintenance program should be implemented to ensure the information remains in an optimized state, that is, complete, consistent, accurate and up to date.

Following optimization, regular maintenance will pay for itself by preserving the initial investment in data optimization and ensuring your organization continues to reap the gains it has worked hard to achieve. These include reduced transaction error and improved patient safety.

New product introduction

The process of adding new items to the hospital supply chain usually starts with a review of the product by a product evaluation committee, sometimes called a value analysis committee.

These committees should have representation from sourcing, procurement, supply chain, finance, infection control, biomedical, MDR and clinical departments as well as any other relevant stakeholders. See *Chapter 4, Product Selection and Standardization,* for more information.

The importance of training

Training programs for new staff must be in place and executed before the staff member is given responsibility for data management. Existing staff should have access to periodic retraining as an opportunity to learn of any changes in process or procedures.

Product evaluation committees usually have representation from sourcing, procurement, supply chain, finance, infection control, biomedical, MDR and clinical departments.

2.7 APPENDICES

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HOSPITAL
ASSOCIATION

Appendix A: Sample Item Set-Up for General; Consignment (1); and, Consignment (2) from OR Supply Chain Project

Sample of Item Set-up - General

Item Set-Up (Example):

Item Templates	Item Attributes	

Stock (Asset)	Inventory (Stockable, Source: 3PL/Internal Asset Sub-Inventory)	1) Noun (Product) 2) Adjective (Type) 3) Size 4) Side 5) Colour 6) Latex Content 7) Sterile/ UnSterile
	Inventory (Stockable, Source: Vendor)	1) Noun (Product) 2) Adjective (Type) 3) Size 4) Side 5) Colour 6) Latex Content 7) Sterile/ UnSterile
Non-Stock/Direct (Expensed)	Non-Stock (iProc, Manual Requisitions)	1) Noun (Product) 2) Adjective (Type) 3) Size 4) Side 5) Colour 6) Latex Content 7) Sterile/ UnSterile
Consignment	Implants (See Detailed Breakdown, next page)	Item Attributes (See Detailed Breakdown, next page)
Linen/Hardware		1) Linen or Hardware 2) Type (Bundle/Basin/Brand Name) 3) Service 4) Size
Instruments	Sets	1) Mfr/Brand/Procedure 2) Type/ Anatomical Part 3) Size 4) Service/ Doctor/Distributor/Mfr
	Single Wrap Instruments	1) Instrument 2) Mfr/Brand Name/ Procedure/Instrument Type 3) Angle 4) Side 5) Size

The above table indicates the typical categories of product that may be set up in the item master files. As mentioned, the naming conventions for implants may be slightly different than a standard nomenclature structure, as clinically, this is not always appropriate.

Sample of Item Set-up Consignment (1)

Item Set-Up (Example: Consignment):

Item Templates | Item attributes

Consignment

- **Knee**
  - 1) **Knee** 2) Brand Name 3) Component (*Femoral, Tibial, Articular Surface or Patella*) 4) Size 5) Side

- **Hip**
  - 1) **Hip** 2) Brand Name 3) Stem (*PressFit or Cemented*) 4) Taper 5) Size 6) Angle
  - 1) **Hip** 2) Brand Name 3) Liner 4) Size (ID) 5) Angle
  - 1) **Hip** 2) Brand Name 3) Shell 4) Holes 5) Size (OD)
  - 1) **Hip** 2) Brand Name 3) Head 4) Taper 5) Size (ID of Liner) 6) Length of Neck
  - 1) **System** – Brand Name 2) **Hip** 3) Stem 5) Liner 6) Shell 7) Head

- **Shoulder**
  - 1) **Shoulder** 2) Stem (*Humeral*) 3) Size (Length x OD)
  - 1) **Shoulder** 2) Head (Offset or Regular) 3) Size (ID x OD)
  - 1) **Shoulder** 2) Glennoid (Pegged or Non-Pegged) 3) Size

- **Drill Bit, Plate, Screw**
  - Drill Bit — 1) **Drill Bit** 2) Type of Drill Bit (Tapping or Regular) 3) Size (Diameter x Length) 4) Metal Construction
  - Screw — 1) **Screw** 2) Size (Diameter x Length) 3) Type of Screw (Cortical or Non-Cortical) 4) Metal Construction
  - Plate — 1) **Plate** 2) Shape 3) Head/Shaft No. of Holes 4) Angle 5) Size

Appendix B: Quick Reference Guide to GS1 Standards

Quick Reference Guide to GS1 Standards

Across health care globally, a lack of recognized standards and governing data structures, including barcode language, has led individual hospitals to develop their own methods of setting up and maintaining item and vendor master files. Discrepancies exist even among hospitals located in the same geographic community purchasing many of the same products from the same suppliers.

In Ontario and elsewhere, group purchasing organizations (GPOs), shared service organizations (SSO), and product vendors are working collaboratively with GS1 Canada, the Canadian arm of the international supply chain standards organization, to develop data standards for health care. Going forward, it is recommended that hospitals considering data-related projects should consult with their appropriate partner organizations and GS1 Canada before getting started. This is an opportunity for Ontario's hospitals to develop a standardized approach to data, which will ultimately benefit all health care organizations and their partners.

In other industries such as grocery, GS1 Canada has worked collaboratively with all stakeholders to design and implement global supply chain standards for identifying, communicating and maintaining data. Through Carenet, GS1 Canada's national health care strategy, the organization and its stakeholders are currently working to develop and implement global data standards for product and location information as well as centralized repositories for use by all Canadian health care organizations and their trading partners. For more details, visit *GS1 Canada's Website* (www.gs1ca.org).

The GS1 System is an integrated suite of global standards. It uses GS1 identification numbers to provide accurate identification and communication of information related to:

- **Physical things** (like products/services, assets, logistics units and physical locations); and
- **Logical things** *(like corporations or a service relationship between provider and recipient).

When this identification system is combined with the GS1 Canada-managed ECCnet Registry and a TrueSource® Locations for product and location identification, respectively, the connection is made between these physical and logical things and the information the supply chain needs about them.

Global Location Number (GLN)

A GLN is a 13-digit GS1 identification code that is assigned by GS1 Canada to identify:
- Legal entities, such as suppliers, hospitals or shared service organizations;
- Functions within legal entities, such as a hospital pharmacy or accounting department; and

- Physical locations, such as a hospital wing, nursing station or manufacturer's warehouse.

The attributes defined for each GLN (e.g., name, address and class of trade) help users to ensure that each GLN is specific to one unique and unambiguous physical location or legal entity.

TrueSource Locations will launch in Summer 2011. This central, online, searchable database ensures accurate and detailed location information for trading partner transactions where location information is required, including GLNs and GLN-related details (e.g., name, address, etc).

For more information GLNs or TrueSource Locations, please visit *GS1 Canada's Website* (www.gs1ca.org).

Global Trade Item Number (GTIN)

The Global Trade Item Number (GTIN) is the globally-unique GS1 identification number used to identify trade items (i.e., products and services that may be sold, delivered or invoiced at any point in the supply chain). GTINs are best known as the numbers at the bottom of a barcode. GTINs are assigned by the owner of the brand and are used to identify trade items as they move through the global supply chain to the hospital or ultimate end user. The attributes defined for each GTIN (e.g., size, weight and packaging) help users to ensure that each GTIN is specific to one unique and unambiguous trading-unit configuration (e.g., a blister of two aspirin tablets or a bottle of 100 aspirin tablets). GTIN information will be available in ECCnet Registry. In health care, 14-digit GTINs will be available in ECCnet Registry beginning in the fall of 2011. The health care and pharmacy sectors are moving towards 14-digit GTINs to identify products, including small and hard to mark products, using bar code symbologies that can be printed in a reduced space.

Global Data Synchronization Network (GDSN)

The GDSN is an Internet-based, interconnected network of data pools and the GS1 Global Registry®. The GDSN enables global trade by connecting companies from around the world and enabling the exchange of standardized, synchronized product data.

Each user has the responsibility of both defining and maintaining its GTINs, along with their associated attributes, and sharing this information with its supply chain partners. To support those efforts globally, the GDSN provides an efficient and effective approach to:

1. Storing GS1 identifiers with their associated attributes.
2. Checking to ensure that the identifiers and attributes are properly defined and formatted.
3. Sharing that information with supply chain partners.

Appendix B: Quick Reference Guide to GS1 Standards
continued

The GDSN offers a continuous, automated approach to data management. With GDSN, trading partners always have the latest information in their systems, and any changes made to one company's database are automatically and immediately provided to all of the other organizations who do business with them. This approach ensures that supply chain information is always consistent between trading partners, increasing data accuracy and reducing supply chain costs.

ECCnet Registry, Canada's healthcare product registry (CHPR)

By fall 2011, ECCnet Registry will be the most comprehensive, perpetually updated and continually validated registry of healthcare product data of its kind in Canada. Product data in ECCnet Registry will range from the new category of medical/surgical data to categories already available through GS1 Canada, such as grocery, pharmacy and food services data.

To enhance data management processes in Canada, ECCnet Registry will be a single point of access between trading partners, enabling suppliers to load and maintain product information in one central registry and healthcare providers to synchronize their item master files with accurate, perpetually updated product information.

ECCnet Registry is set to dramatically improve the accuracy and clarity of data used by the healthcare sector in electronic transactions for purchasing, shipping and receiving products, and will be a key component to reducing medical errors resulting from inaccurate data. ECCnet Registry will receive data from the GDSN so that organizations with international trading partners have access to up-to-date product information from around the world.

The GDSN is an Internet-based, interconnected network of interoperable data pools connected to the GS1 Global Registry. Operated by the GDSN, the GS1 Global Directory allows companies around the world to exchange standardized and synchronized supply chain data with their trading partners.

Further information can be found on *GS1 Canada's Website*. (www.gs1ca.org)

Global Product Classification (GPC)

GPC is the GS1 classification system. http://www.gs1.org/gdsn/gpc

United Nations Standard Products and Services Code (UNSPSC)

The United Nations Standard Products and Services Code (UNSPSC) is a hierarchical set of product categories used by supply chain partners worldwide to classify their products and services. The UNSPSC provides a single, global classification system for all products and services in all industry sectors. Use of the UNSPSC enhances company-wide visibility of spending analysis and promotes cost-effective procurement. The UNSPSC is

used extensively around the world in electronic catalogues, search engines, procurement application systems and accounting systems.

How do the GS1 standards relate to each other?

The GS1 System of standards is an integrated system of global standards that provides for accurate identification and communication of information regarding products, assets, services and locations. GS1 identification numbers provide the link between a product or service and the information pertaining to it. For example, when users assign a GS1 identification number, they are defining a set of standardized information, called attributes, about the object to which that identifier relates. For instance, the GTIN defines a set of attributes related to products, such as size, weight and number of units.

The GS1 System specifies the list of attributes that must be defined for each GS1 identifier. It also provides a precise definition and acceptable values and data formats for each attribute. Standardized attributes about products, which the GTIN identifies, include core data like selling unit, item dimensions and UNSPSC product classification.

Standardized attributes about commercial entities, which the GLN identifies, include core data such as location information about a warehouse or hospital. These healthcare location attributes are stored in TrueSource Locations and shared with supply chain partners. Similarly, healthcare product attributes that are defined by the healthcare community in collaboration with GS1 Canada, are stored in the ECCnet Registry and shared with supply chain partners. Through this process, GS1 identification numbers not only identify an object, but also provide a link to critical information about that object.

This linkage is tremendously valuable. In fact, more than twenty industry sectors use GS1 GTINs, GLNs and the GDSN as the foundation for a wide range of efficiencies and improvements that have enhanced their operations and supported their business processes for decades. Likewise, through the use of GTINs, GLNs, ECCnet Registry and TrueSource Locations, health care providers can lay the foundation for a wide range of solutions to enhance patient safety and supply chain management within their facilities and across their organizations.

Until standardization is achieved, consider the following:

The development and implementation of GS1 global standards in Canadian health care are underway. Until these standards are fully implemented, there may be inconsistencies in product data between vendors and even within the databases of individual vendors. With the implementation of GS1 global standards, the health care sector will begin moving towards consistent use of standardized data. However, variances are expected to occur as each participant implements global standards with varying levels of expertise. Until standardization critical mass is achieved, the following should be considered.

1. Every product has a GS1 barcode that is specific to the manufacturer. However, hospitals purchase some products through distributors that use their own numbering system for re-orders. This can lead to incorrect purchase order matches. As an interim solution, until all

Appendix B: Quick Reference Guide to GS1 Standards

continued

trading partners adopt GTINs, hospitals should use a relationship table that associates the Reference Number in the GTIN to the Distributor's Re-order Number.

2. In some cases, vendors use multiple product codes for the same product. This can occur, for example, if the product manufacturer ships products from different shipping locations that are technically the same. To keep track of where products originate from, the vendor may apply a specialized code identifying the different manufacturer locations. This practice is consistent with ISO standards. A problem arises if the hospital uses product 1000A, places a re-order and receives product 1000B. The two products may be technically the same, but since they originate from different manufacturing locations, they will have different product numbers. As a result, the hospital's supply chain system will register a purchase order mismatch. Adoption of GTINs across the health care system can rectify this discrepancy and allow track and trace capabilities to the point of product origin.

3. Currently, health care vendors are inconsistent in their use of barcode data. There are multiple barcode formats. Some vendors use the Health Industry Bar Code (HIBCC) Standard for barcode data. HIBCC barcode formats can be in either Code 39 or Code 128. Meanwhile, another group of vendors use proprietary barcodes. While many vendors are already compliant with GS1 standards. GS1 Canada, through the Carenet Strategy, and GS1 Healthcare US, are moving the entire Canadian and U.S. health care sectors towards the standardization of all barcodes by December 2012 so they are consistent and compliant with global GS1 standards. GS1 uses a variety of formats, including the UCC/EAN 128 or Code 128 barcode formats.

4. GS1 Application Identifiers (AIs), of which there are over 100, are a finite set of defined identifiers used to connect physical things and logical things to information or business messages. The definitions of the various AIs reside in a standard called the GS1 General Specifications, which is available from GS1 Canada (www.gs1ca.org). Four key AIs within the GS1 standard are: AI (01), which represents the GTIN; AI (10), which represents Lot/Batch Number; AI (17), which represents Expiry; and AI (21), represents which the Serial Number. Hospitals may need to adjust their applications to accommodate variances.

5. The vendor's barcode product number will not always match the hospital's vendor product number. It is expected that the transition to health care supply chain standardization will result in Canadian hospitals moving away from proprietary product codes towards a standardized product number (GTIN) to simplify processes and ensure consistency in supply chain transactions.

SAMPLE OF TYPICAL DATA PROJECT TASKS	
Project Phase:	**Project Tasks:**
Phase 1 - Site Visit:	- Provide orientation to team - Ensure appropriate hospital resources as applicable - Participate in the initial meeting related to data optimization (i.e., IT, Purchasing, owner of item master files, OR Resource that has product management responsibility, etc.) - Discuss and confirm project scope: item master file optimization, inventory optimization , cart optimization and vision - Review data optimization methodology/approach - Conduct tours (with student and project manager) of stores area, OR suites, OR sterile core, and other relevant inventory staging or storage areas of hospital sites – at shared service organizations (tours will include site(s) as well as identified member hospitals) - Understand project sponsor's concerns or issues - Identify the required data bases to be accessed, their locations within the organization and the staff that will be contacted in order to expedite the access of the needed data bases - Attain agreement for the project's next steps
Phase 2 - Systems Review:	- Review item master file set-up fields in the system. - List and identify all set-up fields, determine identify whether or not the information is systemically or manually populated and what, if any, character limitations exist - Identify set-up fields that may be used for data attributes - future state - Review of item master file set-up fields in Operating Room Information System
Phase 3 - Data Extract & Initial Scrub	- Extract stock item issue/usage information for a minimum two-year period(note: pricing information need not be extracted or reviewed in this phase) - Extract non-stock/consignment item expensed/charge information for a two-year period - Consolidate stock and non-stock files - Complete initial Visio Flows for data extract and consolidation - Initial Data Scrub to begin to identify unique records within the consolidated file - Initial Data Scrub completed - Calculate "best" and "worst" case scenarios for level of effort and time based on unique records identified
Phase 4 - Detailed Optimization	- Discuss with project sponsor sites the proposed item description attribute for stock, non-stock and consignment inventory - Initiate detailed optimization to include: Item descriptions, Manufacturer's info, MDL info, Unit of Purchase, Unit of Issue and Package info at a minimum - QA/QC optimized data
Phase 5 - Data Load	- Prepare data for loading into the system. - Load data into the system. - Test and sign off.

Appendix D: Example of a Hospital's Item Master File

Shared Service/Hospital Information:
- SHARED SERVICE OR HOSPITAL
- HOSPITAL OR CAMPUS
- SHARED SERVICE OR HOSPITAL, OR CAMPUS

Item Status Information:
- "NEW", "CHANGE" OR "INACTIVATE" EXISTING ITEM?
- INVENTORY CATEGORY (STOCK, NON-STOCK OR CONSIGNMENT)
- ERP/MMIS ITEM NUMBER (INTERNAL NO.)
- ERP/MMIS ITEM DESCRIPTION (OLD) Full Description
- ERP/MMIS ITEM DESCRIPTION (NEW) Full Description

ERP/MMIS Item Number	Old Description
052442	ZENITH AAA ENDOVASCULAR GRAFT
049009	SCREW SELFTAPPING 17MM AC CON
AS2016	TOARIC LENS

Expense/Account Code Information:
- EXPENSE/ACCOUNT/MIS CODE
- EXPENSE/ACCOUNT/MIS CODE DESCRIPTION
- COMMODITY, CATEGORY CODE
- COMMODITY, CATEGORY CODE DESCRIPTION
- UNSPSC CODE
- UNSPSC CODE DESCRIPTION

Expense Code
4607030
4603201
4602403
4602901
5603104
SCC
EXTRA
4602403
4607030

Item Attribute & Element Information:
- DESCRIPTIVE ELEMENT #1 ... DESCRIPTIVE ELEMENT #11
- SERIAL CONTROLLED ("YES" = At Receipt; Otherwise "BLANK")
- LOT NO. CONTROLLED ("YES" = At Receipt; Otherwise "BLANK")
- EXPIRABLE ITEM? ("YES" if applicable; Otherwise "BLANK")
- Latex Content (L = Latex; NL = Non-Latex)
- Disposable/Reusable
- Sterile?
- Purchasable? (Yes if this item will be purchased at ANY time)
- Is ITEM on CONTRACT? "YES" if applicable; Otherwise "NO"

Vendor Information:
- VENDOR NAME
- VENDOR CODE
- GLN CODE (If Any)
- VENDOR CATALOGUE NO.
- UOP
- UOI
- VENDOR CATALOG
- CONVERSION RATE (PKG STRING) GENERIC if Unknown

Vendor Name	Vendor Catalogue No.	Conversion / Package String
SYNTHES (CANADA) LTD.	242.464	
COOK	TFLE-24-73-2T	
MEDTRONIC OF CANADA	4076-52	
ALCON	8065-9932-45	
BIOMET MICROFIXATION	159594	
TELEFLEX MEDICAL	183405240	

Manufacturer Barcode Information:
- Purchasable? ("YES" if any)
- MANUFACTURER
- MANUFACTURER CATALO
- UPC CODE (UOP)
- UPC CODE (UOI)
- HIBC CODE (UOP)
- HIBC CODE (UOI)
- GTIN CODE (UOP)
- GTIN CODE (UOI)
- MEDICAL DEVICE CLASS
- MEDICAL DEVICE LICENSE NO.

Purchasable?	GTIN CODE (UOP)	GTIN CODE (UOI)
YES	N/A	N/A
YES	N/A	N/A
YES	N/A	N/A
N/A	01008850741015	01008850741015
	90171104077211BB	90171104077211BB
	L396021V	L396021V
N/A	01103806599324	55106733560M
N/A	010501927977864	010501927977864
N/A	04	04
N/A	0104026704301461	N/A

Manufacturer Information:
- MANUFACTURER
- UOI
- PACKAGE STRING

Mcal Information

Chapter 3. OR Inventory Optimization

ONTARIO
HOSPITAL
ASSOCIATION

CONTENTS

CHAPTER AT A GLANCE

Medical-surgical supply expenditures could represent up to half of an acute care hospital's operating room budget. It is a significant cost driver for health care organizations. OR supply replenishment for 'stock', or inventory product, is often performed by supply chain personnel but much of the 'non-stock' and/or consignment products are managed by the clinical staff themselves. (For the purposes of this guide, the term 'inventory' will be used in the broad sense to describe all product categories mentioned above.)

These products typically do not have minimum or maximum inventory levels associated with them, and clinical staff has to keep track of what must be ordered and create requisitions for replenishment. This is a time-consuming task.

Consider managing non-stock and consignment products with standardized and/or automated processes, as it is done with stock products. Improving the management of supplies at their point of use (POU) in the perioperative environment provides significant opportunity for process improvement and reduced costs.

But optimizing the OR supply management process at the point of use within the OR sterile core requires a collaborative analysis of three key elements: the data that ultimately supports the replenishment process; the system that will be used for replenishment; and, the type of storage carts/cabinets/shelves that will be used based on standards for sterile storage in a clean environment.

In addition to introducing readers unfamiliar with OR inventory optimization to the fundamentals of this essential task, this chapter will discuss how to form your team and outline the inherent risks of undertaking such a project; how to assess your current situation and design a relevant solution; how to implement your change, as well as how to measure costs and develop training to support your newly optimized system.

3.1 UNDERSTANDING OR INVENTORY OPTIMIZATION

What is OR inventory optimization?

Optimizing your operating room inventory is essential to streamlining the movement of materials from the supply chain to their point of use. A fully optimized operating room is one where an appropriate level of inventory is available when and where it is required to support ongoing clinical procedures and patient care. At the same time, it must ensure that the replenishment process is efficient and effective, which will optimize your investment in inventory.

OR inventory, as described in this guide, is made up of three components: 'stock' items replenished from a central inventory location; 'non-stock' items, which are typically replenished through purchase orders sent to suppliers; and, 'consignment' items that are owned by a supplier until used by the hospital, which requires a collaborative approach to replenishment.

Optimizing the OR supply management process within the OR sterile core requires a collaborative analysis of key elements, including **the data** that ultimately supports the replenishment process, **the people and processes** that will be used for replenishment, and the type of **storage location** (e.g., carts, cabinets, shelves) that will be used based on standards for sterile storage in a clean environment.

Effective OR inventory management focuses on achieving clinical, operational and financial supply chain goals. It includes such activities as electronic ordering, data, reports and case costing and implant tracking as well as tracing for product recalls and patient safety.

Where is your OR inventory?

Investigating your OR inventory will involve reviewing both the physical locations used to store supplies (these will include areas of the surgical suite, the OR sterile core and the medical device reprocessing (MDR) areas), and the location of the system(s) used to store the data, namely, the item master files.

Your system's item master files are a catalogue of the essential product information hospital employees require to manage frequently purchased goods and services. To function properly, item master files must be clean, consistent and orderly. Typically, these files are housed in your hospital's enterprise

resource planning (ERP) system, and/or materials management system. In some instances, the item master file could still be part of a paper-based system.

Your project team should know where the hospital's item master files are located and how they are kept synchronized. (In most organizations, these are managed by the materials management and purchasing departments.) You must have clean and accurate data to support an OR inventory optimization project. Please see *Chapter 2. Data Optimization*, for information on how to optimize your item master files.

For this kind of project, all clinical departments should agree upon, easily recognizable, consistent and relevant product descriptions and supplier information for unique items. This does not mean nomenclature must be customized or even significantly different from the manufacturer's description. It should simply be agreed upon and common across all clinical departments.

All clinical departments must have agreed upon, easily recognizable, consistent and relevant product descriptions and supplier information for unique items.

Does your OR inventory need improvement?

The following service failures are often signs that an OR inventory optimization project may be warranted:

Customer service failures such as:

- Constant 'stock outs' of needed medical-surgical supplies;
- Surgical procedure delays due to medical-surgical supply issues; and
- Staff unable to locate medical-surgical supplies when required.

Process fragmentation such as:

- Variances in practices, responsibilities and accountabilities across the OR for supply replenishment;
- Lack of historical usage information to understand replenishment needs;
- Excessive clinical time spent on inventory replenishment;
- Multiple and redundant locations of OR inventory;
- Limited/no documentation for procedures and policies;
- Long training periods and high staff turnover;
- Visually disorganized and cluttered OR inventory storage; and
- No ability to manage non-stock or consignment inventories (i.e., not managed through PAR[1] levels).

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1   Periodic automatic replenishment

Reduced dedicated clinical effort for supply replenishment processes such as order placement and expediting allows staff to redirect attention to patient care.

Poor financial performance, such as:

- High OR inventory investment due to overstock, expired and obsolete medical-surgical supplies;
- Non-standardized products and limited contract compliance; and,
- Previous supply chain improvement project benefits not sustained.

Why is OR inventory optimization important?

It takes considerable effort from several departments to move supplies to an operating room, and moving the wrong supplies or the wrong quantity of supplies can add significantly to that workload. But optimized processes will yield the greatest effectiveness from the least amount of effort.

Benefits typically found after implementation include:

- Improved OR supply chain customer service levels resulting from:
    - Supplies available when and where required;
    - Improved order cycle time;
    - Reduced inventory on-hand;
    - Reduced clutter, expired products, waste and obsolescence;
    - Improved staff satisfaction; and,
    - Reduced OR suite delays due to supply issues.

- Reduced dedicated clinical effort for supply replenishment processes (i.e., order placement and expediting) redirecting attention to patient care.

- Improved medical-surgical supplies usage information, which can enable:
    - Standardization efforts;
    - Reduced supplies costs; and,
    - More accurate procedure and surgical case costing.

Please see this chapter's *Appendix A* for more on standardization savings opportunities.

3.2 PLANNING YOUR PROJECT

Forming your project team

Start by forming a steering committee that has a clear and concise project charter. The charter should state your objectives and ensure these are aligned with the organization's goals. Form a steering committee that will provide guidance on project progress and manage any conflict between groups, if required. To start, the steering committee will help to define the project team.

See *Chapter 5: Project Management* for more details on forming your project team.

Operating room supply chain (ORSC) projects are typically most successful when co-sponsored by the surgery program and the supply chain departments with both materials management and the OR performing key project roles.

Your project team should be comprised of representatives from the operating room (clinical and non-clinical), information services (IT), Medical Device Reprocessing department (MDR), infection control, purchasing (contracts, data management) or the shared service provider, administration, and materials management.

Small working groups focused on surgical specialties (e.g., general, orthopedic, etc.) should be formed to run parallel processes for the review of supply location requirements within the OR, and/or on case carts by service. These will be short-term working groups with clearly defined project activities.

The project manager or project lead (subject matter expert) will be relied upon to give direction, challenge internal practices and cultural barriers, and provide proven tools and strategies related to supply management. The project manager will also assist with facilitating the smaller short-term working groups. Depending on the size and scope of the project, the project manager could be a project management person that works closely with the subject matter expert providing administrative support.

All departments, business functions and external partners that will or could be affected by your OR inventory optimization project should be represented on the team.

In forming your team, you should consider inviting representatives from the following areas:

- **Clinical departments:** clinical leaders, charge/resource nurses by service, anesthesia, clinical supply coordinators.

- **Business functions:** perioperative materials manager, representatives from MDR, as well as representatives from procurement, finance, system administration, and IT.

- **External partners:** representative(s) from shared service organizations and from third-party logistics firms.

Identifying your project stakeholders

Knowing who your stakeholders are and the key role they will play is an important part of designing an OR inventory management solution that will not only function well, but be universally accepted.

Senior Management. This group can provide support, approval and conflict resolution but will want to know the benefits of the improvements for the organization.

Materials Management, Purchasing, Shared Service Provider. This group is essential to the project's implementation and its sustainability. As the internal supply source, they will be directly affected by changes in point of use levels. They must also be kept aware of changes in supply stocking locations.

Clinicians. As champions for change, clinicians will directly benefit from improvements and will drive the project tasks.

Surgeons. They will be more likely to adopt new processes if it is clear this will support their ability to perform their procedures without supply issues.

IT department. It can provide software system knowledge and will support automation.

MDR department. It will be directly affected and will surely benefit from improvements with cost and effort reductions.

Infection Control. It ensures hospital policy and infection control standards are followed.

Ensuring your project's success

Risks are inherent in a project like this, mostly because of the number of people, systems and departments that must work collaboratively to ensure proper product and supplies reach the correct storage locations.

Your project's success relies on the use of appropriate communication and a structured project plan. Training plans for current users should be developed to ensure that users of the data are not only aware of the potential changes to come, but also trained in how to work with and sustain the improvement.

Start by designing a project plan detailing realistic timelines and levels of effort for each project role (allowing for staff to take time from their regular duties to perform project work). This will ensure tasks are identified and managed. For a sample project plan, see this chapter's *Appendix B* as well as *Chapter 5, Project Management.*

> **TIP: Things to consider when planning your project approach.**
> Before initiating the project, consider the size and scope of the project. For example, if the OR product data requires restructuring and optimization before inventory optimization occurs, this will significantly add to the scope of the project. The number of items residing in the item master files will also have an impact on the level of effort and the resources required in achieving this.

> **TIP: Know your infection control standards before you redesign storage.** The storage and distribution of sterile supplies requires a review of all related standards before decisions are made about changing storage locations, the type of storage units, and distribution methods and transport carts/containers.
>
> Before you begin the planning phase of this project, it is imperative you consult with your hospital's infection prevention and control department. You should also conduct a full review of your region's standards.
>
> The following are examples of organizations that offer reference publications:
> * Canadian Standards Association
> * Operating Room Nurses Association of Canada: Recommended Standards
> * The Association of PeriOperative Registered Nurses: Perioperative Standards and Recommended Practices
> * The American Institute of Architects, Academy of Architecture for Health: Guidelines for Design and Construction of Hospital and Health Care Facilities
> * Infection prevention and control guidelines.

3.3 ASSESSING YOUR CURRENT STATE

To improve your existing replenishment processes and develop new ones, it is important to have a clear understanding of your current processes, including the associated tasks and responsibilities. You should thoroughly understand the physical layout of your storage space, review any technology that supports your inventory, and conduct an OR inventory count to get a baseline for current inventory value at point of use. It is likely that your stock inventory will be relatively easy to catalogue and count, however the non-stock and consignment inventory may not have specific locations assigned, or may be in multiple locations.

More information on developing current state documents is available in *Chapter 5, Project Management*.

Reviewing your processes

To review medical-surgical supply usage and replenishment processes, start by developing a current state process map for OR inventory use and replenishment activity such as the one in Figure 1, below. You should have different maps for stock, non-stock and consignment items. For each of these, your map should detail:

- The process for re-stocking items on the shelves.
- The process for selecting items to be used.
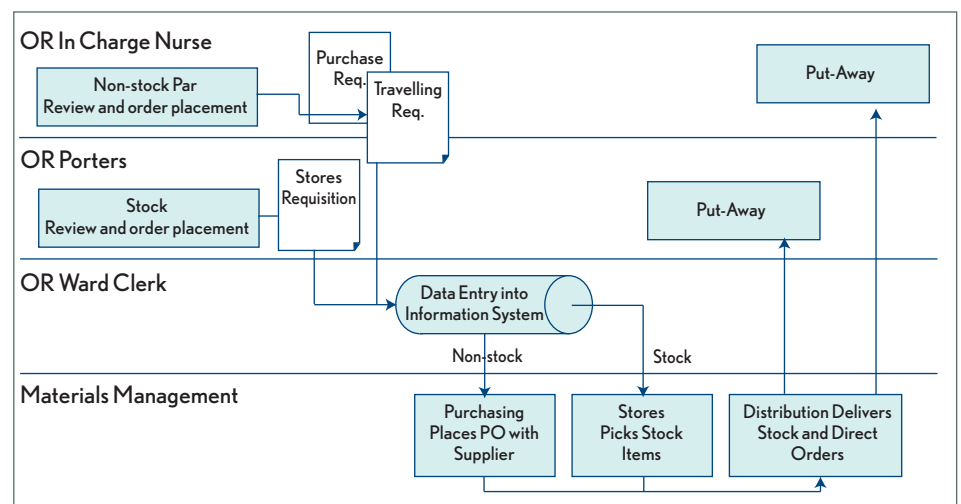- The process for re-ordering items.

Figure 1: Example of high-level current state process map.
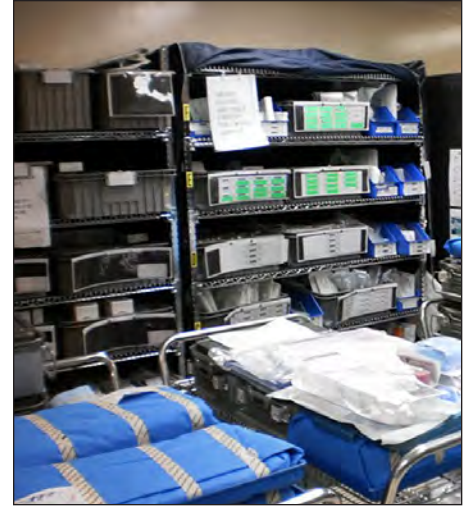
Reviewing your physical space

Review your physical space by conducting a complete tour of the OR and the existing locations of OR inventory with the appropriate clinical, infection control and supply chain personnel. This will give the project team members a thorough understanding of the layout. They should note all top-up areas as well as secondary non-official locations of supplies where staff may be re-distributing or hoarding supplies from the main supply storage areas. Try to involve all the relevant supply chain personnel as not everyone may know where all items are stored.

Mapping your current OR inventory locations

Obtain layout drawings of the areas under review and document existing storage locations. Incorporate the revised drawings into the current state documentation package with a view to reducing and/or changing locations to provide improved access for staff and more efficient replenishment. On the drawing, assign location numbers to each storage area. This will be useful when conducting a physical inventory count. Note that any changes made to supply location and storage medium must meet with your infection control guidelines and OR supply chain vision.

Conduct a tour and note all top-up areas as well as secondary non-official locations of supplies where staff may be re-distributing, or hoarding supplies from the main supply storage areas.

Reviewing your technology

Develop a diagram of current IT systems that support your replenishment processes. Be sure to include procurement and inventory management systems; scanning devices used with cart management systems; and, any integration with OR information systems (case carts, scheduling, etc.). See Figure 2 for an example of the data flow for the replenishment cycle.

Consignment Replenishment Cycle Example

1. Receive item
2. Capture item
3. Move item
4. Use item
5. Log item
6. Auto Replenish Item
7. Vendors pick, pack and ship item

Cross dock items to warehouse
Vendor delivers item
Database repository
Patient item usage updated in other systems
Patient and item information
Other systems
Orders sent to vendors
Trigger order(s)
Return unused items to warehouse
Items delivered to OR

Physical activity
System activity

Figure 2: Data connects at various points within your organization and well beyond its walls, weaving a dynamic and complex web of information whose core strength is derived from the integrity of the data itself and how well that integrity is maintained.
(Source: St. Michael's Hospital)

Counting your OR inventory

A physical inventory count for stock, non-stock and consignment products should be conducted to create a baseline for current inventory value at point of use. This will also help you determine the amount of expired and obsolete supplies to purge and give you the necessary information to determine future inventory levels. Additionally, it will help support any required investment by providing actual inventory reduction and cost-saving potential.

When conducting your OR inventory count, be sure to capture key product information for each supply item. This can include:

- SKU
- Quantity
- Unit of measure
- Cost per item
- Location
- Clinical service use (category code)
- Product type (stock; non-stock; and consignment)
- Product description
- Packaging type, e.g., peel pouch, box.

Collecting OR inventory location data

OR inventory location optimization involves extracting data from the materials management system. If a paper-based system is used, some information may not be available. What follows is an explanation of the information you will need and some suggestions on alternate means (if necessary) for obtaining that information.

Determine your current state OR inventory levels

All the items in the OR inventory locations you have identified may be set up according to different rules, such as 'top-up,' 'min-max,' etc. The rules in use will affect what OR inventory data is collected. These rules can include any of the following:

- **Top-up:** Indicates the target inventory count to which the inventory is to be 'topped up', allowing the supply staff to select the order quantity.

- **Min-Max:** If the inventory level is at or below the minimum, the amount required to achieve the maximum level is ordered.

- **Re-order Point, Re-order Quantity:** If the inventory level is at or below the re-order point (ROP), the re-order quantity (ROQ) is ordered.

WHAT is a SKU?
SKU stands for stock keeping unit and is a number or code used to identify each unique item. Stock items will have a unique number associated to them but non-stock and consignment items may not.

TIP: Standardize your inventory counting.
Where possible, use a computer/laptop when gathering inventory information to minimize data transcription errors and to consolidate information efficiently. If several people are conducting the count, use a template or at least ensure they are all using the same method. Do not underestimate the time and effort required to complete an inventory count.

Note that most inventory replenishment systems using barcode scanning of a shelf label, regardless of the methodology described above, will require the supply attendant to count what is left on the shelf, and enter that value. The system will then calculate the optimal replenishment quantity and generate an order for that quantity. This prevents the supply attendant from over ordering and stock piling the storage location.

To determine optimum OR inventory ordering parameters, it is important to document the current state levels. This will tell you the amount by which order quantities should be increased within the space that is available to improve ordering efficiency.

If OR inventory locations are set up in the materials management or ERP, the data can be extracted from the system. If the OR inventory location is not set up in the materials management system, data will have to be collected manually from the location itself or from other sources such as spreadsheets or printed lists. Determining current state OR inventory levels without a data system will require more effort. See Figure 3, below for an example of OR inventory data that should be collected.

OR Inventory Data	Required/Optional	Comment
Hospital Site	Optional	Include if there is more than one site
Department/Cost-Centre	Required	
Location ID and Description	Required	
Item ID and Description	Required	
Product Category and/or Expense Account	Optional	Useful for identifying item type
Top-Up Level, Min-Max or ROP-ROQ	Required	
Unit of Measure	Required	
Item Size Classification	Required	Items may be categorized in a simple small / medium / large fashion

Figure 3: Sample OR inventory location level data.

Determine your unit of measure conversion rates

Ordering is significantly more efficient when an optimal pack size or a full unit of measure (UOM) is used since full packages mean the warehouse pickers are not required to open packaging and count out items. Also, by remaining in original packaging, supplies are protected during transportation to the point of use. Determine optimal order quantities by obtaining the UOM conversion factors from 'each' to 'pack', 'box', and 'case'. Item quantities can then be rounded up to a pack, box or case size if usage is high enough to warrant it.

Determine your OR inventory usage

All OR inventory items (stock, non-stock, and consignment) should be 'catalogued' in the item master file and generally be on contract with suppliers. It should not be assumed that the current model of classification is appropriate. Historical usage of these products must be analyzed to ensure products are categorized appropriately.

For non-stock and consignment items, the purchase history can typically be obtained by performing a data extraction or a purchasing consumption report for a 24-month period. For stock items, you can obtain a historical usage data extract for a 24-month period. (See *Chapter 2. Data Optimization* for more information on how to perform a data extraction). This review will provide insight into how often OR inventory is purchased, used and replenished. Note that duplicate items may exist in your system but not on the shelf.

To determine OR usage of non-stock and consignment items, look at the purchase history by performing a data extraction or a purchasing consumption report for a 24-month period.

3.4 DESIGNING YOUR SOLUTION

Developing your solution should incorporate leading practices such as:

- The reorganization of medical-surgical supply storage locations (with adherence to infection control guidelines);

- The redesign and standardization of OR supply replenishment processes;

- The identification of optimal OR inventory levels for stock, non-stock, and consignment items;

- Reducing the number of inventory handling touch points;

- The development of regularly scheduled reviews of OR inventory levels;

- The transfer of replenishment functions from clinical professionals to non-clinical supply chain professionals;

- The ability to leverage appropriate supply chain technology, by creating efficient, paperless replenishment processes supported by technology; and

- The development of a measurement process that will allow for continuous improvements; and reducing waste.

Start by conducting workshops and meetings to solicit feedback from OR clinical staff on preferred supply locations, then determine an efficient stocking location design that will reduce redundancy and eliminate waste. In some instances, this may require redesigning stocking locations (developing schematics). Any such changes should conform to infection control standards. Similarly, supply carts may be redesigned to accommodate a more efficient layout, and inventory usage.

Key components of designing the solution

Developing and documenting a solution is a critical prerequisite to achieving a successful and sustainable project.

The following steps, listed below and expanded upon further down, outline a typical process for designing a solution:

- ☑ Conducting research
- ☑ Defining process requirements
- ☑ Drawing a process map
- ☑ Conducting an OR inventory analysis
- ☑ Conducting an OR inventory technology review
- ☑ Conducting a gap analysis
- ☑ Conducting a trial

Conducting research

To gain a thorough understanding of your improvement project's process requirements, it is best to draw leading practice information and examples from a number of sources. You can start by reviewing leading practices research such as *OntarioBuys iSCM Leading Practice Compendium*[2]. Another useful strategy is to schedule site visits for key stakeholders (see *Identifying your project stakeholders*, earlier in this chapter) to organizations that have implemented leading practices. Additionally, a literature search can include:

- OR supply chain white paper publications;
- Association for Healthcare Resource and Materials Management (AHRMM); and,
- OR manager web sites and publications to learn from other industry experts with internationally recognized successes.

A more intensive and resource-dependent approach includes conducting surveys and workshops with OR staff, suppliers, supply chain staff, IT staff and key stakeholders. When conducting a workshop, a potential agenda may include the following:

- Presentation of a case study by the project manager of a successful implementation;
- Current state findings presentation;
- Workgroup discussions and presentations on current issues; and,
- Facilitated session on improvement ideas.

After the workshop, materials can be summarized and a subsequent workshop could be held to map out future state processes.

TIP: What to consider when designing and selecting your OR inventory storage solution:
- Will there be doors?
- Will the design of the doors help keep them closed?
- How high can it be?
- How many shelves?
- Does it need wheels?
- How much weight can it take?
- Does it adhere to regulations and standards?

TIP: Additional educational sources include:
- Healthcare Supply Chain Network (HSCN)
- Operating Room Nurses Association of Canada (ORNAC)
- Association of periOperative Registered Nurses (AORN)
- Healthcare Information and Management Systems Society (HIMMS)
- OR Manager
- OR Business Manager

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2   http://www.fin.gov.on.ca/en/bpssupplychain/documents/iscm_compendium.html

Defining your process requirements

Design new processes and staff roles

Effective changes or improvement exercises will most likely have an impact on staff duties, tasks, processes and responsibilities. Such changes should be examined and developed collaboratively with an analysis that includes the following:

- Defining new roles with HR approval (and external partners as required);
- Testing and validating any new processes from the future state design;
- Conducting additional hiring as required;
- Conducting a review of training and retraining; and,
- Establishing how these changes will be communicated.

As a key component of change management, communication strategies can be decisive in successfully implementing new processes and staff roles. The following issues should continue to be stressed:

- Clarify new processes and roles to key stakeholders.
- Engage stakeholders and solicit improvement ideas and feedback.
- Incorporate improvements into processes.
- Develop a routine iterative feedback or debrief system.
- Ensure compliance to new systems.

Processes for managing stock and non-stock products

While different product categories have slightly different requirements when it comes to data capture, sourcing information and replenishment processes, stock items and non-stock items can be managed in a similar manner by using the same replenishment process. This enables clinical and inventory staff to access and manage like items arranged by clinical workflow regardless of product category.

Process for managing consignment products – general

Consignment items have many requirements for data capture. Clinicians must capture a consignment item's unique information and link it to the procedure and to the patient.

When consignment stock is low, an immediate replenishment order must be generated and sent to the supplier with all pertinent information as to which unique consignment item was used. The supplier will then send replacement product. Finally, the supplier must invoice the hospital for the item(s) used. A completely electronic system to support this process results in a complex data flow, however, the efficiencies of an electronic system will outweigh the initial effort and investment of developing and implementing a fully integrated system. Two key advantages to an electronic system are patient safety for the recall of items, and vendor reconciliation for consigned items based on the tracking of ordered, used and borrowed items.

Process for managing consignment products - screws and plates

Screws and plates are implants that come in sterile trays (modules) on the case cart from MDR. These items need to be clinically charted, charged to the case and re-ordered as the size is selected at the point of use. These items do not have barcodes to scan and there is a legal requirement for the nurse to chart this information. Hybrid inventory solutions are available to manage all inventory types, but can be used for this type of product as well as for ordering, tracking usage and clinically charting.

TIP: Supply management: automated or manual?
A full review of the current systems is required to determine if there is functionality available to support automated supply management. This is typically a function of the ERP system or of a front-end supply management system that allows for scanning shelf label barcodes as well as basic inventory control functions. If your hospital must continue with a manual system, the methodology described in this chapter can still be applied.

TIP: Screws and plates management.
One solution is to add these items to the hospital item master file and use an OR inventory solution. Item number or description can be used to search for the item and virtually vend the items. Electronic cabinets with hybrid options and software solutions can provide a method for these items. Also unique to this category of OR inventory is the item master file requirements.

Every screw and plate size in the module, regardless of purchasing consumption report, must be loaded. The size selection must be available for the surgeon to select and is part of each module component. Once data is collected, consignment quantities can be evaluated based on usage. However, sizes will not be completely deleted due to the nature of the business.

The hospital should, as a long-term objective, move toward purchasing screws, plates and rods from the manufacturer in pre-sterilized packaging, and select the item as required from an inventory kept in an OR storage location. It is not considered best practice to have a range of implant sizes in an instrument tray. Since only the commonly used sizes are replenished regularly, the less frequently used sizes are left to be exposed repeatedly to cleaning and sterilization processes. Eventually, pitting and deterioration can occur.

TIP: Storage in the OR.
Radio Frequency Identification (RFID) or electronic cabinets with hybrid options are storage solutions that can help with inventory control, but they require extensive interfacing and a maintained item master file. An RFID solution is usually reserved for high-value, specialized products such as implants (but not screws and plates). It requires the purchase of RFID tags and staff must load and label the items. An electronic cabinets solution can be used for all items; stock, non-stock and consignment to support accurate consumption data, auto replenishment efforts, and case costing.

Drawing a process map

After completing your high-level conceptual design, draw a process map that shows the replenishment process your project team has envisioned. It should include each product category and the people responsible for its management.

Your conceptual design or future vision should include leading practices and reflect the findings of the workshops conducted to identify your requirements. Remember that validating your vision of the future state can be an iterative process, that is, the draft design will be reviewed by key stakeholders and likely changed and refined until it is agreed upon.
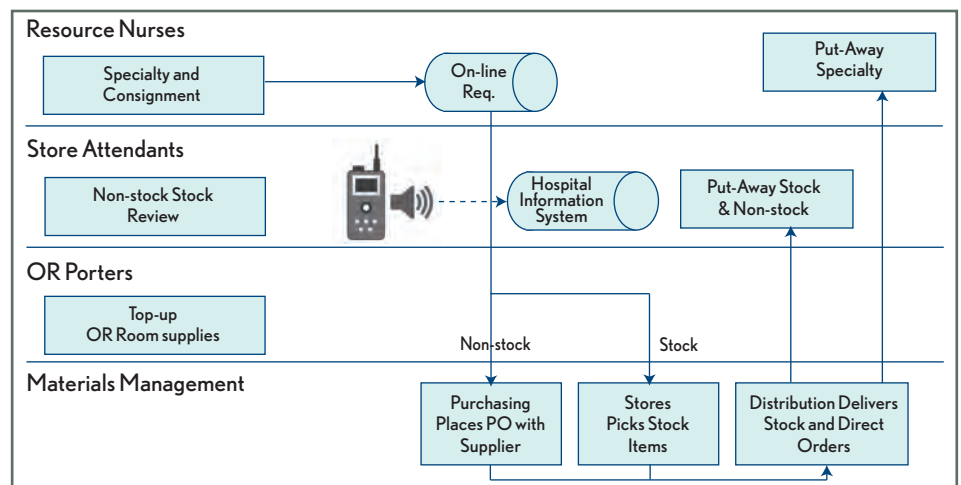
Figure 4: Sample high-level future state process map.

Conduct an OR inventory analysis

When you have assessed your current state, you have the information to:

- Perform a usage analysis on two years of stock and non-stock and consignment items;

- Determine OR inventory locations, review and plan for reorganization of stocking locations;

- Ensure resources are available for data collection and stocking locations should be updated in the item master file (see *Chapter 2, Data Optimization*); and,

- Develop human resources, training and communications plans.

Analyze OR inventory location data

Once item usage, current state top-up levels and unit of measure conversion rates are understood and OR inventory location data has been collected, they can be analyzed together to determine optimum ordering parameters.

To achieve the appropriate OR inventory levels, your organization must foster trust between end users, practitioners, clinicians, materials management coordinators, and departmental management and administrators. Like all clinical supply chain improvement projects, it is best to use a multidisciplinary team approach when reviewing and analyzing perioperative environment supply requirements.

There are two key points to consider when reviewing storage locations. If the storage space is limited, you may only be able to store one to two days of stock based on historical usage data. This then drives a more frequent replenishment cycle, and may escalate associated costs. If there is space available to store a higher quantity, it could minimize the replenishment cycle and associated cost. This applies only to frequently used items. Slow move or no move items should only be stocked at a level that is absolutely necessary.

Determine your product categories

Product categories should be reviewed and decisions made as to which category a product ultimately belongs. For example, if a non-stock product is being ordered on a weekly or even monthly basis, it could convert to a stock item kept in house or in the central warehouse.

TIP: Inventory ordering
Note that not all ERP and or materials management systems allow the ordering of stock, non-stock, and consignment products through the use of barcode scanning. Be sure to know your needs and technology options prior to selecting a solution.

Products should be placed in a 'class' based on usage criteria. This is a common inventory management methodology and most ERP and materials management systems have a data field for the product class. How to do this will be discussed in detail later in this chapter, but for now it is important to be aware that during the planning phases of this project, an analysis of product usage must be performed for all products, regardless of their current category, and then re-categorized based on their frequency of use.

Perform OR inventory location item usage analysis and ABC classification

A minimum stock level is defined for each item on the cart or shelf based on historical usage and the number of replenishment cycles for that area (i.e., the number of times per week the area is checked). Safety stock levels are defined through historical usage and a review of peak levels. Typically, items are considered 'high move' if used every day, 'medium move' if used weekly or less but at least once a month, and 'slow move/no move' if they need to be kept on hand but will seldom be used. The optimal level for each of these groups should ensure enough stock is on the shelf to support usage between replenishment cycles, but not so much that products are sitting for months unused. Typically, a maximum supply level, a minimum supply level and a re-order point are set within the system for each product.

Usage analysis for consignment products should occur for consignment levels set that are appropriate to usage with a safety factor built in. Unlike other inventory with min-max levels, consignment items are ordered and replaced as used. This will require discussion with the product supplier since the items belong to the supplier until point of use. Filling rush orders or having product sit on the shelf for excessively long periods can also be a significant cost to suppliers and increase the risk to hospitals for paying for damaged items.

For this step, OR inventory items can be cross-referenced with their respective utilization and order rates to estimate order frequency. For each item, the number of orders per week is calculated as the number of orders divided by the number of weeks in the range. The sum of orders per week for all items in an OR inventory location will form the baseline order rate. Using this order rate, you can compare the expected decrease in order lines.

The order frequency, which is the inverse of the orders per week, is calculated for each item within the OR inventory location and can be classified as outlined below:

Order Frequency	Class	Description
Twice per week	AA	Very high usage; large, bulky items
Once per week	A	High usage and large size
Every 2-4 weeks	B	Moderate usage, medium to large size
Every 5-12 weeks	C	Low usage, small to large size
Every 13+ weeks	D	Seldom used items

Also, at this point, items can be classified by size, which will help to determine if an order quantity should be increased or decreased.

Size	Example
Small	Needle
Medium	10 CC Syringe
Large	IV solution bag 1000 ml
Extra Large	Chest suction unit

Perform a packaging analysis for warehouse stock items

The utilization data collected by the means described above can be cross-referenced within packaging strings to determine whether items are typically ordered by the consumption unit of measure (typically 'each') or in packaging strings (typically 'pack', 'box' or 'case'). If the average order quantity is at least 90% of the package quantity, then you can assume that the item is typically ordered and picked by the package. Where the OR inventory is replenished from an MDR location the packaging string information is only relevant for the MDR orders to the warehouse.

With the utilization data, you can estimate the number of discrete items counted at the warehouse when picking for the OR inventory location. If the item is typically ordered in package strings, the discrete items counted would be the number or packages ordered. If the item is typically ordered in the consumption unit of measure, then the discrete items counted would be the quantity consumed in the consumption unit of measure.

The sum of these counts for all items in an OR inventory location represents the number of discrete items counted at the warehouse. This sum forms the second baseline for comparison representing the relative efficiency at the warehouse.

The sum of item counts per week divided by the number of orders counted per week will represent the average discrete items counted per order line, which is a useful metric to quantify improvements in picking efficiency.

Revise order quantity and calculate re-order point

Once the usage and packaging data has been analyzed, revised order quantities will be proposed to reduce the overall order rate for the OR inventory location. These will be evaluated based on current OR inventory levels, average order quantity and item size (shelf-life can also be a consideration).

The following are general guidelines to assist with this review:

- The list of items should be sorted by order rate, in descending order with the most frequently ordered items at the top. This will prioritize frequently ordered items, which have the greatest impact on total order rate.

- The 'AA' and 'A' items should be looked at critically and the order quantity increased to change them to 'A' or 'B' items, where space allows.

- All 'AA', 'A' and 'B' items that are not currently ordered in full packing intervals should have order quantities rounded up to one full package, where space allows.

- Large 'C' or 'D' items can have their order quantity reduced or removed if they are no longer required to free space for more frequently ordered items.

Once the order quantity has been revised, the re-order point can be calculated based on the revised item class, using a percentage of the re-order quantity. If the calculated re-order point returns a decimal, the number should typically be rounded up to reduce risk of stock out.

Class	Re-order Point as % of Re-order Quantity
AA	100%
A	100%
B	50%
C	25%
D	10%

The sum of the re-order point and re-order quantity equals the maximum quantity on hand. This figure should be compared to the original OR inventory level, and the percent increase or decrease in space required can be calculated for each item.

Using the revised ordering parameters, the order rate and number of discrete items counted, and the average items counted per order lines can be recalculated to model the future state. These variables can be compared to show a before and after optimization and determine percent improvement.

Validate recommended ordering parameters

When you have completed the steps above, you will have a revised list of ordering parameters and corresponding changes in space requirements. These should be validated visually at the OR inventory location before implementing any changes. Note that if the OR inventory location is being redesigned (e.g., new shelves, racking and or bins installed), the design of the new location and the order quantity optimization for the item(s) being stored there should be completed in tandem. This way, any new order parameters can be based on your future state design rather than the previous layout.

In particular, the following should be reviewed closely:

- 'AA' or 'A' items
- Large or extra large items
- Items with a quantity-on-hand increase of 100% over the original OR inventory level.

This can be completed with a printed list of the new parameters. Any required changes that are noted should be used to update the original analysis spreadsheet. The expected efficiency improvement should be recalculated based on these changes. See Figure 5, for an example.

Redesign stock locations

Using the revised layout plans developed during the process mapping exercise, work teams consisting of OR clinical staff and supply chain staff should review each supply item and determine the right location and restocking requirements. This is a critical and often time-consuming exercise, but done properly, it will determine the most effective stocking configuration to optimize inventory as well as make it convenient for staff. See this chapter's *Appendix C* for an example of designing shelving in the OR sterile core.

As the multifunctional teams work through the location and stocking parameters of each item, look for opportunities to standardize product. For example, during the physical inventory count conducted in the current state analysis and through further sorting and analysis of data, you may find that items with the same application are being sourced from different suppliers in different storage areas within the OR.

You may even find that non-standard items are being requisitioned through direct purchase orders when there are equivalent items available on contract through the central warehouse. As standardization opportunities are identified, procurement staff can be notified to follow-up on contracting and to delete duplicated items as necessary. This will result in lower supply costs and fewer SKUs to manage for replenishment.

As the small working groups focused on surgical specialties review each item and determine OR inventory requirements and placement, you can start to complete the plan for the physical reorganization and schematics of new cart and storage configuration. This is when you can begin requisitioning new racking and carts for purchase. Shortly after, racking can be received and installed with any minor construction done as required.

		Current State Analysis - Packaging				Future State Recommendation									
Packaging Interval	Packaging UOM	Total Quantity Ordered (Packaging UOM)	Average Order Qty (Packaging UOM)	Likely Ordered by Packaging Interval?	Est. Discrete Items Counted per Week (at WH)	Revised Order Quantity	Revised Order Quantity (Pkg UOM)	Revised Order Rate (Per Week)	Revised Order Frequency (Weeks)	Revised Class	Reorder Point	Max Quantity on Hand	Change In Space Required in PAR	Ordered by Packaging Interval?	Est. Discrete Items Counted per Weeek (at WH)
Lookup from Pkg table	Lookup from Pkg table	Quantity / Packaging Interval	Qty / # Orders / Pkg Interval	If Avg Order Qty > 0.9 Pkg then "Yes"	If Ordered by Pkg, Qty of Pkgs, otherwise Qty Ordered	Based on demand size, pkg interval and space available	New Order Qty / Pkg Interval	# of Orders / Days om Range * 7	Weeks in Range / # of Orders	Lookup Frequency from Class Table	Lookup % of Reorder Qty from Class Table	Sum of Reorder Point and Quantity	Incease from Max Qty over Current PAR level	If Avg Order Qty > 1 Pkg then "Yes"	If Ordered by Pkg, otherwise Qty Ordered
24	BX	25	0.4	NO	86	24	1.0	1	1	B	12	36	50%	YES	4
50	BX	14	0.3	NO	103	50	1.0	0.6	1.8	B	25	75	213%	YES	2
100	BX	7	0.1	NO	103	100	1.0	0.3	3.6	B	50	150	400%	YES	1
6	BX	16	0.3	NO	14	2	0.3	1.8	0.5	A	20	4	0%	NO	14
50	BX	6	0.1	NO	41	50	1.0	0.2	4.5	C	13	63	425%	YES	1
10	BX	5	0.1	NO	7	5	0.5	0.4	2.7	B	3	8	167%	NO	7
50	BX	36	1	YES	5	50	1.0	1.4	0.7	A	50	100	0%	YES	5
10	PK	36	1	YES	5	10	1.0	1.4	0.7	A	10	20	0%	YES	5
12	BX	27	1	YES	4	12	1.0	1	1	A	12	24	100%	YES	4
100	BX	2	0.1	NO	34	100	1.0	0.1	10.9	C	25	125	733%	YES	0
25	BX	19	0.7	NO	69	25	1.0	0.7	1.4	B	13	38	27%	YES	3
15	PK	8	0.3	NO	17	15	1.0	0.3	3.3	B	8	23	188%	YES	1
25	BX	6	0.2	NO	21	25	1.0	0.2	4.5	C	7	32	167%	YES	1
50	BX	12	0.5	NO	86	50	1.0	0.5	2.2	B	25	75	50%	YES	2
4	PK	6	0.3	NO	3	4	1.0	0.2	4.4	C	1	5	67%	YES	1
20	BX	10	0.5	NO	27	20	1.0	0.4	2.7	B	10	30	150%	YES	1
50	BX	1	0.1	NO	9	25	0.5	0.1	10.9	C	7	32	220%	NO	9
12	PK	12	1	YES	2	12	1.0	0.5	2.2	B	6	18	-10%	YES	2
12	BX	2	0.2	NO	3	6	0.5	0.2	6.5	C	2	8	33%	NO	3
25	BX	10	0.9	NO	34	25	1.0	0.4	2.7	B	13	38	-24%	YES	1
20	BX	2	0.2	NO	4	10	0.5	0.1	8.7	C	3	13	8%	NO	4
8	PK	9	1.6	YES	1	8	1.0	0.4	2.8	B	4	12	-4%	YES	1
12	BX	1	0.3	NO	2	3	0.3	0.2	6.5	C	1	4	-50%	NO	2
12	BX	1	0.2	NO	1	2	0.2	0.1	8.7	C	1	3	-25%	NO	1
4	BX	0	0.3	NO	0	1	0.3	0	26.1	D	1	2	0%	NO	0
		273			681				12.3						75

Figure 5: Analyzing the current quantities ordered and the available packaging intervals can yield revised order quantities for your future state.

Typical storage locations

The following details three main storage areas and the types of supplies kept within:

- **OR suite storage:** Minimal supplies in closed storage units, e.g., a small stock of common size gloves, prep solution, sutures specific to service, extra sponges for emergencies.

- **OR sterile storage:**
  - *Generic supplies:* Used by all services, centrally located and can be on open storage units if not located near a source of water, steam or contaminants.
  - *Service specific storage:* Located adjacent to, or near specific service suites, with supplies only required by that service. Can be open or closed units depending on the location, cost and the ability to maintain product sterility.

- **MDR storage (where applicable):** Ideally, with a case cart system implemented medical-surgical items on a pick list for the case carts would be stored in MDR.

A model that decreases duplication of supplies will support a more efficient replenishment process.

TIP: When loading case carts, have you considered the following?

1) Are the items on the case cart in the order of how the case set up occurs in the OR suite?

2) Is the case cart picking area set up in the same sequential order?

3) Are the pick lists generated with the items in order of how they should be picked?

4) Are the items placed ergonomically on the cart (e.g., the heaviest items on the middle shelves and consumables on the bottom shelves).

5) Are applicable infection control practices and standards being followed?

TIP: What to consider when looking at storage types and locations.

- Each storage location should be assessed for available space before min-max levels or the types of storage units are determined.

- If storage space is limited, higher quantities of product will not be able to be stored and will result in a more frequent replenishment cycle.

- Space should be optimized by selecting storage units that will maximize the available footprint.

- Wire carts with plastic bins are often suitable as they can be assembled specifically to fit a space. However, consideration must be given to all infection control, CSA and OR standards that relate to the storage of sterile goods, as open shelving is not appropriate to all areas.

- The ability to clean the storage units is another key consideration.

- When choosing bins, consider how easily you can affix a label to it, given its size, and the number of compartments.

It cannot be emphasized enough that a collaborative team should be gathered to assess and select storage units. Infection control representation and a review of the related standards is critical part of this process.

Cart selection or consideration

Determining what kind of cart you will use is based on the product's size and Total Package Allocation Quality (TPAQ) plus the total number of SKUs to be organized on the cart.

Smaller items less than 10 inches, typically, can be better organized on a multilevel drawer cart with the larger items on a five- to six-shelf cart including individual dividers. You can mix large items with small items, however, you have to determine your ratio of small to large items. Typically, any ratio greater than 3:1 (three small to one large) is best organized on a multilevel drawer cart. Otherwise, you should use the standard shelf cart with dividers and bins for smaller items.

For example, a drawer that is 6 inches deep by 18 inches long and 16 inches wide can be divided to house 12 items that are less than 6 inches in size (depending on quantity needed of course). So 12 items x 9 drawers = 108 items.

Determining which items belong in a storage location

This process requires clinical input and is best achieved by having the OR service leaders participate. There are significant efficiencies for clinicians to have 'like' products placed close to each other within a storage location. For example, all catheter supplies should be located together so that the clinician is not picking one item from one cart and the other related item from another cart location.

Once products are located by the clinician within a storage unit, the supply chain group can determine how much space in that location is need-based on the product usage and the min-max level that is appropriate. Replenishment systems require that an item location be very specific and the following information should be associated with each product:

1. Location of storage unit: OR Core
2. Storage Location Cart Number: Cart # 1 or by name (e.g., Urology)
3. Shelf Location: Shelf # 1
4. Position: Position #1

> **TIP: What is Total Package Allocation Quality (TPAQ)?**
> Total Product Allocation Quantity (TPAQ) = PAR Value + the Min Value
> Example: Skin Markers PAR=25 ea. Min= 10 ea. Total space to allocate on the cart will be 35 ea.

This information must be defined in the system before the system can create replenishment orders.

Ultimately, before a storage space reorganization can occur, all data that relates to product description, vendor re-order number, product category, packaging size, location of storage unit, shelf location and position, min-max level, and source for replenishment, as well as any other hospital specific data, should be entered on a spreadsheet or in a database. Please see this chapter's *Appendix D, Storage Redesign Guidelines.*

Conducting an OR inventory technology review

When developing your technology plan, look to study best practice solutions such as OR inventory cart management systems, point-of-use cabinets and their hybrid solutions (scanning, buttons, and closed cabinets) systems as well as RFID labeling.

These may be future considerations as some hospitals might not employ this technology yet. But as it is likely to be a future component of most perioperative environments, it is valuable to understand what technology is available.

Evaluate beyond restocking the shelf and managing appropriate OR inventory levels. Understand leading practice opportunities to generate reports and data including full case costing for budget, savings and standardization. Also evaluate the resources internally and support services that will be required for system sustainability and be sure you have your organization's commitment. Most importantly, the technology must support the clinical workflow and your process requirements.

Once a solution is selected, understand its impact on your current technology to determine how to leverage, enhance, or replace it.

Conducting a gap analysis

When stakeholders have agreed on the fundamental principles of change, conduct a gap analysis to compare the current state environment to the high-level conceptual design. This will help to identify gaps or areas where change is necessary to achieve the future state. Any disparities should be documented in the gap analysis document.

It is important to establish budget estimates for implementation of future state elements and estimated return on investment. Be sure to examine project costs such as project resource and backfill requirements, technology capital and implementation costs as well as physical storage aspects like shelving and bins, and minor construction costs. The organization may choose to move forward with the physical space reorganization but not invest in the technology to automate processes. There could be a multi-year, phased-in approach to such an analysis.

> **TIP: Resources and expertise**
> Remember a project takes two things: resources and expertise. Careful consideration should be made on every project regarding resource capacity and whether external help is required to supplement internal expertise.

Conducting a trial

Hospitals and their staff are very familiar with conducting trials or 'pilots' within the context of developing and sustaining evidence-based practices for clinical care. The same evidence-based approach can benefit your team in implementing change for surgical OR inventory management solutions.

Selecting a particular clinical service to 'trial' using new or modified OR inventory levels or replenishment processes has many advantages. Essentially, a trial allows for the mitigation of risk. For one, errors can be kept from spreading beyond the limited scope of the trial area. Exposing a smaller group to the new processes minimizes resistance to change, while maximizing the ability to leverage the benefits.

A phased approach following the trial has the same advantages of slowly identifying new processes required as well as any human resource gaps. A service by service approach will allow you to accommodate service specific requirements while working towards a more general standardized approach.

3.5 IMPLEMENTING OR INVENTORY OPTIMIZATION

Starting with optimized data

As in many supply chain improvement projects, the first step is to ensure that the item master file is optimized and accurate. OR inventory optimization involves a great deal of usage analysis, physical rearrangement and barcoding of the supplies held within the OR. All of this effort could be lost if the item master file is not accurate and/or if a data optimization project is undertaken after the OR optimization project.

The approach and specific methodology for ensuring that item master files are optimized may be found in *Chapter 2. Data Optimization*.

Implementing physical space changes

Redesigning and building your OR inventory storage space should be a collaborative process involving clinical and non-clinical professionals. It is important that those who design the storage space (be it shelving, bins, or carts) understand both the needs of those who stock and replenish the storage areas, and even more importantly, the end users who are removing and using the medical-surgical products. See this chapter's *Appendix B* for a sample explanation on designing shelves in the OR sterile core.

Updating technology and labeling

Hardware and software

The technology plan developed for the future state of your project will have defined the platform for implementing point-of-use inventory management systems, such as hand-held scanning with traditional OR inventory cart management systems, point-of-use cabinet and hybrid solutions, RFID systems or a combination of these technologies.

It is critical to have resources from the organization's IT department work with the project team on developing and implementing the technology plan. The IT group should work with the project team to source and install hardware, source software and integrate it with existing systems, as well as develop testing and training.

OR inventory location data and labeling implementation

The key steps in implementing the revised order quantities from the OR inventory optimization exercise include updating the materials management system and labeling OR inventory locations. Labeling should be completed as the physical redesign takes place to minimize duplication of effort.

Update materials management system

Once the revised ordering parameters have been calculated, they can be loaded into the materials management system. Ideally, the system will allow for the two variables, the re-order point (ROP), the re-order quantity (ROQ), with the ROQ being locked so that a smaller quantity cannot be ordered. For replenishment staff, re- ordering then becomes a "yes" or "no" question, as opposed to "how much". This enforces compliance and drives greater efficiency. If only a single field is available for the OR inventory item quantity, the sum of the ROP and ROQ should populate this field, and a secondary method to indicate order quantity must be determined.

Labeling of OR inventory locations

The final step in implementing OR inventory location changes is printing new labels for these locations and affixing them to the shelves or bins. This step can be time consuming as an OR inventory location may contain hundreds of items. Work with the appropriate stakeholders to determine what should appear on the labels since clinical staff and materials management staff have different information needs.

Remember that the labels will need to be changed/updated each time product information changes. This should be an assigned responsibility to a specific role to maintain consistency.

Managing change during implementation

As you implement your new OR inventory processes key change management elements must be kept in mind. Effective communications and training components are included as part of an implementation strategy.

At this stage it is important to communicate new processes, new roles and responsibilities, new or revised storage locations, and any new rules governing the use and maintenance of OR inventory data.

> **TIP: Make custom labels or use more than one.**
> - There are label design software applications that can be used to generate custom labels.
>
> - Two labels can be provided, one to meet the clinical needs, a label that states what the items is e.g., LATEX GLOVES and one for materials management (MM) that provides all the appropriate ordering information e.g., LATEX GLOVES, barcode, min/max levels, etc. These labels can be placed on top of each other. So the clinician can see what the item is, and when ordering/replenishing is required, the clinical label can be flipped up so the MM label can be used.

3.6 MEASURING AND SUSTAINING IMPROVEMENTS

Collecting measurable post-implementation data

The measureable data collected during the current state analysis will form the baseline against which to measure your post-implementation improvements. This can enable your project team to provide quantitative estimates of savings for the business case projections. The table below outlines measureable data that your team would have collected during the current state analysis.

Measure	Data	Collection
1. Reduction in clinical labour for supply chain functions	Number of nursing hours spent on supplies replenishment divided by savings due to clinical staff supply replenishment responsibilities conversion to supply chain	• Define discrete replenishment tasks from order requirement through to receipt; • Document a sampling of time and responsibility for each task over a one or two week period; or • Eliminate tasks and measure as per "Workflow Redesign Summary" example from the University Health Network (See this chapter's *Appendix E: Workload Analysis* for examples).
2. Reduction in on-hand inventory and obsolescence	On-hand inventory value (audit)	Conduct a physical inventory at project initiation of all items within the OR.
3. Reduction in inventory obsolescence	Value of obsolete and expired supplies write-off	• Track expired and obsolete inventory disposed of during project . • Request historical obsolescence figures from the organization's finance department.
4. Proportion of rush orders	Number of rush orders divided by total number of replenishment orders	
5. Inventory turn-over	Total OR inventory value divided by annual OR inventory spend	Include the physical inventory taken from the a review of OR expenditures either at the project's initiation or from the previous year's total.
6. Inventory turnover by category (A, B, C)	Total OR inventory value divided by annual OR inventory spend by category	Include physical inventory taken at the project's initiation or from the previous year's total in the 'OR spend by' category.

Measure	Data	Collection
7. Proportion of items inactivated from the item master file	Total number of items removed divided by the total number in the item master file.	Track number of inactivated items.
8. Improvement in customer service levels – reduction in stock-outs and reduction in OR suite delays	a) Number of OR delays due to supply issues b) Fill rates to end users (from central stores), e.g., perfect orders/ total orders c) Stock-outs at the cart level d) Number stock-outs/ period supply chain customer satisfaction	a) Include a count of delays pre- and post-implementation. b) Track supply chain stock orders. c) Track items with zero inventory on carts. d) Conduct client satisfaction survey with OR patient care staff pre- and post- implementation – continue to monitor on a quarterly basis.

> **TIP: Use a formal follow-up schedule.**
> To ensure effective OR inventory location evaluation and tracking, a formal follow-up schedule or program should be implemented. The absence of such a plan is frequently a weakness of Operating Room Supply Chain projects, where efficiency objectives are met over the short-term but gradually regress to something closer to their previous state due to lack of maintenance.

Ongoing OR inventory location evaluation and tracking

When you have completed your implementation, it is critical to have the supply chain team monitor the optimized OR inventory location and review it on a periodic basis with clinical managers to ensure the following:

- Quality and client satisfaction are maintained (or enhanced);
- Staff are compliant with new ordering parameters; and,
- Efficiency objectives are achieved.

Furthermore, OR inventory item usage should be re-assessed periodically to determine if items significantly increase or decrease in usage.

Monitoring service quality

End-users in departments where medical-surgical product inventory locations have been optimized should be consulted regularly for the month following implementation to ensure that service quality has been maintained. Consider asking the following:

- Is there too much stock resulting in overcrowding?
- Have stock-outs increased or decreased (due to low re-order points)?
- Is packaging waste being disposed of appropriately and in a timely manner?
- Are users able to quickly find the products they need?
- Are labels being re-generated each time item information changes?

Monitor compliance

If your ROQ is locked in the materials management system or handheld device, then compliance is guaranteed. However, if users can still order variable amounts, check your OR inventory ordering history approximately one month after implementation to assess if the replenishment staff is ordering according to your newly implemented parameters.

Measure efficiency increases

Design a simple report that queries the number of lines issued to each OR inventory location (or department) from the materials management system. A few months prior to implementation will establish the baseline of comparison. The number of lines should adjust quickly downward to the expected level based on the analysis and revision you have completed. If your results are not what you expected within a few weeks of implementation, investigate the root cause and take corrective action.

Monitor for changes in item usage

Produce periodic reports to determine if items have increased or decreased substantially in usage. For large inventory locations, this should be completed every three to six months. Smaller inventory locations can be checked every nine to 12 months as inefficiencies for these areas will not have a substantial impact on order lines. This monitoring and correction can be completed relatively quickly as the reports and queries will already be set up from your optimization project, and typically less than five percent of items will require corrective adjustments.

Sustaining your change

The aim of this initiative, as with all others in this guide, is to create an environment of continuous improvement. While *Chapter 5, Project Management* examines the broader ideas surrounding how to sustain the changes your project has brought about, here are a few considerations specific to OR inventory and OR inventory level optimization work:

- **Communicate:** Ensure that communication is maintained between OR and the supply chain. You can do this by developing regular meeting schedules and standard agendas; implementing an OR inventory review process; reviewing metrics on a regular basis to ensure benefits are sustained; and, developing standard nomenclature for item master file in conjunction with supply chain and OR clinical.

- **Protect:** Manage your data by ensuring processes are documented and in place for item add/change/delete to keep 'bad' data from being re-entered into the item master file. This may be a new role for the OR and for the purchasing department, so the impact to resources will need to be evaluated.

- **Audit:** Conduct regular physical audits, noting and reporting any increase in clutter, OR inventory status, obsolete or expired goods.

- **Survey:** Conduct and evaluate annual or semi-annual customer satisfaction surveys of OR staff.

- **Train:** Provide ongoing training for new staff and as staff re-fresh.

- **Show:** Post before and after photos, 5S processes to remind staff of project successes.

- **Tell:** Build trust by providing service delivery stats reporting, comment boards, etc.
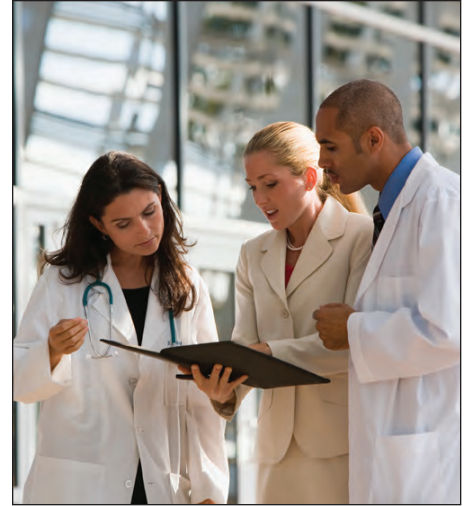
You can maintain your change by conducting and evaluating annual or semi-annual customer satisfaction surveys of OR and MDR staff.

3.7 APPENDICES

Appendix A: Standardization Savings Opportunities Example from OR Supply Chain Project

Commodity	GNG	SCG	WHS	Total Annual Spend	% of Total	GPO?	Converted?	Benefits est Low	Benefits estimate High	Contract Exp
PT SPEC-HIP REPLACEMENT	$ 542,938	$ 830,601	$ 427,329	$ 1,800,868	12.62%	N		$ 180,087	$ 360,174	2009
PT SPEC-KNEE REPLACEMENT	$ 433,862	$ 885,557	$ 430,332	$ 1,749,751	12.26%	N		$ 174,975	$ 349,950	2009
SCREWS/PLATES-JOINTS OTHER	$ 314,141	$ 346,479	$ 202,785	$ 863,405	6.05%	N		$ 86,341	$ 172,681	
PT SPEC-JOINTS (OTHER)	$ 15,299	$ 123,354	$ 31,146	$ 169,799	1.19%	N		$ 16,980	$ 33,960	
ORTHOPEDIC IMPLANTS TOTAL	$ 1,306,240	$ 2,185,991	$ 1,091,592	$ 4,583,823	32.12%			$ 458,382	$ 916,765	
PT SPEC-CARDIO-PACEMAKERS	$ 226,370	$ 445,592	$ 270,083	$ 942,045	6.60%	N		$ 0	$ 0	2009
M&S-SUPPLIES UNCLASSIFIED	$ 247,039	$ 491,136	$ 152,759	$ 890,934	6.24%					
M&S-STAPLES	$ 172,801	$ 520,422	$ 178,580	$ 871,803	6.11%	Y	Y	$ 0	$ 0	2008
M&S-INSTRUMENTS-REUSABLE	$ 222,172	$ 433,995	$ 147,166	$ 803,333	5.63%	Y	Y	$ 0	$ 0	2011
M&S-INSTRUMENTS-DISPOSABLE	$ 186,012	$ 310,519	$ 251,443	$ 747,974	5.24%	Y		$ 0	$ 0	
M&S-DRESSINGS	$ 123,706	$ 212,106	$ 91,264	$ 427,076	2.99%	Y	Y	$ 0	$ 0	
PT SPEC-INTRAOCULAR LENS	$ 218,675	$ 1,135	$ 181,321	$ 398,861	2.79%	N		$ 0	$ 0	2011
DRAPES-SURGICAL-REUSABLE	-$ 2,905	$ 224,162	$ 127,228	$ 354,295	2.48%	N		$ 0	$ 0	2008
M&S-SUTURES	$ 93,513	$ 166,247	$ 92,727	$ 352,487	2.47%	Y	Y	$ 0	$ 0	2008
DRAPES-SURGICAL-DISPOSABLE	$ 245,258		$ 6,227	$ 251,485	1.76%	N		$ 25,149	$ 62,871	2009
PT SPEC-CARDIO-LEADS	$ 116,872	$ 58,649	$ 65,344	$ 240,865	1.69%					
PT SPEC-PHACO EYE PACKS	$ 85,790		$ 142,001	$ 227,791	1.60%					
M&S-CATHETERS	$ 58,758	$ 95,424	$ 59,083	$ 213,265	1.49%					
M&S-GLOVES	$ 70,156	$ 68,855	$ 50,050	$ 189,061	1.32%	Y	N	$ 18,906	$ 37,812	2009
RESPIRATORY-DISPOSABLES	$ 49,434	$ 94,451	$ 31,725	$ 175,610	1.23%	Y	Y	$ 0	$ 0	
MINOR EQUIPMENT-FUNDED		$ 160,878		$ 160,878	1.13%			$ 0	$ 0	2009
M&S-GENERAL	$ 80,287	$ 67,022	$ 59,518	$ 206,827	1.45%			$ 0	$ 0	
LINEN-STAFF APPAREL	$ 65,171	$ 95,572	$ 33,391	$ 194,134	1.36%			$ 0	$ 0	
PT SPEC-CARDIO-GRAFTS		$ 107,548	$ 26,809	$ 134,357	0.94%			$ 0	$ 0	
Top 20 Spend Categories Total	$ 3,571,159	$ 5,737,434	$ 3,058,311	$ 12,366,904	86.66%			$ 502,437	$ 1,017,449	
Total OR Spend 2007/08	$ 9,007,685	$ 14,514,305	$ 7,699,561	$ 31,221,551	100.00%			$ 1,463,256	$ 2,951,662	

Appendix B: Sample Project Plan from OR Supply Chain Project

POU Optimization Sample Timeline		Year			
Point of Use Supply Replenishment Optimization	Owner		Phase 0	Phase 1	Phase 2
Project Initiation					
Develop Budget estimates for Pilot Project Roll-out					
Confirm Potential funding sources					
Senior Executive Plan/Budget Approval and Ongoing Updates			△ △ △ △	△ △ △	
Stakeholder Development					
Senior Executive Ongoing Updates					
Perioperative Committee Update					
Regional Logistics Facility Coordination					
Human Resources					
Develop New ORSC Position descriptions, roles & responsibilities					
Develop Training plans for new ORSC positions					
Roll-out Training					
Communication					
Conduct Stakeholder analysis					
Develop Communication Plan					
Roll-out Communication Plan					
Initiate meetings with appropriate clinical groups					
Conduct stakeholder feedback surveys			△	△	
Develop metrics for project performance measurement					
Establish measurement reporting and develop baseline measures					
OR Supply Replenishment Process Improvement					
High level map of current processes and design of future vision					
Map current replenishment processes from order to reciept for the OR:					
Stock supplies					
Non-stock supplies					
Consignment supplies					
Identify inefficiencies, redundancies, gaps etc.					
Review Healthcare Supply Chain leading practices					
Interview key stakeholders					
Design new, streamlined replenishment processes and schedules					
Confirm new processes with key stakeholders (workshops etc)					
Finalize and document future state process flow					
Develop detailed implementation plan to achieve improvements					
Confirm new job roles and responsibilities applicable for new processes					
Develop revised job descriptions and obtain HR approval					
Provide detailed estimates and expected schedule of costs and savings					
Complete implementation					
Conduct post-implementation audit and measure benefits					
Data Collection/Cleanse					
Confirm Data requirements for revised processes ie: bar code scanning etc					
Collect existing item data on stock, non-stock and consignment items					
Complete inventory of all locations for all items					
Remove obsolete and expired items					
Confirm IT system(s) data requirements for Bar Code & Scanning					
Data Cleanse SEE PROJECT TYPE DATA CLEANSE					
Gather/document data elements for new SKU set-up as required					
Set-up new items in information system item master as required					
Identify items for standardization initiatives					
Develop and implement item add/change/delete processes & responsibilities					
PAR Optimization					
Develop schematics of all supply room locations					
Determine available space for revised stocking locations					
Develop future state stocking locations and cart/shelving requirements					
Develop new cart/shelving/bin specifications					
Determine renovation requirements					
Develop and release RFP process for carts/shelving/bins					
Develop and release RFP process for renovations					
Review vendor submissions, complete contract negotiations					
Determine/Estimate usage data by item by location					
Establish Par levels by location by item					
Meet with clinicians by area to secure sign-off on Par levels					
Enter Par information into IMIS systems					
Build carts/shelving, arrange items in bins etc and label					
Implement new replenishment schedules, provide staff training					
Review fill rates and adjust Par levels as required					
Technology Implementation					
Determine capabilities of I MIS system for revised processes					
Develop gap analysis and technology requirements					
Devlop Technology implementation plan					
Determine implementation costs and confirm funding source					

Appendix C: Designing Shelving in the OR Sterile Core –
An Example from OR Inventory Optimization, OR Supply Chain Project

OR Inventory Optimization - Steps to Designing Shelving in the OR Sterile Core

1. Consult with clinical staff and team leaders to group all medical-surgical inventory that is to be kept in a particular location by either service-specific items, or items they would like to see next to or close to each other. Please see the section on *Determining your Product Categories* earlier in this chapter.

2. Group the above by slow and fast moving products.

3. Select one 'each' (1 ea.) of every product and build a sample layout of the cart keeping in mind, the above mentioned parameters.

4. Try to put fast moving product in the middle shelves or drawers and the slower moving items on the top and bottom.

5. Have clinical professionals review the layout.

6. Once reviewed, make necessary adjustments as per any clinical recommendations.

7. Label. Ensure this is the last step, as location changes will be made before the cart build is complete.

Additional Tips
- Obtain unit or department usage reports from stores and/or purchasing. Also general usage knowledge from nurses and team leaders. (PAR and Min Values)

- Note pack factor of each product or the unit of issue from vendor to assist you in determining how much space the product will need upon receipt and how it can best be stored within the OR storage area based on Unit of Issue and UOM.

- Understand lead time (i.e., How long will it take for the product to arrive from the time of ordering to being stocked on the shelf.) This will help to determine Min value as well.

Guidance for Supply Storage Redesign

Principles to keep in mind

- Flexibility – required to accommodate ongoing changes and future system optimization to meet clinical, business and financial needs.
- Accessibility – ensures efficiency, but be sure to keep in mind that product locations and storage space redesigns are primarily based on your customer (clinical) needs but should also balance with replenishment efficiencies
- Standards – meets required organizational practices
- Collaboration (clinical and non-clinical) – essential for product locations and storage space design
- Controlled – High cost items and implants can benefit the organization financially if they are in a secure closed solution.

Environmental storage conditions

- Required controlled conditions
  - temperature 24 (18-22) degrees C
  - maximum humidity 70% (30-50%)
  - (ventilation) positive air flow pressure
  - minimum four air exchanges/hour

- Fire code regulations
  - eight-10 inches from floor
  - 18 inches from ceiling,
  - two inches from wall

- Traffic controlled
  - limited access
  - separate from high traffic area

- Housekeeping and cart washing required

Sterile supply placement

- Minimize exposure to contaminants (e.g., water/condensation from pipes, sinks, windows, floors)
- Use closed or covered cabinets (especially for seldom used supplies)

Appendix D: Guidance for Supply Storage Redesign from
OR Supply Chain Project continued

- Maintain package integrity (prevent crushing, compression, puncturing/tearing)
- Separate from clean supplies
- Keep sterile supplies above clean supplies
- Consolidate supplies into categories
- Maintain event-related sterility standards
- Accommodate large supplies
- Do not use cardboard or external shipping containers

Functional conditions

- Visibility – easily identified and located
- Open access in non-patient areas
- Diverse configurations to accommodate different sizes
- Able to accommodate changing package sizing (drawer size/shelf height)
- Secure placements
- Placed in logical sequence
- Avoids sterility compromise
- Conducive to stock rotations
- Decreases potential of overstocking/excess
- Marking/labeling is readable, informative, and features appropriate naming conventions
- Complies with occupational health and safety standards (weight, location, etc.)

Appendix E: Workload Analysis Example from OR Supply Chain Project

DATA ENTRY TIME ANALYSIS

Time in **minutes** for a 7.5 hour day over a 6 day period. April 29- May 06 2008.

Staff	OR Orders	Repairs	Exchanges	Stock Items	Non Stock Items	Loaner Equipment	Back Orders	Substitutes	Trials	Consignment	New Items	Resource RN requests	Requisition Maintenance	Site-Site Shared Equipment	Total Redundant hours/day	FTE Total	FTE Value
OR STAFF																	
DMH	250	5		70	35	125		80		85	7	5	90		0.99		
GNG	335	45	10	155	175		80		5	25	5	20	20		1.85		
PCG	15	10	5		5		10			5		10	45		0.06		
OSS	60	35		75						85		65	80		0.38		
SCG	155	50	20	90	80	105	15	5	20	20	80	80	75		0.90		
WHS			15	120	300	135	15	30							1.17	0.21	$ 9,663
TOTAL	815	145	50	510	595	365	120	115	25	220	92	180	310		5.33	0.98	$ 44,174
MM STAFF																	
DMH	48	2	3		38	2	3								0.24		
GNG	182	33	63	20	363	11	29	17			23	5	5		1.57		
PCG			10												0.00		
OSS	60	20	10		15	15	25			85	20				0.21		
SCG	650	165	40	40	95	50	970			125	165				2.18		
WHS	60	5		5	65	30	25			5	125		150		0.36	0.07	$ 2,991
TOTAL	1000	225	126	65	576	108	1052	17	0	215	333	5	155	0	4.56	0.84	$ 37,755
WHS	60	5	15	125	365	165	40	30	0	5	125	0	150	0	1.53	0.28	$ 12,654
TOTAL	1815	370	176	575	1171	473	1172	132	25	435	425	185	155	310	14.03	1.82	$ 81,929

Time not captured for delivery of requisitions to purchasing and stores departments.

OR Staff times include surgical support worker charge nurse resource nurses and ward secretaries.

PCG Charge Nurse who is responsible for ordering only worked 2 days.

Chapter 4. Product Selection and Standardization

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CONTENTS

CHAPTER AT A GLANCE

Typically the responsibility of a hospital's purchasing department, product selection is done using structured criteria to facilitate fair and transparent processes in business practices and relationships with suppliers. While an OR may have different product requirements than the hospital at large, it is best to follow your organization's policies and procedures when it comes to selecting a product. In most cases, any specific product requirements you may have will be addressed by your organization's additional or unique product selection processes.

If your organization does not have an existing structure for product evaluation and standardization, you should make every attempt to put one in place. Hospitals that belong to a shared service organization usually follow collaboratively developed sourcing, contract management and procurement policy.

This chapter begins with an examination of product selection and standardization including how various decision making structures, such as value analysis, product evaluation, and standardization committees, are created. It also looks at how these structures allow clinicians to assess new products and provide feedback on them before they are brought into the OR.

If you work as part of a large organization, product selection policies will already be in place. In this case, this chapter can serve to give you a better understanding of how product selection is typically conducted, and to show you the framework that will be used to assess the unique requirements of your OR.

If you work as part of a smaller organization, where a perioperative environment may have a more direct role in purchasing, this chapter will serve to improve your understanding of how to create a product selection process.

4.1 UNDERSTANDING PRODUCT SELECTION AND STANDARDIZATION

What is product selection and standardization?

Product selection refers to the process by which perioperative departments, surgical service areas, and hospitals as a whole select, evaluate and ultimately procure the products they use and consume. These products can be stock, non-stock or consignment items. One of the key elements of product selection is standardization, which has several benefits including increased patient safety and lower costs.

Ontario's hospitals consume vast amounts of products, require a great deal of related services and rely on thousands of suppliers. The perioperative service (the term department is not inclusive enough in this context) is one of the heaviest users of products and supplies in the hospital's continuum of care. This entails the constant intake and replenishment of products from external parties such as distributors, vendors and manufacturers.

Given the number of parties involved in reviewing, selecting, evaluating, trialing, and procuring products and services for the perioperative environment, forming a product evaluation and standardization committee to manage product selection decisions is considered a leading practice.

Who performs product selection?

Product selection centres on collaborative decision making within an accepted and understood organizational structure. Most often, this will consist of interdisciplinary committees with set terms of reference, governance structures, and policies and procedures for reviewing, procuring and assessing new medical surgical products for the hospital. Product evaluation and standardization committees and value analysis committees are two common examples of interdisciplinary committees.

Collaborative decision making

Getting interdisciplinary participation in product evaluation is a critical success factor to surgical departments and the hospital as a whole. In addition to clinicians, physicians and materials management representatives, it is important to include a wide range of representatives from all relevant areas of the organization. An effective product evaluation process must include participation from hospital administrators, patient safety and infection control representatives, finance and risk managers, as well as purchasing and procurement professionals from your hospital or shared service organization.

Interdisciplinary and collaborative evaluation teams allow various stakeholders to voice their concerns and opinions, consider patient safety and also help ensure that personal preference is not the sole factor in product selection. What is more, interdisciplinary teams not only strengthen product selection and procurement processes, they can facilitate adherence to processes and procedures, making sure these are sustained and improved over time.

An effective product evaluation process needs more than just the input of clinicians, physicians and materials management. Involve hospital administrators, patient safety and infection control representatives, finance and risk managers, as well as purchasing and procurement.

What is value analysis?

Value analysis is the organized, systematic application of recognized techniques that identify the functions of a product or service. It seeks ways to enhance value by providing the performance you need at the lowest overall cost. Product selection and evaluation can be seen as an integral part of a value analysis process, but product selection and evaluation in and of itself is not value analysis. Value analysis is far more comprehensive, as is illustrated in Figure 1, on the next page.

Figure 1: Value analysis holds a central position in relation to the key areas of Product Users, Purchasing and Procurement, and Finance.[1]

Specific to a hospital's clinical services, the value analysis process can also include the evaluation of the need for and suitability of OR specific procedures, medical supplies and equipment[2]. These decisions generally occur either at a perioperative executive level or at a senior organizational level.

Generally, the goal of a hospital's value analysis program is to improve performance and manage costs. It does so through the review of efficacy, standardization and the effective use of products, services and processes. And it does this all the while maintaining or improving the quality of care it provides. Your hospital's value analysis program may have a number of value analysis teams or committees, of which one may be the perioperative or surgical value analysis team.

1   Source: "What is Value Analysis in Healthcare? WellStarr Health System Georgia, USA.
    http://www.iienet2.org/uploadedfiles/Webcasts/SHS_VA_Presentation.pdf
2   Cornwall Community Hospital, Surgical Services Value Analysis Committee Terms of Reference, 2010

It is important to note that value analysis is not generally the responsibility of perioperative supply chain professionals. Representatives from the perioperative and medical device reprocessing (MDR) departments should be involved in the value analysis process and committees, but the responsibility for the initiation and implementation of value analysis and its processes belongs to the hospital's purchasing or procurement group.

It is also important to consider that while a value analysis is meant to review products, services, and processes, conducting a value analysis in a surgical setting may also lead to an evaluation of the type of surgical or clinical services provided, or an evaluation of the volume of those services provided. Such evaluations are beyond the scope of this guide, as are any specific recommendations pertaining to particular product decisions or vendor decisions.

The team should also consider the total cost of ownership of the products and equipment before determining the value. Items that may provide efficiency in the OR can actually add to the work of other departments within the hospital. This may be justified if it supports clinical practice, but should be taken into account from a costing perspective. An example of this is the adoption of minimally invasive procedures using endoscopes. While these provide obvious benefits to the patient, reprocessing endoscopes can be labour intensive and this equipment has, in some cases, driven up costs within MDR departments. Although the overall benefit outweighs this additional cost, it is often not considered as part of the cost analysis.

What are the benefits of product standardization?

Product selection efforts can and should lead to some degree of product standardization. This enables the efficient use of resources, promotes common approaches and processes, reduces the opportunity for error, and increases patient-centred outcomes. There may continue to be a need for several different sets of products and instruments from a clinical and patient safety perspective, however, reduction in variety here should be seen as a positive and achievable goal on both a departmental and organizational level.

TIP: Consider sterilization costs of new product
Be sure to involve representatives from the MDR department in the value analysis process and committees. Hospitals must be certain they can clean and sterilize the product being considered, and if so, at what cost.

Once an approved product is selected, appropriate downstream systems, including materials management systems and clinical information systems, can be updated with applicable and accurate product information.

Product standardization can assist in a number of other ways, including:

- Helping to introduce product to staff and surgeons and easing adoption through appropriate change management and communication;
- Reducing duplication of effort in areas such as training, knowledge transfer, product handling, and replenishment processes;
- Increasing transferability of knowledge and skills;
- Increasing safety for patients, surgeons and staff;
- Assisting with determining clinical case costing; and,
- Promoting overall cost savings through economies of scale purchasing and streamlined adoption processes.

Additionally, a structured approach to product selection, including a committee-based product introduction framework, can assist the hospital and specific departments within the hospital in limiting the introduction of 'exceptional' or unauthorized products.

Once an approved product is selected, appropriate downstream systems, including materials management systems and clinical information systems, can be updated with applicable and accurate product information. This can benefit the following:

- Product data optimization within the item master files
- Procedure card accuracy
- Product inventory replenishment
- MDR activities
- Vendor and contract management.

4.2 PLANNING YOUR PROJECT

Most hospitals already have a formal product evaluation structure in place. Product evaluation and potential standardization decisions should involve all key decision makers from the clinical and non-clinical professions.

There is no single perfect solution or organizational structure for product evaluation and standardization. Product selection and potential standardization efforts centre on collaborative decision making, value analysis, and adherence to decisions through effective policies and procedures. Ultimately, "the ability to consolidate purchases, to use few suppliers and fewer products, generates substantial financial benefits related to inventory investment, product pricing, and total delivered cost… as well as cost associated with clinician use, education, and potential product usage errors."[3]

Forming your project team

Most hospitals have some form of committee structure for product selection, if they do not already have committees for value analysis and product selection and standardization. If a product evaluation and selection structure and process exists within the hospital, then optimization projects or improvement suggestions should be taken to the chairs of the appropriate committees.

If your organization does not have a product evaluation and selection structure specific to the medical surgical products for the perioperative or surgical environment, consider forming one as part of the larger product evaluation and selection structure. In this case, the perioperative area may undertake a 'project' to form a perioperative product evaluation and selection committee that would report through the perioperative committee.

Steering committee

A steering committee should be formed at the beginning of the project and a clear and concise project charter should be developed that articulates your objectives and ensures these are aligned with the organization's goals. The steering committee will ultimately be responsible for project progress and participate in conflict resolution, if required. See *Chapter 5: Project Management* for more details on forming your project team.

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3   Anderson et al. *Healthcare Supply Chain Management: Resource & Logistics Processes* (Chicago, IL: Association for Healthcare Resource & Materials Management of the American Hospital Association, 2010) p. 316.

Surgeons should see that their input has been sought, their positions listened to, and that the products selected continue to meet their surgical needs.

Project team

As with any other improvement project, two key elements should be stressed:

- The importance of dedicated project management; and,
- The importance of establishing a collaborative, interdisciplinary project team.

Typically, from the perioperative environment, the following people must participate in your product evaluation improvement project:

- Service group coordinator (resource nurse, team leaders)
- OR manager
- Surgeon sponsor by service
- Perioperative materials manager
- Supply chain coordinator
- Inventory systems/transactions coordinator/data base managers
- MDR representative
- Shared service organizations representative
- Infection control practitioner.

Identifying your project stakeholders

Beyond having a comprehensive and collaborative composition, your product selection or value analysis committee should include other stakeholders whose involvement is key to bringing about your project's success.

Senior management. This group can provide support, approval and conflict resolution but will want to know the benefits of the improvements for the organization.

Surgeons. They will be more likely to participate if it is clear that the changes will support their ability to perform their procedures without supply issues. They should also see that their input has been sought, their positions listened to, and that the products selected continue to meet their surgical needs.

Clinicians/professional practice educators. As champions for change, clinicians will directly benefit from product selection improvements and will drive the project tasks.

IT department. It can provide historical purchasing data and support automation of the evaluation process.

Materials Management, Purchasing, Shared Service Providers and Finance. These groups include procurement professionals who will carry out the decisions of your evaluations and product selection.

MDR department. It will be directly affected and will benefit from improvements, product streamlining and standardization, with cost and effort reductions.

Organizational development teams. They can assist with change management, communication, and relationship-building strategies.

Key activities for developing and optimizing product selection

As with other improvement initiatives, you should start with a clear understanding of your project's key components and its business requirements. Additionally, you should design a model of the future state.

Key components of your project then should include the following:

1. **Assessing your current state.** Once you have assembled your team and identified the stakeholders, you should work to form your baseline metrics by collecting data, mapping processes and assessing existing policies and procedures.

2. **Developing your future state.** This includes the assessment of what products and supplies are required to successfully complete the clinical procedure and an assessment of the options available.

3. **Implementing product selection optimization.** Having used the current state analysis and measured it against your future state, you will have identified areas of opportunity on which to focus implementation measures. In practical terms, much of the implementation will focus on the formation and functioning of a product selection committee and process.

4.3 ASSESSING YOUR CURRENT STATE

Once you have identified project team members and stakeholders, you should devote time to understanding your current product selection processes so that you can form your baseline metrics. To do this, perform the following tasks:

Ask questions

Some key questions used to drive your assessment of the current state of product selection in your perioperative environment include the following:

• Do we have or need a perioperative-specific product evaluation selection process as part of our hospital's larger product evaluation and selection process?
• Who is selecting/trialing the products and how often?
• How long does a product selection process take?
• What does our current process do well?
• Where are the opportunities for improvement?
• What is the role of the shared service organization and/or group purchasing organizations in this process?

Collect, classify and summarize data

A data collection task can include tracking the number of new products by surgical service line, procedure, unit, or department that are reviewed, trialed, selected and procured in a given time frame.

It is important that information on products currently being used for the same purposes in similarly classified procedures, including comparative pricing, is available and presented to all stakeholders, including, most importantly, to the surgeons. This should be done in a manner that allows for clear evidenced-based decision making.

The importance of accurate and current product information and pricing in product evaluation selection and standardization serves to underscore the prominence of data optimization in improving all aspects of the clinical supply chain.

Map decision-making processes

Successful product selection efforts can benefit from project management elements such as templates and flow charts.

Figure 2, below, is an example of a decision-making flow chart that allows for all parties, including vendors and the hospital, to understand how decisions are made and who is responsible at various stages of the process.
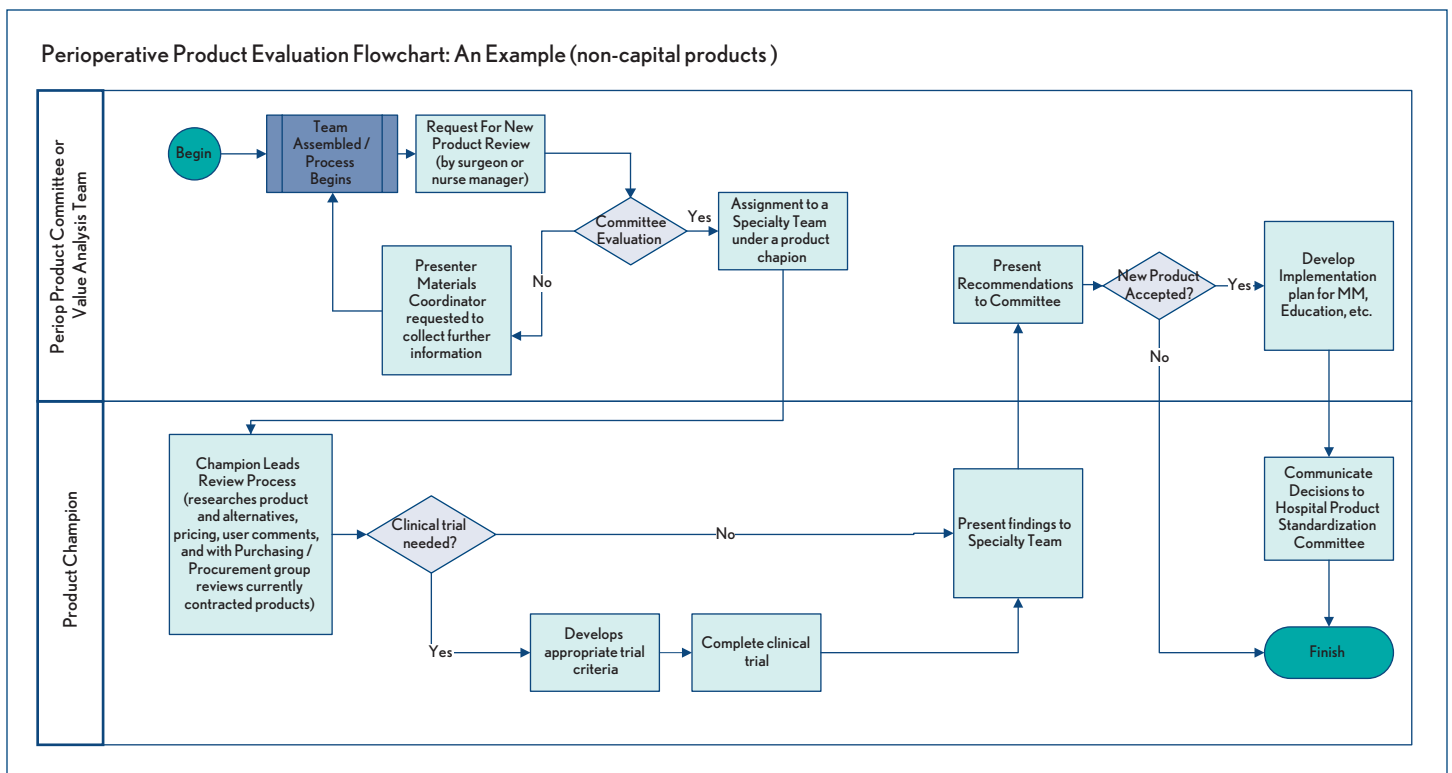
Figure 2: Decision-making flowchart for product selection and evaluation.[4]

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4   Source: Adapted from *Healthcare Supply Chain Management*, Association Healthcare Resource and Materials Management, 2010, p.303.

The process of determining clinical requirements should be led by surgical practitioners and clinicians.

The flowchart in Figure 2 illustrates a simplified process for the selection of non-capital products or supplies intended for use in the perioperative environment. A similar flowchart could inform a capital product decision making process within a hospital. However, any capital decision-making process should include a link to the operational decision-making process within the hospital or affected area. Capital decision making for products and equipment must advise, inform, and solicit feedback from operational groups that will be affected.

Know your procurement policies and procedures

Procurement Policies and Procedures (PPP) provide a framework and mandatory requirements to govern how organizations conduct sourcing, contracting and purchasing activities, including approval segregation and limits, competitive and non-competitive procurement, conflict of interest and contract awarding.[5]

The mandatory requirements for procurement for Ontario hospitals can be found in Ontario's *Broader Public Sector Procurement Directive*[6].

It must be stressed that the process of determining clinical requirements should be led by surgical practitioners and clinicians. But procurement processes, from assessment through to trials and actual procurement, must be collaborative and involve non-clinical professionals from various parts of the hospital and from the shared service organization. Indeed, while having the surgical practitioners' input into this process is very important, they are not the sole decision makers for the procurement of goods and services in your perioperative environment.

Vendor relations and management

Assess the state of your vendor relations including policies and procedures for the perioperative department. This assessment should also consider how your perioperative department's vendor relations and management policies and procedures relate to those of the hospital's as a whole. Please refer to this chapter's *Appendix C: Vendor Management.*

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5   http://www.fin.gov.on.ca/en/bpssupplychain/documents/bps_procurement_directive.html
6   http://www.fin.gov.on.ca/en/bpssupplychain/documents/bps_procurement_directive.html

4.4 DESIGNING YOUR SOLUTION

Understanding your requirements and conducting research

Product evaluation has requirements that are both clinical and non-clinical. Ultimately the goals of product evaluation are to select products and devices that:

- Meet specific performance criteria, including clinical and financial criteria;
- Are safe for patients and health care workers;
- Contribute to positive patient outcomes, such as fewer infections and injuries; and,
- Are cost-effective for both the facility and the patient.

A wide range of literature on the benefits of product standardization exists, in Canada and internationally. Conduct research as part of determining your requirements.

> **TIP: Know your regulations and standards.**
> As part of determining your future state, ensure that research is conducted to determine what regulations or standards exist that may apply to this project. This may include specific clinical and/or infection control standards, or Ministry of Health and Long-Term Care reporting standards.

Clinical requirements

Once an organization has decided on the clinical services to be offered by the perioperative department, clinical and surgical practitioners can determine the products, supplies, instruments, and equipment that will be required.

Within Ontario, clinical requirements for hospitals are determined by the hospital's boards and management working with Ontario's Ministry of Health and Long-Term Care and a hospital's Local Health Integration Network. A detailed discussion of how clinical requirements are determined is beyond the scope of this guide, but more information can be found on the Ontario Ministry of Health and Long-Term Care's website at www.health.gov.on.ca.

Business process requirements

The development of process requirements for product selection will ultimately define a future state model that considers the most efficient process for the introduction, evaluation and selection of product and supplies for the perioperative area or the hospital as a whole.

Traditional procurement focuses on evaluation and purchase, while vendor management drives the entire vendor relationship life cycle.

An effective product selection committee structure, with clear terms of reference, senior leadership support, and that is free of individual participant biases (enforced by the terms of reference, a strong governance structure, and a conflict resolution mechanism) should be considered a key business requirement for successful product evaluation and selection.

Working group sessions, facilitated by the project manager, should encourage participants to be open and interactive, discussing all ideas for the future. This process should not be influenced by current limitations, e.g., system limitations, lack of resources, or behavioural barriers that may have inhibited a truly effective product selection process in the past.

An ideal model should be clearly articulated. And before implementation, decisions about priorities, ability, capacity and cost will need to be made. This will allow you to determine short-term implementation goals as well as decide what will need to be moved to another longer-term project phase.

Understanding vendor relationships

In health care, there is a symbiotic relationship between vendors, hospitals and physicians. As with any relationship, success is based on trust, open communication and the recognition that all parties have something to offer and gain. Traditional procurement focuses on evaluation and purchase, while vendor management drives the entire vendor relationship life cycle.

Hospitals have acknowledged that vendors also bring value in expertise and technical clinical skill development. Collaborative relationships allow hospitals to leverage the technology and specialized knowledge of a vendor. The ideal relationship is characterized by clearly-defined and properly communicated expectations for all parties, who operate with accountability and mutual respect. Refer to this chapter's *Appendix C: Vendor Management*, for further information.

Identifying opportunities for savings

Value analysis and product selection initiatives can be enhanced by examining purchasing patterns across departments. Consider categorizing items and products not just by cost centre or product category but also by additional factors such as the degree of clinical preference associated with the product and the cost saving opportunities. See Figure 3, below, which examines the relationship between clinical preferences and cost savings opportunities. These types of categorizations will require research and should be objective-driven, using an organization's historical data on usage, purchasing, and pricing.

Value Analysis & Standardization Opportunities

High Clinical Preference
(Low Potential Savings)

High Clinical Preference
(High Potential Savings)

Cardiovascular
Products / Stents

X-Ray Film

Orthopedic Implants

Cardiac Catheters & Guides

Endoscopic
Products

Sutures   Pacemakers

Intraocular Lenses

Cath Lab Supplies

Anesthesia Products

Surgical Packs & Gowns

Linen

Enteral
Nutritional
Products

Dressings

Sharps Collection

Custom Sterile Kits

Low Clinical Preference
(Low Potential Savings)

I.V. Solutions

Food

Low Clinical Preference
(High Potential Savings)

Office Supplies

Business Forms

Cost Savings Opportunities

Figure 3: The relationship between clinical preferences and cost savings. [7]

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[7]   Source: *Healthcare Supply Chain Management: Resources & Logistics Processes,* (AHRMM), p.305.

4.5 IMPLEMENTING PRODUCT SELECTION OPTIMIZATION

Forming product selection committees

As mentioned earlier in this chapter, most hospitals have some form of committee structure for product selection, if they do not already have proper committees for value analysis and product selection and standardization. (Refer to this chapter's *Appendix B* for sample documents that outline the formation of an executive supply standardization committee, a clinical services value analysis committee, and a product evaluation and standardization committee.) In most circumstances these are ongoing or standing committees.

The Operating Room Nurses Association of Canada, in its most recent edition of Standards, Guidelines, and Position Statements (see *Appendix A* for this chapter), offers the following list of participants to be considered in a perioperative product selection committee:

- OR manager/leader
- OR educator
- Perioperative nurses
- Infection control personnel
- Finance representative
- Biomedical representative
- Anesthesiologist
- Surgeon
- Allied health professionals
- Materials management
- MDR representatives.

While these committees are generally formed in the same manner as most decision making bodies in a hospital, when it comes to value analysis and product selection and standardization, some key points should be considered:

- All participants must be aware of the objectives and desired outcomes of the value analysis or product selection process.

- All participants should have an interest in supply management and expense management and overall cost containment and reduction.

- Surgeon involvement is critical. But they must understand that there are
  a number of contributing factors to the decision-making process, including
  business requirements that they may not have considered.

- Organizational culture may play a significant part in influencing the overall
  product selection process.

Figure 4, below, illustrates the structure of a value analysis and product selection
committee and its governance, as well as its relationship to other bodies within
the organization.
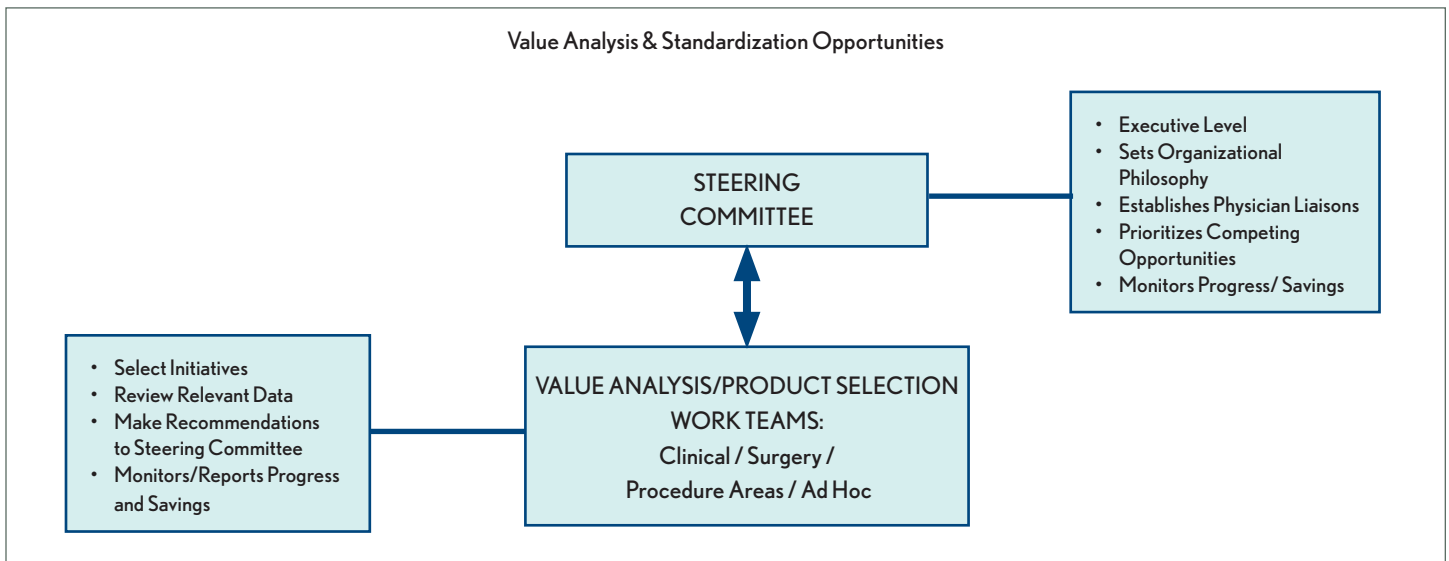
Figure 4: A value analysis committee's structure and relationships. [8]

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8   Source: *Health Care Supply Chain Management*, AHRMM, p299

Setting terms of reference

There are a number of common elements in the terms of reference for product selection committees. These may include:

Purpose/objectives
- May include the scope of the products, services, or departments to be included.

Function
- Can include operational, clinical, and financial objectives;

- Design performance criteria for product selection according to needs for patient care, health care worker safety, and clinical efficacy weighed against governmental and organization policies and desired outcomes;

- Frameworks for planning and implementing an evaluation of products in clinical settings; and,

- Frameworks for analyzing product performance and cost-effectiveness.

Authorities
- Individuals responsible for the committee.

Membership
- Set out in the product selection committee list above.

Frequency of meetings
- Periodic (monthly meetings are common) or may be called on an
- ad hoc basis.

Additional elements within the terms of reference may include:

Conflict of interest policies
- Declarations by members for the committee for any existing or potential conflicts of interest with any agenda item at any meeting.

Information and decisions
- The method by which the committee shall receive information and publish its decisions or minutes.

Targets and goals

- Financial and operational targets or goals can and should be considered.

Vendor input and information

- How vendors interact with and present information to practitioners and committees should be considered in alignment with the organization's vendor management policies and *Doing Business With the Broader Public Sector: A guide for small and medium enterprises)*[9].

Review

- The framework and frequency by which the terms of reference will be reviewed. Organizations often do this annually.

See this chapter's *Appendix B* for examples of product selection committee and executive selection committee terms of references.

Having decision makers who are clear on the needs of all stakeholders, and other decision makers, will contribute to successful product selection and value analysis processes.

What makes a successful product selection process?

Implementing product selection and value analysis processes requires collaborative planning and an effective decision making system. Factors contributing to the success of product selection and value analysis processes include the following:

- Having organizational and executive support;
- Having policies and procedures for evaluating and selecting products;
- Assessing current product being used on a value analysis basis;
- Having equal and open access to information for informed decision making;
- Having decision makers who are clear on the needs of all stakeholders and other decision makers;
- Having early clinical involvement in the decision making process;
- Being accountable (clinical and non-clinical) for execution of the process; and,
- Having effective decision-making and committee structures.

4.6 MEASURING AND SUSTAINING IMPROVEMENTS

Measuring the project impact

Measuring the impact of your project can be done in two ways. The first involves examining how well product selection committees are established and maintained. This could be done by measuring how often these committees meet, who regularly attends, and by gauging the overall meeting participation.

The second and more complex measure of success should be left to individual committees. It centres on tracking, using appropriate baseline data, the financial and operational measures that the committee, and the organization as a whole, has chosen to improve upon. These measures could include financial elements, overall product costs (e.g., by category, by service), departmental budgets, staff and patient safety metrics, satisfaction with product and satisfaction with the evaluation process.

Sustaining your change

Finding success in value analysis and product selection depends on several key factors. First, executives must make a commitment, supported by the organization as a whole, to allow managers and staff to take time away from their day-to-day duties to participate in the value analysis and product selection process.

Next, senior leadership must commit to implement the decisions that come out of the processes and act on recommendations. It is not enough to simply convene committees without heeding their recommendations.

Third, ensure open, fair, and equitable discussions and processes are maintained. There are many ways to manage this. You can rotate the chairpersons of specific work teams or committees; maintain an established terms of reference, and establish a dispute resolution process.

Participation, however, is perhaps one of the most important aspects and committee members should be allowed the time to be properly engaged. They should feel comfortable within the process and see that their participation is valued and that the collective decisions and recommendations they design are being implemented. An annual review of the value analysis and product selection processes is also recommended.

Product selection and value analysis should be viewed as an organizational undertaking. Given the complexity of ever-evolving products within the perioperative environment, it is important that staff, clinicians, and surgical practitioners all be involved in product selection and overall value analysis. The perioperative department may not necessarily lead these activities. For many organizations product selection and value analysis are led by purchasing or procurement groups. Nonetheless, the perioperative department has a vital role to play.

Product selection and value analysis frameworks are not short-term or ad hoc solutions. Their success is measured over a longer period, in line with organizational goals. However, establishing the right decision making and committee structure is an important first step.

Additional resources

Product selection and value analysis are activities that cross several disciplines. Clinicians and surgical practitioners receive formal training on product evaluation, and procurement specialists receive specific training on procurement policies, procedures, and best practices. However, there are many sources of information on procurement, product evaluation as well as how to structure committees, including specialized training courses.

TIP: Beyond asking your peers in other hospitals, look to these organizations for additional information: The Association for Healthcare Resource and Materials Management (AHRMM) of the American Hospital Association, http://www.ahrmm.org/

The Association of Operating Room Nurses, http://www.aorn.org/

Healthcare Supply Chain Network, http://www.hscn.org/

The Operating Room Nurses Association of Canada, http://www.ornac.ca/ .

4.7 APPENDICES

Appendix A: Excerpt from ORNAC's Standards, Guidelines, and Positions Statements for Perioperative Registered Nursing Practice

Standards, Guidelines, and Position Statements for Perioperative Registered Nursing Practice Operating Room Nurses Association of Canada (ORNAC), 9th Edition, 2009

Included with permission from ORNAC

Equipment Selection/Trialing

Surgical equipment and supply acquisitions need to be managed by having appropriate processes in place to ensure that the right product is available for the right application. Patient safety and staff safety should be considered.

PRACTICE	*RATIONALE*
4.2.1 Health care facilities should establish a multidisciplinary committee to review equipment/supply requests. This committee should include but not be limited to the following: - OR Manager/Leader; - OR Educator; - Perioperative nurses; - Infection Control personnel; - Finance representative; - Biomedical representative; - Maintenance representative; - Anaesthesiologist; - Surgeon; - Allied Health Professionals: - Materials management; and - Sterile Processing personnel (CSAZ318.8-08)	Surgical suite equipment is expensive and technology is rapidly changing. Input from a variety of users is required to make the best purchase decision. The amount of dollars available for technology purchases is usually far less than the dollar value of requests made, so decisions must be sound.
4.2.2 A systemized process for equipment A systemized process for equipment requests should be in place and the process should include a feedback mechanism to inform the requester of the status of the request.	Most health care facilities have specific timelines for capital budget item requests. Non-capital items may be purchased within operating budgets.
4.2.3 Standardization, appropriate utilization and price reduction are the best way to reduce supply expenses.	Standardization benefits both physicians and perioperative staff by creating uniformity in practice that results in reduced learning curves with reduced changes. (Cunningham, 2000, p. 19)

PRACTICE	RATIONALE
4.2.4 The following criteria should be considered by the committee to narrow the choice of product/equipment to select/trial: - size, weight and specifications fit into the physical environment; - the cost of the item falls into budgeted dollars; - the item has the functionality to meet the clinical end use; - the equipment is approved for use in your jurisdiction (HPB/CSA approval); - the company or manufacturer shall provide validated cleaning/reprocessing instructions for the equipment; and - the necessary infrastructure is in place to support the use of the equipment. (CSA, Z314.22-04)	Reviewing the equipment in this context will assist in creating a "short list" of products/equipment to evaluate. To decrease problems related to inappropriate equipment size, selection etc. , avoid costly mistakes and waste of valuable time.
4.2.5 On site equipment evaluation should be completed prior to purchase. Contact and/or visit other sites to gather information such as: - does the equipment meet the needs specified; - what is the cost and is it acceptable; - are educational sessions offered through the vendor; - how is the equipment reprocessed; - are staff satisfied with the product; - is the equipment reliable; - does the vendor provide service/maintenance vendor; - what is the cost of upkeep; - was this the preferred choice; and - would they purchase the same item if they had that choice Document and save all information.	To ensure equipment is functioning and suitable to patient, staff and departmental needs. Input from other centres and staff provide valuable information related to equipment function, use and reliability. To be used for future reference and decision making.
4.2.6 The decision to trial new equipment/ technology should consider but not be limited to the following: - do physicians and staff require training prior to the use of the equipment; - is the presence of the sales representative	To plan the necessary arrangements for training. The presence of a sales representative to lend technical assistance related to the device should not substitute for orientation and training of nursing staff members in the use of the equipment; neither should such presence substitute for formal

Appendix A: Excerpt from ORNAC's Standards, Guidelines, and Positions
Statements for Perioperative Registered Nursing Practice continued

PRACTICE	RATIONALE
necessary to support the use of the technology; and should the patient be informed that new technology is being used.	instruction of the surgeon before using new equipment in the OR. (Murphy, 2001, p. 824) The sales rep should be readily available if needed and to assist in appropriate equipment selection/use. Sales representatives should not be regarded as an extra set of hands for tying gowns or opening supplies, even if the representative has the skills to do so safely. The representative's legitimate role is to provide technical assistance related to the device for the safe care of the patient. (Murphy, 2001, p. 824) To acknowledge the patient's input and provide the necessary information required for consent. The patient's decision to consent to (or refuse) treatment must be informed; that is, the patient must receive information about the nature of the proposed treatment, its expected benefits, the material risks, special risks or material side effects associated with it, alternative courses of action and the likely consequences of not having the treatment. (CPSO, 2001, p.3)
4.2.7 Health care facilities should develop policies and procedures related to equipment trials involving but not limited to: - Risk manager; - Bioethicist; - Physicians; - OR Manager; - Perioperative Registered Nurses; - Allied Health Professionals; and - Infection Control Practitioners.	
4.2.8 Develop a user friendly evaluation tool to provide objective criteria to help with the assessment of different technologies. The decision to purchase a piece of equipment should include but not be limited to the following considerations: - does it meet the clinical need; - does it pose a safety concern for the patient or team; for the patient - ergonomics - what are the ongoing costs of consumable items; - is physician, staff and biomedical education	To help with decision making. A user friendly tool will increase compliance. All information is necessary to make an informed final decision. Sound business principles combined with knowledge of clinical practice should drive the acquisition decision. (Berhardy, 2001, p. 26)

PRACTICE	*RATIONALE*
included; - are operating/reprocessing instructions resources included (videos, CDs, manuals); - are maintenance instructions available for biomed/maintenance department; - are preventative maintenance contracts available with the vendor; - what is the warranty on the item; and - are there opportunities to lease or lease-to-own.	

Appendix B: Sample Product Standardization Committee
Terms of Reference from OR Supply Chain Program Participants

Executive Supply Standardization Committee[1]

TERMS OF REFERENCE

PURPOSE

- The purpose of the Executive Supply Standardization Committee is to provide direction and support for the purchasing strategies of the hospital.

FUNCTIONS

- Develop formal objectives and financial targets for Supply Chain Management subcommittees.
- Provide quarterly financial progress reports to subcommittees based on annual supply cost reduction targets.
- Provide direction and support to the subcommittees.

AUTHORITIES

- Established by and is responsible to the Senior Administration Team.

MEMBERSHIP

- Chief Financial Officer (Chair)
- Chief Planning and Resource Officer
- Chief Clinical Officer
- Chief of Staff
- Director Logistics and Equipment Planning
- Director of Material Management Services
- Director of Financial Services

FREQUENCY OF MEETING

- Monthly (or as determined by committee)

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[1] Examples of Committee Terms of Reference and Membership have been drawn from ORSC hospitals with particular acknowledgement to Cornwall Community Hospital, The Hospital for Sick Children, and Trillium Health Centre

Surgical Services Value Analysis Committee

TERMS OF REFERENCE

PURPOSE

- To evaluate the need for and suitability of OR-specific procedures, medical supplies and equipment.
- To assist the leadership and physician users of the program in determining the best product at the best price utilizing a value analysis approach.
- To serve as a liaison and a resource, in regards to operative medical/ surgical products, for the physicians, the perioperative staff and when necessary the clinical program leaders.
- To formalize a process for the management of special requests.

FUNCTIONS

- To critically review and consider for trial or for use, speciality medical surgical supplies or devices required for interventions in the OR. The committee will also define criteria for specific trials as well as determine duration and identify an evaluation process. The selection of products to be included in the OR speciality/pre-approved purchase processes is based upon objective evaluation of therapeutic merit, safety and budget impact. Duplication of products is minimized.
- To review and recommend the standardization of product use, which will result in financial savings, minimize the breadth of product lines and lead to improvement strategies.
- To serve in an advisory capacity to physicians, perioperative leadership/staff and the administration in issues related to the purchase and/or use of surgical and anaesthesia supplies including investigational and Special Access Program products.
- To ensure that all new products, equipment, and services meet all safety standards, and codes of the hospital.

AUTHORITIES

- The Surgical Services Value Analysis Committee (SSVAC) is a subcommittee of the OR Committee and Executive Supply Standardization Committee.
- Procedural and product decisions made by the SSVAC are subject to final approval by the Executive Supply Standardization Committee.

MEMBERSHIP

- Director of Material Management
- Director of Surgical Services
- Chief of Surgery
- Chief of Anaesthesiology
- Supervisor Operating Room

FREQUENCY OF MEETING

- Monthly (or as determined by committee)

Appendix B: Sample Product Standardization Committee
Terms of Reference from OR Supply Chain Program Participants continued

Product Evaluation and Standardization Committee

TERMS OF REFERENCE

PURPOSE

The primary purpose of the Product Evaluation Committee is to provide support to the purchasing strategies of the hospital by:

- Advising the Executive Supply Standardization Committee on issues dealing with product standardization / utilization in the hospital;
- Establishing and monitoring a process for the timely and cost efficient acquisition of products using value analysis techniques;
- Focusing on consolidation of products which leads to obtaining best possible quality products at best prices;
- Pursuing the consolidation of vendors, wherever and whenever possible, if this results in realizable benefits to the hospital.

FUNCTIONS

- The purchase and maintenance of standardization of all stock and non-stock supplies within the hospital. Exception applies to pharmaceutical, reusable stainless steel instruments, nutritional, specific reagents, research, biomedical and engineering products.
- The evaluation of products.
- The standardization/utilization of products.
- To evaluate the impact of the purchase of new equipment on operating supplies and make appropriate recommendations to the relevant decision-making authority for capital acquisitions.
- To authorize the introduction of new products by analyzing, evaluating, and monitoring all trials with the objective of selecting the most clinically and cost-effective products, using predefined criteria and establishing subcommittees to lead the clinical evaluation process.
- To investigate, and where feasible, standardize when two or more products are used to perform the same function.
- To review new or proposed product usage so its economic impact can be identified, studied, and evaluated except for items that fall under the responsibility of other committees, i.e., Pharmacy
- To monitor and evaluate the use of disposable and reusable products.
- To educate all users on current product and product-related and newly adopted policies and procedures.

AUTHORITIES

- The Production Evaluation and Standardization Committee reports to the Executive Supply Standardization Committee.

MEMBERSHIP

- Director, Material Management Services/ Purchasing
- Infection Prevention and Control Professional
- Director, Surgical Services
- Director, Medicine
- Team Leader, Emergency
- Occupational Health & Safety Practitioner
- Patient Safety Coordinator

- Clinical Resource Nurse
- Representative, Operating Room
- Director, OB/GYN/Peds
- Diagnostic Services Representative
- Physician
- Sterile processing (senior representative)[2]
- Secretary

ADDITIONAL INFORMATION

- Members are responsible for relaying products to be addressed at the next meeting to the Chairman.
- When the Committee determines that a product should be evaluated, the key users will be identified and invited to participate. Sample distribution and evaluation results will be coordinated by the Director of Purchasing and appropriate Committee member(s).
- Medical and surgical items that are difficult to assess in terms of relevant impact on patient care, quality and relevant cost will be reviewed by the P.E.S.C. and referred to the appropriate administrative committee.

FREQUENCY OF MEETINGS

- Monthly or as determined by committee

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[2] Sterile processing representation is important particularly if a reusable product is being evaluated or trialed.

Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program

Guide to Vendor Management

WHAT IS VENDOR MANAGEMENT?

Vendor management is an all-inclusive approach to managing your interactions with the companies and individuals that supply your hospital. For the clinical supply chain, it is about the relationships with vendors that ensure a flow of products, supplies and services to the perioperative environment.

Vendor management includes the management of communications, business practices, negotiations, procedures, and services such as training and support, as well as the day-to-day interactions used to establish and maintain a relationship with a vendor.

Vendor management entails the development and implementation of a framework that addresses the following:

- Accountability for vendors, hospital / shared services staff, clinicians, and surgical practitioners;
- Inter-personal relationships;
- Conduct and practice;
- Patient safety and confidentiality;
- Security, and;
- Adherence to all applicable legislation, regulations, professional guidelines and codes of conduct.

WHAT ARE THE BENEFITS OF EFFECTIVE VENDOR MANAGEMENT?

Effective vendor management, which uses policies and procedures, will mitigate potential risks for practitioners, clinicians, the perioperative department, the procurement department and the hospital as a whole. These risks can include:

- Reputational risks
- Operational and technical risks
- Transactional risks
- Credit and financial risks

- Compliance risks
- Security risks
- Access risks
- Contractual risks.

Vendor management is not a matter of simply negotiating the lowest price. Rather, it is about constantly working with your vendors to come to agreements that will mutually benefit both sides.[1]

It is important to understand this process as relationship building for the long term. Communicating and strategizing with your vendors will help in the development of effective vendor management policies.

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[1] Bucki, James. In *Vendor Management: Making It A Win-Win.* Retrieved May 5, 2010 from http://operationstech.about.com/od/vendormanagement/tp/VendMgtTips.htm.

Vendors can also be important learning resources. Indeed, vendors of specialized products being introduced into the perioperative environment have an important role to play in explaining and demonstrating their products. They also educate (or assist in the education) of hospital professionals who will use the product in patient care, reprocess it or maintain it, as well as replenish and store the product.

WHO ARE YOUR VENDORS?

There are a number of different types of vendors selling goods, services and supplies into hospitals. These include the following:

- Manufacturers
- Distributors
- Sales representatives
- Service and repair companies

- Consulting companies (management consulting and or subject matter consultants)
- Engineers
- Technical/clinical specialists.

There are also variations and combinations of these basic vendor types and it can often be confusing for purchasers to understand the specific role of their vendor in the manufacturing, selling, and servicing process. An effective vendor management system will help to clarify these roles. In Ontario, there are many classifications and terms used for the variety of people employed by, working in, or visiting hospitals. Vendors may be classified as 'visitors', however, each hospital may have its own classification system.

Organizations may consider categorizing vendors based on the areas within the organization or hospital with which they interact. Examples of vendor categories include:
- Vendors that call on materials management, facilities management, administrative areas, and other non-patient care areas;
- Vendors that call on patient care areas;
- Vendors that are required to interact with clinical staff and/ or surgeons; and,
- Vendors that call on and are required within the perioperative environment.

WORKING WITH VENDORS IN THE PERIOPERATIVE ENVIRONMENT

It is increasingly common to find vendors in the perioperative environment. For this reason, vendor management and any formalized vendor agreements should outline matters such as the adherence to aseptic technique, adherence to protocols surrounding blood borne pathogens and sharps, and compliance with and adherence to patient safety and confidentiality regulations and protocols. (For a sample of vendor guidelines, please see Example A at the end of this section.)

In many cases, different hospital departments have different vendor management policies. For perioperative departments, the responsibility of vendor management tends to fall to departmental directors and the daily enforcement of these policies to departmental managers. Collaboration between vendors and perioperative management teams in setting parameters for innovation and access would help to ensure that hospitals get the most benefit from new techniques and technologies.

The value and insights that vendors may provide to the perioperative environment should not be underestimated. Given the nature of their jobs and the positioning of their organizations, vendors and their representatives have access to multiple organizations, clinicians, and practitioners. Additionally, many of

Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program
continued

these vendor organizations are aligned with academic medicine's research and development agenda, have access to clinical trials and resources, and they may have the talent to improve and to expand the development and use of their products.

At a minimum, vendors to your organization's perioperative environment should be bound by a written agreement or contractual obligation to adhere to your vendor policies and procedures. (See the examples at the end of this section for reference materials and position statements that may inform your organization's development of perioperative vendor policies.)

DEVELOPING VENDOR MANAGEMENT POLICIES

Vendor management policies, procedures and responsibilities can serve as a universal guide. While these are developed collaboratively by various stakeholders to fulfill a number of requirements, among them is the need to ensure effective and efficient patient care.

The Ontario Broader Public Sector Supply Chain Code of Ethics, shown below, sets out basic overarching principles of conduct for broader public sector organizations and must be easily accessible to suppliers, advisors and other stakeholders.

Ontario Broader Public Sector (BPS) Supply Chain Code of Ethics

Goal: To ensure an ethical, professional and accountable BPS supply chain.

I. Personal Integrity and Professionalism

Individuals involved with Supply Chain Activities must act, and be seen to act, with integrity and professionalism. Honesty, care and due diligence must be integral to all Supply Chain Activities within and between BPS organizations, suppliers and other stakeholders. Respect must be demonstrated for each other and for the environment. Confidential information must be safeguarded. Participants must not engage in any activity that may create, or appear to create, a conflict of interest, such as accepting gifts or favours, providing preferential treatment, or publicly endorsing suppliers or products.

II. Accountability and Transparency

Supply Chain Activities must be open and accountable. In particular, contracting and purchasing activities must be fair, transparent and conducted with a view to obtaining the best value for public money. All participants must ensure that public sector resources are used in a responsible, efficient and effective manner.

III. Compliance and Continuous Improvement

Individuals involved with purchasing or other Supply Chain Activities must comply with this Code of Ethics and the laws of Canada and Ontario. Individuals should continuously work to improve supply chain policies and procedures, to improve their supply chain knowledge and skill levels, and to share leading practices.

Source: Broader Public Sector Procurement Directive *April 2011*

DEVELOPING VENDOR CONDUCT POLICIES, CHECKLISTS AND CREDENTIALS

Vendor Conduct Policies:

All hospitals should have vendor conduct policies or protocols. Policies should delineate guidelines for visitation to the hospital and address appropriate activities and interactions between the hospital's medical facility personnel, allied health professionals and other vendors. These may be enhanced by specific departmental policies.

It is recommended that hospitals establish general operating procedures for all vendor representative visits, as well as the receipt and delivery of products.

Vendor Management Checklist:

A checklist will ensure transparent communication, which can in turn help to manage issues over vendor access. The consistent application of the checklist will reduce redundancy, improve risk management and ensure compliance by the vendor community.

Items typically found in a vendor management checklist include:

- Personal Health Information Protection Act (PHIPA) regulations, Freedom of Information regulations, and Bill 122, Broader Public Sector Accountability Act, 2010.
- General Conduct Expectation Introduction within the hospital and the perioperative environment. These include an overall understanding of roles and responsibilities of vendors, practitioners, hospital staff, and various intermediaries including procurement professionals and shared services organization representatives. They can also include:
  - Patient privacy guidelines
  - Institutional / organizational privacy and confidentiality policies
  - Purchasing protocols, including new technology introduction.
- Specific guidelines addressing vendor relations concerning:
  - Gifts
  - Preferential treatment or benefits to staff, surgeons
  - Entertainment
  - Samples of goods and services
  - Consulting and research activities
  - Vendor sponsorship
  - Confidentiality of business matters.
- Infection control rules within the hospital should also outline issues of hygiene and attire for vendors. These can include details about the wearing of hair coverings, masks, personal valuables as well as matters such as hand washing protocols, policies on vaccinations and awareness of infectious conditions such as colds, and influenza.
- Information outlining the visible identification vendors must wear. (Vendor credentialing according to their particular access to hospital patients and assets.)
- Information outlining check-in and check-out protocols.
- Information on surgical procedure protocols, which should include:
  - Awareness of and adherence to the sterile field.
  - Awareness of where to stand while in the surgical suite as well as how to conduct themselves within the surgical suite.
  - Protocols on the documentation of vendor presence (on the perioperative or other intra-procedure documentation).
  - Appreciation for appropriate behaviour and conversation in the operating room.

Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program
continued

- o Acknowledgement of emergency protocols.
- o Protocols on the appropriate time for a vendor to enter the surgical suite (the vendor is not to enter until the patient is draped).
- o Protocols and procedures regarding the prohibition of vendor representatives from opening or handling any sterile items within the sterile field.
- o Policies prohibiting vendors from providing any patient care (the vendor will act as support agent for products only).
- o Observational Experience Agreement Forms (to be completed for each representative present in a procedure. Forms can be kept on file in the department and updated on an annual basis).
- o Patient consent form (which can include check box for vendor representatives).

- Hospital expectations on the delivery and removal of supplies, products, and instruments.
- Policy on interactions with surgical practitioners, staff, clinicians, fellows, residents' requirements. This includes designated meeting areas for discussions, appointments and a listing of key contacts for specific areas or departments within the hospital.
- Protocols surrounding compliance, accountability, and conflict resolution processes.
- Hospital health and safety rules and regulations.

Additionally hospitals and their leadership teams should consider how vendor conduct and vendor management policies impact on or may be affected by regulations that govern the operation of a hospital. They should also consider safety, patient confidentiality and environmental issues.

Vendor Credentialing:

A vendor credentialing program helps ensure the hospital meets its obligation to provide a safe, secure, and infection-free environment. Credentialing ensures that vendors and their representatives are indeed who they claim to be. These programs are often carried out in partnership with a third party or private company that can be very effective assisting the hospital in establishing, and/or maintaining the credentialing program.
These programs are increasingly necessary as hospitals become more operationally complex entities with multiple entry points that are largely unsecured. What is more, purchasing departments are often located off site, so it is increasingly difficult for hospital staff and surgeons to know all of their vendors.

Vendors should be classified according to the level of access they have within a hospital. This is particularly important in the perioperative area. General vendor credentialing can include the following:

- Background checks such as criminal record checks on individual representatives, proof of insurance, professional credentials, national / international lists of excluded persons or companies, etc.

- General financial and business information on the vendor company, including Workplace Safety and Insurance Board compliance, tax compliance, etc.

- Immunization record checks for TB, Influenza, Hepatitis B, Mumps, Measles, Rubella, Chicken pox, etc.

- Behaviour guidelines and compliance: these are general expectations and hospital safety rules, regulations (and may include training for vendors through various educational media).

Importantly, this can include OR / perioperative environment protocol and aseptic technique (conduct within sterile conditions) and training on the elements of the Personal Health Information Protection Act.

Some vendors may be required in ORs to assist surgeons in developing competency with certain equipment. For these vendors, consider additional requirements such as:

- Product training attestation letter with reasonable expiry timelines
- OR protocol expectations course
- Blood borne pathogens training
- Sharps training.

Credentialing may also include rules and regulations concerning business performance metrics such as delivery terms and order fill requirements, but most often these issues are dealt with in contractual terms. (For more information, see Example D at the end of this section.)

CONDUCTING YOUR VENDOR MANAGEMENT RESEARCH

Hospitals have many resources available to them to assist in the development of vendor management strategies, policies, and formalized contracts and agreements. To start, hospitals can work with their procurement professionals, shared services organizations and peer hospitals. They can also leverage many of the resources made available by various organizations, including the Government of Ontario's publications such as the Ministry of Finance's Broader Public Sector Procurement Directive (www.fin.gov.on.ca/en/bpssupplychain/documents/bps_procurement_directive.html) and advice to vendors in, Doing Business With the Broader Public Sector: A guide for small and medium enterprises (www.fin.gov.on.ca/en/bpssupplychain/documents/bps_doing_business_handbook.html).
Information on vendor credentialing programs and standards can be found through the U.S.-based Association of Perioperative Registered Nurses (www.aorn.org) and also through The Joint Commission (www.jointcommission.org).

Additionally, Accreditation Canada (www.accreditation.ca) , the Canadian Standards Association (www.csa.ca) , and the Operating Room Nurses Association of Canada (www.ornac.ca) all provide valuable information on standards of practice (for conduct and products) that can be applicable to vendors within the hospital environment.

Many resources are available to Ontario's hospital professionals (and shared services organizations) to assist in the development of addressing vendor management issues. These include:

- Accreditation Canada www.accreditation.ca

- Advanced Medical Equipment Technology Association (Advamed) – www.advamed.org (code of ethics)

- Association for Healthcare and Resource Materials Management www.ahrmm.org (part of the American Hospital Association)

- America College of Surgeons www.facs.org – Statement on Health Care Industry Representative

- Association of Canada's Medical Technology Companies - MEDEC (code of conduct) – www.medec.org

Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program
continued

- Association for Perioperative Practice (AFPP) www.afpp.org.uk/home - formerly National Association of Theatre Nurses

- Association of Operating Room Nurses (AORN) – www.aorn.org position statements and guidance documents including "**The Role of the Health Care Industry Representative in the Perioperative/Invasive Procedure Setting"**

- Canadian Medical Association – www.cma.ca CMA Policy – Guidelines for Physicians in Interactions with Industry

- The Joint Commission (responsible for accreditation of hospitals in USA) www.jointcommission.org – FAQ on **Health Care Industry/Vendor Representatives**

- Ontario College of Physicians and Surgeons www.cpso.on.ca (who have adopted CMA Guidelines)

- Operating Room Nurses Association of Canada www.ornac.ca (advice within Guidelines and Position Statements on 'visitors to the surgical suite')

VENDOR MANAGEMENT TOOLS AND TEMPLATES

EXAMPLE A: Guidelines for health care industry representatives in the operating room

Source: Southwest General Health Center, Middleburg Heights, Ohio.
http://www.ormanager.com/PDF/reps.PDF

GUIDELINES FOR HEALTH CARE INDUSTRY REPRESENTATIVES IN THE OPERATING ROOM

POLICY

Only knowledgeable health care industry representatives will be permitted access to the operating room at Southwest General Health Center (SWGHC) for the purpose of providing technical support during a surgical intervention.

The presence of any health care industry representative in the OR must be justified by his or her contribution to positive patient outcome and is subject to approval by the resource coordinator, associate administrator, or administrator of the Surgical Care Center.

REQUISITES

1. All health care industry representatives must present written verification of their successful completion of an approved course inclusive of OR protocol, blood borne pathogens, and HIPAA requirements. (Note: SWGHC has approved the on-line course: OR Protocol TM, Blood borne
Pathogens Vol I: "Exposure to Blood borne Pathogens in the Surgical Environment," and
Blood borne Pathogens Vol II: "Infectious Diseases." These courses can be accessed at
www.healthstream.com/training)

2. All health care industry representatives must present written proof of current TB testing and Hepatitis vaccination.

3. All approved health care industry representatives must obtain a Southwest General Health Center photo ID
      a. Photo ID will be kept at SWGHC and will be given to the health care industry representative at
        time of sign-in.
      b. Photo ID will be visible at all times.
      c. Photo ID will be returned to the control desk associate when leaving.
      d. Failure to return ID will require health care industry representative to apply for a duplicate
        photo ID.

PRACTICE

1. An approved list of vendors for each respective OR schedule will be located in our health care industry representative log.

2. Upon arrival, the health care industry representative will check in at the control desk and sign in the vendor log book.

3. The health care industry representative will respect all SWGHC protocols created to protect patient confidentiality. The health care industry representative:

Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program
continued

  a. Will not be given access to the surgical schedule.
  b. Will not be given access to patient scheduling.
  c. Will not procure information from the patient's chart.

4. All items taken by the health care industry representative into the OR will be documented. The health care industry representative will provide a written list to include all products, product ID numbers, and quantities.

5. All electrical equipment must be here at least 60 minutes before the posted time of the procedure to allow adequate time for the needed biomedical testing.

6. All equipment must be wiped down with an environmental disinfectant before being taken into the respective OR.

7. Any reusable instruments/items must be here the evening before the scheduled procedure unless another time has been previously approved by the resource coordinator or administrator.

  a. The health care industry representative must provide a written inventory list for all components of the tray(s).
  b. The health care industry representative must check in with a CS associate and complete all necessary CS paperwork.

8. The health care industry representative is under the direct supervision of the RN assigned to the respective operating room at all times.

9. The RN scheduled for the respective room will be responsible for the health care industry representative. He/she will:
  a. Document the presence of the vendor on the OR record.
  b. Ensure the vendor does not perform any task delegated to the surgical team (eg, scrub in, open sterile items).
  c. Ensure the vendor does not go into the core or to CS.
  d. Verify the appropriate opening and use of all chargeable items.
  e. Report any violation of conduct.

Source: Southwest General Health Center, Middleburg Heights, Ohio.

VENDOR AGREEMENT

I have received, read and agree with all key points as they are stated in the Guidelines for Health Care Industry Representatives in the Operating Room. I acknowledge that I will only be in the OR for technical assistance as requested by the specific surgeon and will only provide the items specifically requested by the resource coordinator at SWGHC. I will never open supplies, scrub-in, or perform any medical or surgical procedure. I agree to maintain patient confidentiality at all times. Any infraction of patient confidentiality will result in immediate and permanent removal from the OR.

I will never use this opportunity for the introduction or discussion of any other product. I will never offer the surgeon a device or component of a system that has not been previously approved by the r**esource coordinator or administrator of the Surgical Care Center. My company will only be reimbursed for approved items.**

I will provide an itemized invoice within 24 hours after use for all authorized items to include item name, product number, cost, patient name, surgeon, and procedure.
Date: _____
Healthcare Industry Representative:
_____ _____
(Printed Name) (Signature)

EXAMPLE B: AORN Position Statement on the Role of the Health Care Industry Representative in the Perioperative/Invasive Procedure Setting

PREAMBLE

AORN recognizes the need for a structured process for education, training, and introduction of procedures, techniques, technology, and equipment to health care professionals practicing within the perioperative/invasive procedure setting.

By virtue of their training, knowledge, and expertise, health care industry representatives can provide technical support to the surgical team to expedite the procedure and facilitate desired patient outcomes. Health care industry representatives may function in any of several positions (e.g., clinical consultants, sales representatives, technicians, or repair/maintenance personnel).

The primary responsibility of the perioperative registered nurse is to ensure the safety of patients undergoing operative or other invasive procedures. Core nursing activities that, by licensure, may not be performed by non-nurses are assessment, diagnosis, outcome identification, planning, and evaluation.

The surgical setting is one of the most potentially hazardous of all clinical environments and is subject to strict regulations, clinical practice guidelines and standards of care to preserve patient safety. It is important that the healthcare industry representative understands how to safely work in the operating room to assist the perioperative team in maintaining the patient's safety, right to privacy, and confidentiality when a health care industry representative is present during a surgical procedure.

Please refer to "AORN guidance statement: The role of the health care industry representative in the perioperative setting" for more specific information and guidelines.[1]

POSITION STATEMENT

AORN supports the education of perioperative team members on new procedures, techniques, technology, and equipment with which personnel are not familiar before their use in a surgical procedure. AORN believes the following.

The RN is accountable for the patient's nursing care during the procedure and advocates for the patient's safety, privacy, dignity, and confidentiality.

Health care industry representatives may be permitted in the perioperative setting to provide technical support in accordance with facility policies, local, state, and federal regulations.
Health care industry representatives should not provide direct patient care or be allowed in the sterile field. However, AORN believes the health care industry representative with specialized training and facility approval may perform calibration/synchronization to adjust/ program devices (such as but not limited to implanted electronic devices, radio frequency devices and lasers) under the supervision of the physician.

Patients have a right to be informed about the presence of a health care industry representative in the perioperative/invasive procedure setting during a surgical procedure according to local, state, and federal regulations.[2]

Health care facilities should incorporate the local, state, and federal regulations regarding health care industry representatives in the perioperative/invasive procedure setting.

Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program
continued

References

1. "AORN guidance statement: The role of the health care industry representative in the perioperative setting," in *Standards, Recommended Practices, and Guidelines* (Denver: AORN, Inc, 2006) 261-263.
2. "Standards for privacy of individually identifiable health information; final rule," 45 CFR Parts 160 and 164, *Federal Register* 65 (Dec 28, 2000); 82462. Also available at
http://www.cms.hhs.gov/hipaa/hipaa2/regulations/privacy/finalrule/PvcFR01.pdf (accessed 3 Oct 2005).

Original statement adopted by the AORN Board of Directors in October 1999; ratified by the House of Delegates, New Orleans, in April 2000. Ratified by the AORN House of Delegates, Washington, DC, in March 2006. Sunset review: March 2011

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EXAMPLE C: American College of Surgeons American College of Surgeons Statement on Health Care Industry Representatives in the Operating Room

(From Document Revised September 2005)

[By the American College of Surgeons]

The ACS recognizes the need for a structured system within the perioperative setting for education, training, and introduction of procedures, techniques, technology, and equipment to the surgical health care team. Health care industry representatives (HCIR), by virtue of their training, knowledge, and expertise, can provide technical assistance to the surgical team, which expedites the procedure and facilitates the safe and effective application of surgical products and technologies. The purpose of this statement is to supply guidelines to health care facilities and members of the perioperative health care team to ensure an optimal surgical outcome, as well as the patient's safety, right to privacy, and confidentiality when a HCIR is present during a surgical procedure.

INSTITUTIONAL POLICIES:

Surgical department administrators in all facilities, including the acute care hospital, ambulatory surgery facility, and office based operating room (OR) settings should establish specific written policies governing the presence of HCIRs in the operating room. **These policies should define:**

1) The requirements and procedures for manufacturers' representatives to be present in the OR, and

2) The role and limitations of the HCIR in the perioperative setting. These policies should comply with applicable state laws and regulations, should be consistent with the organization's existing policies, such as those promulgated by the OR and/or credentialing/privileging committees, and should include, but not be limited to, the following elements:

FACILITY REQUIREMENTS AND PROCEDURES FOR MANUFACTURERS' REPRESENTATIVES TO BE PRESENT IN THE OR SHOULD INCLUDE:

1. The institution should designate an authority for approving an HCIR's presence in the OR. A time frame for securing this approval should be established. This authority should:

- Supply a time-limited approval and appropriate identification (to be worn at all times) for the HCIR
- Ensure orientation to the facility is provided
- Verify the documentation that certifies the HCIR has had education and training in:
- HIPAA compliance and all matters related to patients rights and confidentiality
- Appropriate conduct and attire in the OR environment
- Aseptic principles and sterile techniques
- Infectious disease and blood borne pathogens
- Occupational Safety: biohazardous waste, fire, electrical, radiation and other safety protocols
- Other applicable practices that may be related to the operation.

2. The HCIR should be present at the request of the operating surgeon. The HCIR should be introduced to the entire OR team and the purpose of the visit explained. If the surgeon did not initiate the request, the surgeon should be notified and approve the visit prior to the operation.

3. The patient should be informed of the presence and purpose of the HCIR in the OR and give written, informed consent. This should be documented within the medical records.

American College of Surgeons American College of Surgeons Statement on Health Care Industry Representatives in the Operating Room.

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Appendix C: A Guide to Vendor Management based on the OR Supply Chain Program
continued

ROLES AND LIMITATIONS OF THE HCIR IN THE OR

The HCIR is present as an advisor to the perioperative team to ensure the safe and effective application of surgical devices and technologies. The presence of the HCIR in the operating room is not an appropriate substitute for preoperative training of the surgical team. The surgical team must have the theoretical understanding and knowledge, training and skills necessary for the application of these surgical devices and technologies prior to surgery. In the role of educator and facilitator the HCIR:

- Should not engage in the practice of surgery, nursing or medical decision making
- Should not scrub or be involved in direct patient contact
- May be involved in the remote calibration or adjustment of medical devices to the surgeons and manufacturers' specifications (e.g. pacemakers, laser technicians)
- Should have his or her activities monitored and supported by the surgeon (or, at the surgeon's discretion) by the perioperative nurse responsible for the patient's care

A clearly defined institutional mechanism should exist to address any departures from the above established policies.

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Reprinted from **Bulletin of the American College of Surgeons**
Vol.85, No. 5, May 2000

EXAMPLE D: The Joint Commission Position on Vendor Credentialing

Source: **http://www.jointcommission.org/**

Health Care Industry/Vendor Representatives

Current | April 15, 2009

Q. Does the Joint Commision have requirements related to credentialing health care industry/vendor representatives who are involved in care, treatment, and services provided by professional staff in accredited health care organizations?

A. The Joint Commission does not have any standards that specifically address health care industry/vendor representatives who are involved in care, treatment, and services provided by professional staff in accredited health care organizations. This is due to the fact that at this time there are no accepted national standards on competence for the tasks performed by these health care industry/vendor representatives. Currently, there is also no specific licensure, certification, or registration for health care industry/vendor representatives who are involved in care, treatment, and services provided by professional staff in accredited health care organizations.

There are several Joint Commission standards that are relevant to any individual that enters a health care organization who directly impacts the quality and safety of patient care. In order to protect patient safety, accredited health care organizations need to be aware of who is entering their organization and what these individuals are doing in their organization (EC.02.01.01). Accredited health care organizations need to take steps to ensure patient rights are respected (RI.01.01.01), and that infection control precautions (IC.02.01.01) and other organization-specific policies and procedures are followed.

Additionally, The Joint Commission has several standards related to anyone who can impact the quality and safety of patient care; many of which are located in the Leadership chapter. Some of the requirements located in the Leadership chapter are LD.03.06.01 EP4 (competence of anyone who works in the organization), LD.04.01.05 EPs 1 and 3 (leaders oversee operations, and administrative and clinical direction responsibilities are defined), and LD.04.04.05 EPs 1, 3, and 4 (the development and implementation of a patient safety program).

Although The Joint Commission does not have any specific credentialing requirements for health care industry/vendor representatives who are involved in care, treatment, and services provided by professional staff, please note that some professional organizations are recommending general credentialing requirements for these individuals. For more information, you may want to contact AdvaMed whose website is www.advamed.org.

Chapter 5. Project Management

ONTARIO
HOSPITAL
ASSOCIATION

CONTENTS

CHAPTER AT A GLANCE

Perioperative departments function in busy environments where the staff is required to tend to a number of activities and processes. Bringing an ORSC improvement project into the mix can be done successfully by applying the fundamentals of project management.

The objective of this chapter is to provide an overview of the key activities that contribute to a project's success. Clinicians, supply chain professionals and others involved in the project can use this chapter to guide them from planning to project close. For those with more project management experience, it can serve simply as a resource.

Beyond outlining the importance of project management, this chapter provides key insight and advice on project planning, current state analysis and the development of a future state plan. It also examines the elements of developing a business case, how to implement a project and measure results as well as how to manage scheduling and how best to sustain your successes and results.

5.1 UNDERSTANDING PROJECT MANAGEMENT

If your hospital has a project management office, you should leverage its expertise. If you don't have one, there may be project managers working in other departments who can advise you on your project.

What is project management?

Project management is the discipline of planning, organizing, and managing resources to bring about the successful completion of a specific goal. It should not be mistaken for operations management, which is the management of day-to-day activities to deliver a repeatable service or result, such as the normal cycle of work completed in a department.

A project has clear objectives intended to achieve a unique result. It is temporary in nature but is usually expected to deliver lasting change. As well, staff members may be assigned to project roles that are different from their operational roles. In mid- to large-sized organizations, a project management office, or PMO, may exist. If your hospital has a PMO, you should leverage its expertise. In mid- and small-sized organizations, where there is no PMO, there may be project managers working in other departments. Try to access the expertise these individuals possess to help manage your project.

Why is project management important?

Project management increases the likelihood of delivering projects that are on time, on budget and that meet objectives. It also contributes to the effective and efficient use of resources.

Projects are often undertaken to change the status quo, and project management deals with the impact of that change. This includes provisions for communicating project objectives, engaging stakeholders, and providing training and other formal change management practices. Project management also provides a framework for managing risk, which is essentially any factor that can positively or negatively affect your ability to meet the project objectives.

Additionally, good project management involves an understanding of your project's scope and the impact a scope change can have. For example, if you were to start a project to improve the restocking process for the OR and soon after decided to make a scope change by including the introduction of bar coding, it would have an impact on the following:

- Budget: Higher cost as more work must be done.
- Quality: Improved quality as bar coding is more accurate than manual tracking.
- Schedule: Extended schedules as more work must be done.
- Resources: Increased resources as more and different resources are required.
- Risk: Increased risk as a new technology is introduced.

But the most challenging aspect of project management is to maintain an acceptable balance between all these different project elements, that is, scope, quality, budget, schedule, resources and risks, while still meeting the project objectives.

The relationship between scope, cost, schedule and quality can be seen below in Figure 1.

Some signs of poor project management include the following:
- Projects that miss timelines
- Projects that have cost overruns
- Projects that fail to meet the stated objectives or benefits
- Projects that face resistance (passive and active) when implementation occurs
- Frequent turnover in project team members
- Resources unwilling to sign on to projects, with the understanding that, "It won't change anything"
- Organizations unwilling to take on project work
- The organization as a whole has limited knowledge/use of project management techniques.

Figure 1: Project Risk: Balancing the triangle of constraints.[1]

Successful management of project risk can be viewed as the balance of divergent constraints. A change in one constraint has an impact on the others and can affect the quality of the project. The quality of the project is the result of the management of the other three elements or constraints (with resources as an implied aspect of cost).

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1   Source: Adapted from: http://upload.wikimedia.org/wikipedia/commons/a/a6/The_triad_constraints.jpg

What makes a good project lead?

The project lead or project manager is responsible for starting, organizing and planning the project as well as for making sure the work actually happens. The project lead assigned may not 'own' the operational departments affected by the project, but there should be interaction between the project team and the operational teams to gain organizational support and meet the project objectives.

A good project lead will possess most or all of the following characteristics:

• Be organized.
• Have great communication skills and be able to interact with all levels of the organization.
• Have excellent managerial skills to lead and keep project team members on track and ensure quality of project deliverables.
• Have mediation and facilitation skills that can align the diverging interests of multiple stakeholders.
• Be able to assess and manage risk.

An individual who has taken a project management course, has a Project Management Professional designation or has project management experience would be a key asset.

Overview of key project phases

The project life cycle is a collection of generally sequential, but sometimes overlapping, project phases. For the purposes of this guide, these activities will be referred to as Project Planning, Assessing your Current State, Designing your Solution, Implementing your Solution and Measuring and Sustaining your Improvements. They are described on the following page in Figure 2.

Project Management

Project Planning	Assess Current State	Design Solution	Implement Solution	Measure and Sustain
• Opportunity identification • Identify stakeholders • Create cost benefit analysis • Create project charter • Assemble project team	• Collect requirements • Finalize scope • Create WBS • Finalize budget • Plan communications • Plan risk management • Plan procurements • Define metrics	• Identify areas for improvement • Define project scope • Define project requirements	• Direct and manage project execution • Distribute information • Manage stakeholder expectations • Conduct procurements	• Close project • Close procurements • Measure and celebrate success • Evaluate results • Build new methodologies or processes into regular routines

Monitoring

Risk Management

Communication

Time →

Figure 2: Activities specific to each of your project's key phases as seen through the project life cycle.

Some activities are specific to each of the project phases while others, such as monitoring the project, managing risk and communicating the status and objectives of the project, are meant to be performed continuously throughout the life of the project. In an ideal project, the Project Planning, Assessing your Current State, Designing your Solution, Implementing your Solution and Measuring and Sustaining your Improvements phases would be distinct, but in reality they often overlap.

The overlap of these phases occurs because projects are by their nature iterative, i.e., involving frequent repetitious actions. As such, they require continuous modification and updating as new information impacts the project. For this reason, project documents should never be considered closed.

TIP: Remember that all projects evolve and change.

- **Change is inevitable.** The project plan is meant to evolve. Do not create it thinking it will be stored and forgotten about.

- **Late changes cost more.** The cost of change increases exponentially as you progress through the project. It is better to plan ahead and make the changes you need early on in the project rather than invest in a course of action only to change project direction later in the process.

5.2 PLANNING YOUR PROJECT

Forming your initial project team

While there are usually few people involved in the project during the initiation phase, some key roles still need to be performed. Depending on the size of the project, in the initiation phase these roles may be performed by one or more people:

Role	Function
Project Sponsor/ Executive Sponsor	• Person or group that provides the financial resources, in cash or in kind for the project. • Champions the project, which includes being the spokesperson to higher levels of management to gather support throughout the organization and promote the benefits the project will bring. • The sponsor is most active during the project's start up until it is formally authorized and will play a significant role in the initial scope and charter definition. • For issues beyond the control of the project manager, the sponsor serves as a conduit for the escalation of issues or risks that may impact on the project's success. • The sponsor may also be involved in authorizing scope change, phase-end reviews and decisions to proceed or not to proceed when risks are particularly high.
Project Lead or Project Manager (PM)	• The PM is most active when the project is authorized to proceed. • The PM manages stakeholder expectations (this is difficult because stakeholders may have competing objectives). • The PM must manage the influence of the various stakeholders in relation to the project requirements to ensure a successful outcome. • The PM is responsible for determining what processes are appropriate and the degree of rigour to be applied to each process. • The PM must determine the most appropriate method of carrying out the project. Decisions must be made regarding who will be involved, what resources are necessary, and the general approach to completing the work.
Project Governance/ Project Steering Committee	• Project governance provides a comprehensive framework for the management of the project and includes clearly established provisions for accountability, roles and responsibilities and an established (and ideally consistent) method of controlling, monitoring, measuring, and managing the project.

Developing a business case

The business case is a persuasive argument for a proposal. Developing a business case, sometimes called a cost-benefit analysis, allows you to formalize your project opportunity. This will help gain approval to proceed. It is a complete document that provides a rigorous analysis along with all the information required to justify a recommendation. It is also important to identify who will help sell the business case.

The business case should essentially answer two questions: 1) Is this the best way to spend our money or do better alternatives exist?; and, 2) Does the project provide value?

Elements of your business case should include the following:

- **Background.** What is the problem or opportunity? Who is the customer (patient, staff, etc.) affected by the problem? What is the impact?

- **Decision statement.** What should you do?

- **Objectives.** What results are you seeking and what are the resource (or other) constraints?

- **Comparison.** Show the alternatives using a matrix of cost/benefit/risk. This demonstrates you have considered all options. Use three to four alternatives, one of which is maintaining the status quo.

- **Recommendation.** Identify a favoured course of action.

- **Details.** Include financial details such as cost-benefits, an outline of an action plan with milestones and dates.

The business case is used to generate the financial metrics the project sponsor will use to determine if he/she wants to fund the project. The business case is also used to calculate a return on investment (ROI), which is the ratio of money gained or lost on a project relative to the amount of money invested. It is usually expressed as a percentage. For a more thorough explanation of cost benefit analysis, see this chapter's *Appendix F*.

Business Case vs. Project Charter
Some of the content in the business case is also found in the project charter and vice versa. Depending on an organization's methodology, the business case and project charter may be one or two documents. The contents of the documents may also shift depending on the methodology used. Regardless of your organization, all the elements in the business case and project charter should be addressed in the Project Planning phase. If your organization does not have a methodology, templates can be found in *Appendices B and C* for this chapter.

Your organization may already have business case templates that you can use. Additionally, a quick scan of your immediate resources may allow you to find many good examples you can tailor to fit your needs.

Creating a project charter

A key project document, the project charter allows you to think through the entire project before work begins. It includes the project requirements, criteria, assumptions and constraints. At a minimum, the project charter should provide the following information:

Key Element	Usually Includes:
The project purpose and/or justification	• Problem statement • Organizational need (patient safety, reduce inefficiency, etc.) • Technological advance • Legal requirements (government/standard compliance)
Measurable project objectives and success criteria	• Benefits and metrics to be collected
High level requirements	• Requirements from multiple stakeholders
High level project description (scope)	• The current state • The future state • What project elements are included (in scope) • What is not included (out of scope)
High level risks	• Issues that may impact the project
Summary milestone schedule	• The overall project timeline • Key milestones • Key deliverables
Summary budget	• The overall cost of the project
Project approval requirements	• Governance structure • Who decides on project success • Who decides when the project is done • Who is authorizing the charter • Who approves the scope
Key resources	• Named project sponsor • Named project manager • High level organizational chart for project team
Communication plan	• How communication will be handled throughout the project life cycle
Training	• What type of training, and who will need training

Identifying your stakeholders

Stakeholders are people or organizations who are actively involved in the project or whose interests may be positively or negatively affected by the performance or completion of the project.

To conduct a stakeholder analysis, determine who should be involved in the project, who are key influencers, who the key decision makers are, and how decisions are made.

When identifying stakeholders and their degree of influence, it is important to understand and be realistic about how decisions are made in your organization.

- Will project decisions be made in a dictatorial fashion, where one individual or department has final authority?
- Will it be majority rule, where everyone has a say and the majority wins?
- Will it be unanimous, where everyone must agree before proceeding?

In general, having few people involved in the decision making process will result in short-term project gains as decisions will be made quickly. In the long term, this approach will cause more effort in change management activities and more resistance in implementation as more people will feel they were not involved in the project.

Remember to look at the big picture when thinking about who really must be engaged. Consider all those who are currently involved with or 'touch' the current state processes and all those who will 'touch' or be affected by the future state processes.

Assembling the larger project team

In the planning phase, the project team should represent all departments, business functions and external partners that will or could be affected by the project.

> **TIP: Get multiple stakeholder buy-in now for easier implementation later.**
> While involving all stakeholder groups (clinicians, surgeons, materials management, etc.) in the decision making process can prolong the time it takes to make decisions, implementation is easier if all groups feel engaged in the project.

TIP: How to work with a part-time project team. Projects staffed by people that must perform the project work in addition to their day-to-day responsibilities often fail because these staffers are stretched beyond their limits. To ensure the best chance for success, the project lead or project manager should be a dedicated full-time resource. The operational team must also have dedicated time allotted to the project. Ideally, members should be seconded to the project team with their home positions backfilled. If this is not possible, other internal or external resources must be part of the project team.

It is important to staff the team appropriately. Ensure your team has the following:

- A cross-functional representation
- A blend of skill sets and perspectives
- People who are knowledgeable and passionate
- Support from key clinical and non-clinical leaders, including surgical practitioners.

Once the project team is staffed, in addition to an organizational chart, also consider documenting project roles and responsibilities with a RASCI chart, as outlined below.

What is a RASCI Chart?
This is a simple and effective tool used to document roles and responsibilities on a project.

R	Responsible: *'The doer'* owns the problem/deliverable/activity.
A	Accountable: *'The buck stops here'* where '**R**' is accountable to **A**, **A** must approve the work.
S	Supportive: *'The help'* where '**S**' can provide resources or can play a supporting role in the implementation.
C	Consulted: *'In the loop'* where '**C**' has information and/or the capability necessary to complete the work.
I	Informed: *'Part of the picture'* where '**I**' must be notified of results, but need not be consulted for the work.

Current State Review of ORSC Process	Stakeholders	Project Lead	OR Coordinator	OR Clinician	OR Logistics Resource
Document Process		R	A		S
Conduct Walkthrough			R	C	S
Identify Bottlenecks			R	C	S
Share Findings	I	R			

Figure 3. Typically, the processes and activities involved in a project are listed down the left side of a RASCI chart and the roles are listed across the top.

The following table shows a typical ORSC project team, and describes each member's responsibilities:

Project Role/Team Member	High-Level Responsibilities
Project Director	• Provides leadership and direction for the operational management of the project and the ongoing implementation of strategies. • Develops communication strategies for the various levels of stakeholders and participants.
Project Manager or Project Lead	• Provides day-to-day project management and hands-on support for the project. • Supports training by consultants on new systems to OR and supply chain personnel to facilitate knowledge transfer for future implementations at other sites.
Inventory Data Analysts	• Provides data collection, analysis and categorization of supplies used.
Periodic Automatic Replenishment (PAR) Optimization Analyst(s) (can be from the materials management or shared service organization)	• Provides data analysis and knowledge transfer to ORSC staff in the review of all supply locations and usage levels. • Redesigns areas and determines new PAR and minimum values, and may set up barcodes and configure scanning devices.
OR Senior Leader	• Provides clinical resources and support to the project team. • Communicates to the staff, surgeons and the surgery program.
OR Clinician(s)	• Provides input into the proposed process changes and partners with the heads of service to implement changes in their respective services. • Provides a leadership role for small working groups. • Collaborates and communicates with staff and surgeons on changes. • Exhibits role model behaviour required to successfully manage the process and changes.
OR Supply Chain Technician(s)	• Provides hands-on assistance to PAR optimization analysts to review existing supplies configuration, reorganize supplies onto new carts, and generally shadow consultants to enable knowledge transfer for future implementations at other sites.
Infection Control Personnel	• Provides guidance on how proposed supply locations and storage medium changes conform to infection control standards.

Developing a project plan

The project plan is sometimes referred to as the project schedule or work breakdown structure (WBS). It is a detailed list of the activities that must be performed to meet the project objectives and is designed to provide you with a tool to keep track of them.

As part of creating the project plan, you must complete the following:
1. Define the activities that will be part of the plan.
2. Sequence the activities.
3. Estimate the resources needed for the activities.
4. Estimate the duration of the activities.
5. Develop the schedule.
6. Identify milestones (e.g., a critical activity or significant target).
7. Communicate the plan to the team and stakeholders.

To define the activities in the project plan, you must subdivide project deliverables and project work into smaller more manageable components. The project should define the level of detail required in the project plan. As a general rule, the components of the project plan should be detailed enough to allow you to schedule, estimate costs, monitor and control it.

If the project plan is too high-level, you might not notice the slippage of activities early enough to take corrective action. Where possible, describe project plan activities in terms of outcomes rather than actions, for example, document current state ORSC processes and assess or analyze them against your desired future state conditions or outcomes.

For more information and examples, please refer to the *Appendices* for this chapter.

EXAMPLE: The importance of good detail in a project plan
If you were completing a data optimization project and the project plan lacked detail, it might look something like the following:

Activity: Data Optimization
Duration: 4 months
Resources: 2 people (full-time equivalent)

Two months into the data optimization, when the project sponsor asks for a status update and a projection of when the activity will end, you would not be able to answer these questions because the project plan lacks details of the activities.

If the project plan included the following detailed activities, the project lead would have a much better idea of the status of the project. Below is a more detailed plan.

Data Optimization

Confirm scope and methodology	week 1
Review systems and document current state	week 2
Design and document future state	week 2
Extract stock item/usage information	week 3 & 4
Extract non stock and consignment item/usage information	week 3 & 4
Complete initial scrub	week 5 to 8
Estimate detailed optimization effort	week 8
Agree on descriptions/fields	week 9
Perform detailed optimization	week 10 to 16

At the two-month point, according to this detailed plan, the following activities should be complete: confirmation of scope and methodology, review of the current state, definition of the future state, extraction of your item/usage information, the completion of the initial scrub and the estimation of the detailed optimization.

If these activities are all on track and complete, you can demonstrate that the project is on track. If some of these activities are not complete, you can determine why and whether the time can be recovered or if the target will be missed.

For more detail on developing the project plan, please refer to Appendices A, B, C and D for this chapter.

As a general rule, the components of your project plan should be detailed enough to allow you to schedule, estimate costs, monitor and control it.

To help identify risks, pretend the project has failed and ask your team to discuss what might have gone wrong. The obstacles they imagine could become part of your risk plan.

Using ongoing project management resources

Risk management plan

A risk management plan is a systematic approach to setting the best course of action by identifying, assessing, understanding, acting on and communicating risk issues. It is a living project document that should be continually updated. As the project progresses, risks will go from being generic to being specific.

When assessing a risk, the two main factors are: determining the likelihood that the risk will materialize; and determining its subsequent impact on the project. High probability and high impact risks should be addressed first. At a minimum, a mitigation strategy must be in place for these high impact, high probability risks.

To help identify risks, ask team members to pretend they are at the project post-mortem and that the project has failed. Ask them to discuss what went wrong. The obstacles they imagine could become elements of your risk management plan. See this chapter's *Appendix C* for a risk management template.

Communication plan

The project communication plan should define how information will be collected from various project areas and how often it will be updated and reported. It should also address how unplanned communication should take place (i.e., anything outside of regularly scheduled briefings). This may include visual communication tools, such as bulletin boards, notices and email blasts.

The communication plan will also define how information will be controlled and distributed, and how often. It should describe how the project information will flow throughout the organization and who decides where information flows. It should also describe which stakeholders and team members should have access to particular areas of information (e.g., should everyone on the project see how much the project costs?). The last element of the project communication plan should address where project information will be stored.

The communication plan is especially important in a project environment because:

- Projects are usually staffed by a matrix organization (i.e., the project team members may not report to the project manager in their operational roles), so it is essential to build a common understanding of objectives and benefits for the project team.

- Projects may affect many operational teams, some positively and others negatively. All these parties need to be aligned to the one project objective and understand how the project will change their activities.

- Resistors often complain of not being properly informed of the change or not being involved. The communication plan provides a framework to make sure this does not happen.

Decision log

The project team may consider using a decision log to keep track of key decisions, recording when they were made and by whom.

Procurement

Procurement should be addressed very early in the project. Items requiring long lead times to procure, such as consultants, subject matter experts, or capital equipment, should be considered in advance so that the appropriate procurement policies and procedures for either your organization or those of the funding organization can be followed. (It should also be clear from the beginning of the project which set of procurement policies and procedures will be used.)

Change management

Change management is a pre-defined framework established to help an organization introduce and accept changes that affect people, processes or technology. Change management activities must be outlined at the beginning of a project and continually defined throughout so that they are ready to implement at the project close. Leaving these activities too late usually results in the rejection of the new processes or a very costly change.

TIP: What's in your communications toolbox?
The ORSC pilot projects that inform this guide used several means to communicate objectives, including:

- Explaining the project at existing staff meetings.

- Holding specific project meetings.

- Using newsletters (existing or brand new).

- Creating striking visual displays on bulletin boards in the OR area or staff lounge areas.

- Proposing friendly competition among staff such as case cost challenges among surgeons.

- Hosting professionally facilitated sessions such as Kaizen events (part of the Lean methodology).

To promote change, find people at different levels of the organization to champion or sell the project to their peers and colleagues.

Key elements of change management include:

- **The communication plan:** How you share project objectives, project status, changes and project successes with all project stakeholders.

- **Stakeholder management:** Formally managing the influence and objectives of the stakeholders.

- **Stakeholder engagement:** Early and frequent involvement of stakeholders in key project decisions and project activities.

- **Sponsor support:** Foster sponsor support through communications and actions that support the project.

- **A shared purpose:** Show the need for change.

- **Champions:** Assemble a team of people at different levels of the organization that champion or sell the project to their peers and colleagues.

- **Addressing concerns:** Seek to address the concerns of resistors early on.

- **Offering recognition:** Recognize both effort and progress.

- **Developing skills:** Identify skill gaps in the organization and give people the skills they need to succeed.

- **Training:** Training and other forums can ease the transition to the future state.

Figure 4, below, shows a working change management document identifying the stakeholders affected by the change and rating their levels of awareness, support and influence.

2. Organizational Change Management Scope - Overview				
The following table lists stakeholders who will be affected by changes made in the OR Supply Chain process. It is extremely important to engage those stakeholders with a high level of influence and ensure their inclusion in the change process. For stakeholders who have a high level of influence but do not have a high level of suport or awareness, a plan will be put in place to create or build understanding and support.				
Stakeholder Management				
Stakeholder Name	**Awareness (H/M/L)**	**Degree of Support**	**Influence (H/M/L)**	**Plan (Attended Training/Session. ✓)**
				Session ✓ Business Requirements Session ✓
OR Team Attendant	L	L	L	Change Management Training ✓ Lean Training ✓ Adjusted Vertical Value Stream Session ✓ Business Requirements Session ✓
Chief of Surgery	H	H	H	Future State Planning Session
Chief of Anaesthesia	H	H	H	Change Management Training ✓ Lean Training ✓ Adjust Vertical Value Stream Session ✓

Figure 4: Example of a high-level change management plan. (courtesy of North York General Hospital)

5.3 ASSESSING YOUR CURRENT STATE

Assessing your current state is essentially a matter of gathering timely and relevant information concerning the process your project is designed to improve. This information will form a starting point, or baseline metric. When documenting the current state, the following tools and techniques can be used:

Process mapping. Conduct a current state process mapping workshop with key stakeholders involved in the process. This may or may not involve a physical walkthrough. The process mapping could include identifying the person, activity, handoffs, decision points, and systems involved.

Operating Room Supply Chain (ORSC) Project: High Level ORSC Process April 2003
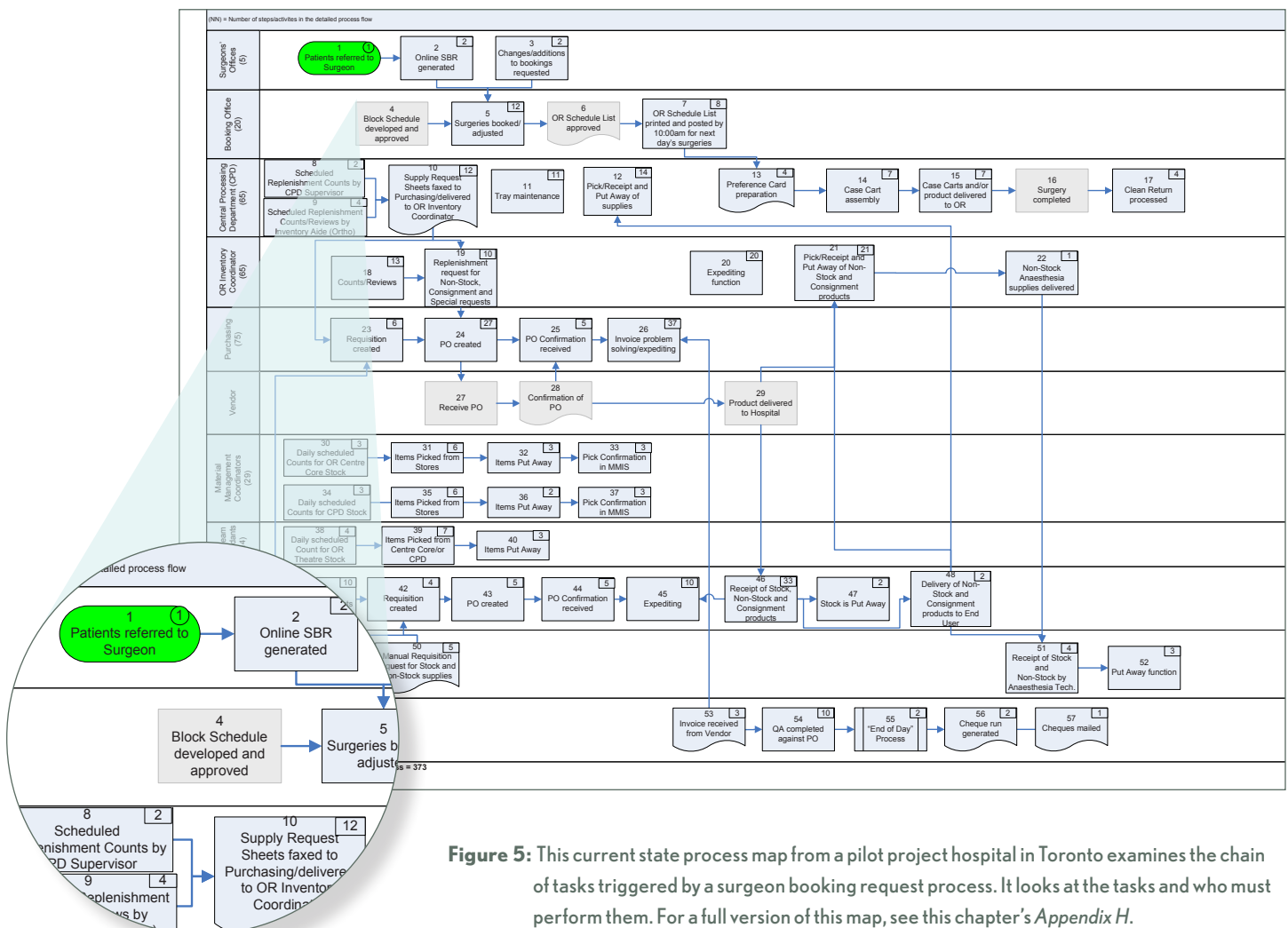
Figure 5: This current state process map from a pilot project hospital in Toronto examines the chain of tasks triggered by a surgeon booking request process. It looks at the tasks and who must perform them. For a full version of this map, see this chapter's *Appendix H*.

Research. Gather information. Ask: Does the organization have any documentation that already exists such as process flows, procedure documents or health and safety documents?

Physical walkthrough. Look at a given process from an outsider's perspective. Ask: What is it? Why does it happen? How does it happen? Who does it? Where does it happen? When does it happen? For example, if your project will include the implementation of case carts, pick a particular high-use procedure and look to answer all of these questions. Physically walk through all steps/areas of the hospital where those pieces of equipment are received, ordered, used and discarded.

Peer review. Try to have a peer review your current state. Use an organization such as the OHA, or access your professional network. Peers will bring a fresh perspective to your environment and may identify gaps, opportunities or ask questions you have not considered.

Multiple perspectives review. Look at the current state process from different perspectives. How does the current state differ when viewed by clinicians, support staff, surgeons and even patients?

Issues-based review. Look for specific pain points. Areas that are high risk to patient, high volume, high cost, high frustration, and that cause patient delays or decrease patient volumes and flows. For these issues, try to find the root cause (which is not always apparent).

Metrics and how to use them

Often used to monitor operations, metrics are useful tools for project management and quality control. Metrics are designed to reflect progress in the areas of resource use, budget, people assets, scheduled technical achievements, performance milestones and project outcomes. They can also be used to define success, purpose, task completion and can provide a quick comparison between actual results and planned results or outcomes.

Metrics must be timely, accurate and relevant, and they should be accepted as meaningful by those responsible for the project execution. Metrics reflect what is rather than what should be or what the team wants. See this chapter's *Appendix G* for more information on metrics.

TIP: To find root causes, use a simple technique called 5-Why.
Keep asking 'why' until you find the root cause. For example, if the problem is that cases are cancelled because of stock outs at the cart level, ask:

Why?
Because MDR never stocks the carts correctly.

Why?
Because procedure cards sent to MDR are incorrect.

Why? Because nurses are frustrated maintaining procedure cards and don't do it frequently.

Why?
Because the names in the item master file are confusing, duplicated, and don't make sense to clinicians.

Why?
Because materials management maintains the item master without input from other departments.

Solution: Optimize item master file and establish a nomenclature that can be used by all in the organization. Optimize the procedure cards. Make it easier for procedure cards to be maintained.

5.4 DESIGNING YOUR SOLUTION

The gap between your current and future state becomes the focus for the project objectives and part of the initial plan.

Identifying areas for improvement

On a day-to-day basis, hospital staff members are primarily focused on providing quality patient care and professional service. Yet, within their areas of expertise and even within their physical work areas, front-line staff often have some of the best ideas for organizational or business unit specific improvements. While staff members can be canvassed for improvement suggestions, it is best to have a structured method and accepted process for bringing forward and developing opportunities.

Organizations with effective means of generating improvement suggestions foster an environment of 'continuous improvement' that leverages trust, stakeholder engagement and feedback. Consider showing staff and stakeholders that they are being heard by implementing suggestions and using a system of recognition and rewards that encourages excellence.

Determining project objectives and your future state

To determine your project objectives and complete the business case, you must take a high-level view of your current state and understand what you want your future state to be. Documenting the current state (which includes people, activities, tools and systems) and designing the future state should be done across functional areas.

Define the difference between the current state and future state and determine what you need to get to the future state. The gap between your current and future state becomes the focus for the project objectives and part of the initial plan.

Future State

The future state can sometimes be a blend of things that can be done in the short, medium and long term. When looking to design the future state, the following tools and techniques can be used:

Research leading practices. This can be done in a number of ways, including using Internet resources (e.g., the Integrated Supply Chain Management Leading Practices Compendium), accessing industry or sector publications, networking with peers, arranging peer reviews, finding visionaries or leaders

in the field, visiting and touring other organizations' sites to see what peers are doing, etc.

Hire external subject matter experts. If your organization does not have the skill set or bandwidth to design the future state in your organization, hiring a subject matter expert, either through peers or consultants, can be helpful.

Use internal resources. Using interviews, surveys and brainstorming sessions, you can design the future state based on the ideas of the people who will need to support it. One of the most effective ways to do this is to have stakeholders from multiple departments involved at the same time. Bringing stakeholders together helps everyone see the big picture and understand how one team's solution may cause upstream or downstream issues for others.

Future state process mapping. Conduct a future state process mapping workshop with key stakeholders involved in the process. This may or may not involve a physical walkthrough. Process mapping could include identifying the person, activity, handoffs, decision points, and systems involved. Figure 6, below, illustrates the future state process mapping of all the steps involved with the booking of a surgery for a specific hospital.

ORSC Future State Process: Surgeon Booking Request
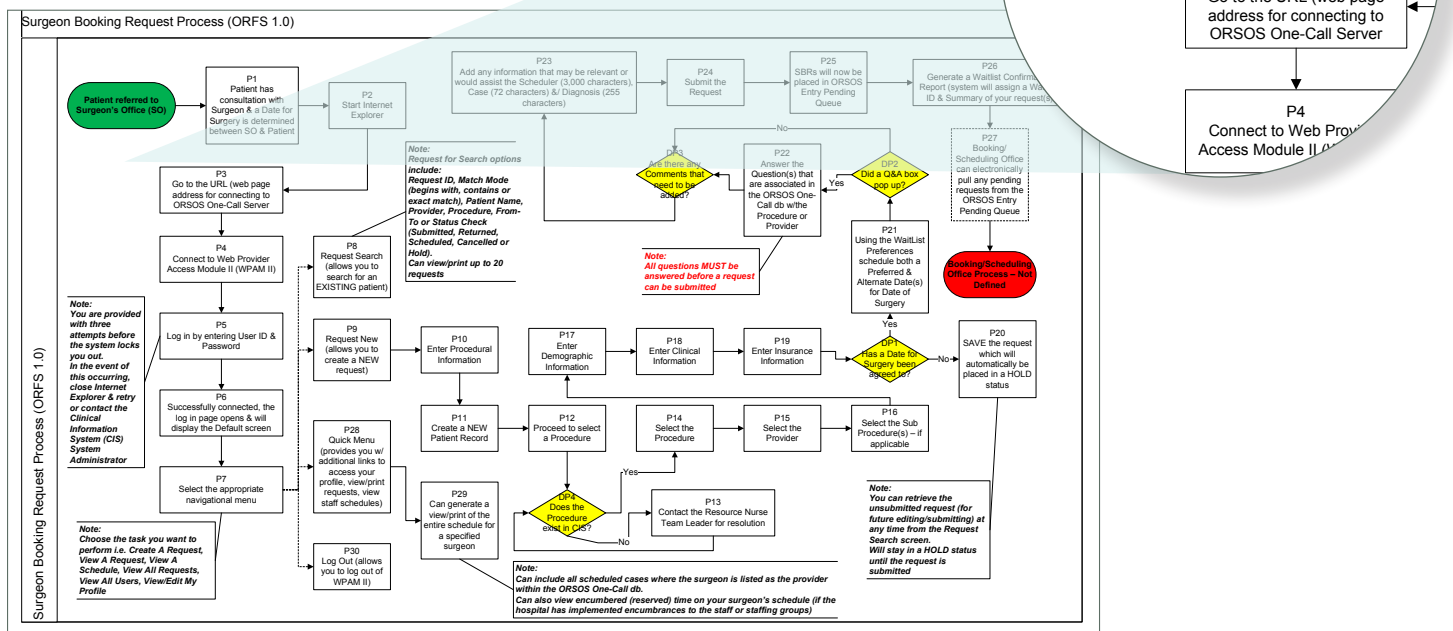
Figure 6: This future state process map from a pilot project hospital in Toronto examines the surgeon booking request process in detailed steps to see how it could function. For a full version of this map, see this chapter's *Appendix I*.

Defining your project's scope and requirements

The scope of the project is a detailed description of the project work and its deliverables. The scope provides a common understanding of the project among stakeholders. By outlining explicit scope exclusions, it can help manage the expectations of what will be delivered as part of the project.

The scope of the project must be managed and controlled. As the project progresses, information will become available that may lead to changes in the project. Minor scope changes can be noted and the project may progress when the scope change is communicated to stakeholders. When a major scope change occurs, it is recommended that all project documentation be reviewed and potentially revised. Also, the change must be communicated and approved by the appropriate person.

Identifying requirements is the process of defining and documenting stakeholder needs to meet the project objectives defined by the gap analysis.

A requirement should be recorded in enough detail to show that it has indeed been met. Having specific requirements also helps to manage stakeholder expectations.

Many tools can be used for collecting requirements and are similar to those used to document the current state and design the future state. Techniques such as interviews, focus groups, facilitated workshops, and group work such as brainstorming, can be used to identify requirements.

At a minimum, requirements should cover the following:

- Identify the business need or opportunity to be seized, describing limitations of the current situation and why the project has been undertaken.
- Highlight the business and project objectives for traceability.
- Identify functional requirements, describing business processes, information and interaction with the product.
- Identify non-functional requirements such as level of service/performance, safety, security, compliance, supportability, retention.
- Outline acceptance criteria.
- Identify impacts on other organizational areas.
- Outline support and training.
- Identify requirement assumptions and constraints.

It is important to realize that sometimes not all the requirements can be met given other project constraints. Requirements may need to be prioritized based on your business needs.

Functional Requirements

The analysis of requirements involves the detailed examination of the functional processes that a unit or area is required to perform its tasks. While common in many production environments, this type of analysis of processes (or process steps) is equally applicable to the hospital or a perioperative environment. It requires that project team members (and stakeholders) consider each of the detailed processes needed to carry on their business. This analysis is vital to the development of an agreed upon future state. Figure 7, below, provides an example.

Business Processes

Process Id	Business Event	Process Title	System Utilized & Interface	Description of Process	Output
ORFS 1.0 Surgeon Booking Request	Booking A Request For Surgery	Surgeon Booking Request	ORSOS, Or SBR ORSOS	After Patient Consult, Surgeon's Office can proceed to book a Request for Surgery either via the ORSOS WPAM II or enhanced SBR Booking Tool	A Booking Request is generated with a Preferred and Alternate Date of Surgery for the Booking/Scheduling Office to process
ORFS 2.0 Consignment	Tracking	DMI: Tracking Consignment	Middleware	Items will be tracked in their Parent Location utilizing RFID and Middleware. Events will be recorded when items are placed in or removed from storage location.	System visibility and reports
ORFS 3.0 Consignment	Consumption Consignment	CIS: Consumption Consignment	ORSOS	A scan of either the manufacturers bar code or RFID tag at point of consumption will capture unique product information i.e. manufacturer info and serial/lot number	Population of product information electronically on the ePHR in ORSOS
ORFS 4.0 Consignment	Replenishment Consignment	Replenishment	ORSOS ERP/MMIS	The scan of a bar code/RFID tag in ORSOS will trigger a consumption advice in ERP which will create an electronic requisition through the Plexxus Procurement stream. Transaction sets used to send acknowledge and notify hospital of replacement/replenishment	Creation of a requisition for processing into an order for replenishment. 997, 810, 850, 855, & 856 transactions
ORFS 5.0 Consignment	Invoicing	Middleware: Billing Consignment	Middleware Vendor Middleware ERP/MMIS	Consumption advice will be sent to Middleware to supplier to generate an invoice. The Vendor will attach the original replenishment PO number to the invoice	Consumption Issue/Advice is forwarded to the Vendor for the purposes of Billing
ORFS 6.0 Vendor	Vendor Activities	Vendor: Procure-To-Pay	ERP/MMIS Vendor Middleware Vendor	Depending on which option is selected, this flow describes what the process is internal to Vendor upon receipt of either a 'Consumption Issue/Advice' or an EDI 850 PO	Vendor process related to PO Receipt to Shipment of goods ordered. Vendor will complete the process with the generation of an EDI 856 ASN to be utilized for receiving items

Figure 7: This example captures process details that can be used to determine functional requirements for a project.

5.5 IMPLEMENTING YOUR SOLUTION

Directing and managing the project

During the implementation phase, the primary focus of the project lead is to direct and manage the project. This phase is when the bulk of activities that are in the project schedule begin, although there may be some overlap with activities that started during the planning phase. To monitor and control the project, the following aspects must be managed:

- Schedule
- Cost
- Risk
- Scope
- Communication
- Changes.

One important function of the implementation phase of the project is to compare the actual performance of the project (in terms of schedule and cost) to its planned performance. If there are discrepancies, corrective or preventative actions may be required.

When looking at the activities in a project, the types of questions you should ask include:

- **What activities have been started?** What activities should have been started by now (compared to the baseline project plan)? This will indicate activities that are behind schedule.

- **What activities are in progress?** Are the activities proceeding as planned?

- **What activities have been completed?** What activities should have been completed by now (compared to baseline)? This will identify activities behind schedule.

- **How much of the budget has been spent so far?** How much of the budget should have been spent by now (compared to baseline)? This will indicate the potential underspend or overspend. In most instances, the budget spent on an activity is usually in line with the work completed. For example, if an item's activities are 50 percent complete, you would expect 50 percent of the budget for that item to be spent. When cost and completion of work are not aligned, this is a potential indication of trouble. For example, if your plan was to perform a data optimization of 4,000 records in an item master file at a cost of $10,000, and you have optimized 2,000 records so far but spent $7,500, this activity will likely go over budget, over schedule or both. If certain activities will not follow this relationship, they should be flagged at the beginning of the project.

The monitoring and controlling of the project should also include:

- Identifying new risks, tracking and monitoring existing risks and making sure the risk response plan is being executed.

- Actively managing scope and changes. There should be a formal change process in place for the project. If a change is required in the implementation phase, it must be analyzed to determine its impact on the overall project (schedule, budget, risk) as well as its impact on your ability to achieve the overall project objectives.

Often, tradeoffs must be made to manage the scope and meet project objectives. Stakeholders must approve the changes with an understanding of the overall impact of the change on the project.

When changes to the project occur, be sure that stakeholders have approved of these and understand the overall impact it will have on the project.

Disseminating information

Part of the monitor and control function is to disseminate project information during the implementation phase as defined in your communication plan.

Use status reporting to distribute information about the project. At a minimum, the status reports should provide activity and deliverable status, schedule progress, forecasts, costs incurred as well as risks and issues. The level of detail in your status report should be such that it can stand on its own. In other words, someone not familiar with the project should be able to read and understand it.

When writing a status report, ensure that the level of detail is such that it can stand on its own. In other words, someone not familiar with the project should be able to read and understand it.

Another method of disseminating information is through the delivery of training, which usually happens in the implementation phase.

Connecting with key stakeholders

As has been stressed throughout this guide, collaboration is very important. Below is a high-level view of the various stakeholders involved in a typical ORSC improvement project and the communication items that relate to each of them. Developing a table, similar to the example below, will be beneficial to project communication plans.

Key Stakeholders	Communication Items
Senior Management	• Project status update at regularly scheduled steering committee meetings. • Issue management and resolution resides here.
OR Management	• Communicate project accomplishments. • Identify and resolve any implementation issues. • Monitor ongoing support for project objectives.
OR Clinicians/Patient Care	• Provide forum for input and feedback with representation on the project team and ad hoc work teams.
Surgeons	• Obtain lists of committees, chairpersons, meeting schedules and prepare presentation materials for status updates.
Materials Management/ Purchasing/ Shared Service Organization staff	• Provide forum for input and feedback with representation on the project team.
Suppliers	• Identify key OR supplies providers; involve them in the validation and optimization of data, communicate changes in replenishment processing.
IT	• Engage early in project planning to ensure any system requirements are identified and included in project tasks. IT representation on project team if required.
Biomed	• Obtain input as required.
Finance	• Engage in initial business plan development to validate project costs and savings budget forecasts.

5.6 MEASURING AND SUSTAINING IMPROVEMENTS

The last phase of the project life cycle deals with the activities involved in winding down the project and ensuring the change will endure.

Measuring the project impact

One of the first objectives of this phase is to measure whether the project objectives have been met. There should be quantitative proof that the original business objectives were met. Going back to compare against the original scope definition will also provide a way to detail which objectives have been met. When measuring the project outcomes against the objectives, you should list the following:

- Objectives met
- Objectives not met (and reasons why)
- Objectives exceeded
- Any unplanned benefits or costs that resulted from the project.

Another objective of the close phase is to share what was learned on the project. This is usually accomplished through a structured post-mortem review. In the post-mortem review, the team and stakeholders can discuss what went well in the project, what could have been improved, what lessons were learned and what new opportunities were identified.

The project should also measure its success based on the objectives and target metrics identified at the beginning of the project. See this chapter's *Appendix E* for more information.

Sustaining your change

Consider measuring the sustainability of the project by applying the metrics you have developed to track the adherence to the new processes that are now in place. These measures can be added to the department's monthly or quarterly tracked measures.

This last phase is also an opportunity to analyze the efficacy of the project and the effectiveness of the project's methods and processes against overall departmental and organizational goals. Additionally, it is strongly recommended that a framework for the initiative's sustainability be developed (or at the very least considered) if one is not already in place within the organization.

The knowledge surrounding a new clinical practice should be distributed over a number of 'reservoirs', that is, people, routines, manuals and relationships, as well as using hospital information spaces like bulletin boards and conferences.

Sustainability hinges on continued and effective leadership, information and knowledge transferability as well as what researchers Virani, Lemieux-Charles, et al. referred to as an organization's 'knowledge reservoirs' in their 2009 *Healthcare Quarterly* journal article on sustaining change.[2]

They suggest that the knowledge surrounding a new clinical practice should be distributed over a number of appropriate reservoirs. These can include people, routines, artifacts (such as manuals, IT systems), relationships (including with patients), organizational information space (such as a bulletin board or a conference); culture, and even organizational structure (by defining role and responsibilities).

While reservoirs can serve to better institutionalize a change, do not overlook the stakeholders. Engage them in the process and celebrate areas where the project has made a positive impact. Figure 8, below, shows how project stakeholders can view change.

Challenges in Sustaining Change: Not everyone views the change or the need to change the same way.
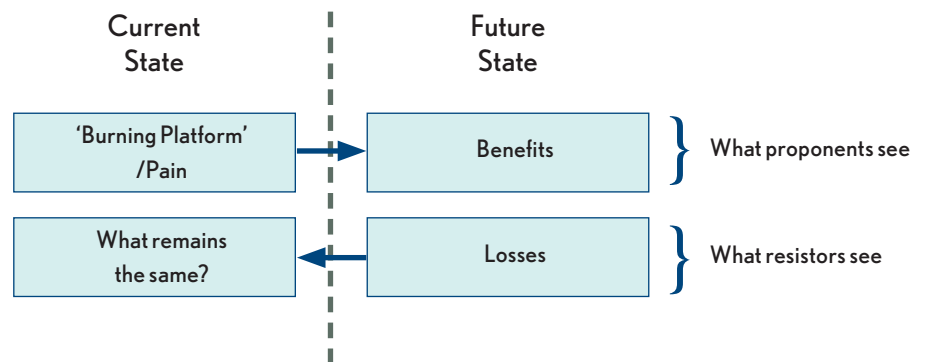
Figure 8: Develop a change management strategy that addresses concerns of both the project's proponents and resistors.

2   Virani, Lemieux-Charles, et al. "Sustaining Change: Once Evidence-Based Practices are Transferred, What Then?", Healthcare Quarterly, vol. 12, number 1, 2009, http://www.longwoods.com/content/20420

5.7 APPENDICES

ONTARIO HOSPITAL ASSOCIATION

Developing a Project Plan

The following provides details on:
- ☐ The level of detail in the project plan
- ☐ Baseline and monitoring the project plan
- ☐ Dependencies in the project plan
- ☐ Estimating effort in the project plan
- ☐ Gantt chart.

Level of Detail

Other rules of thumb to consider when determining the level of detail of your project plan:
- The 80-hour rule. Do not have activities longer than 80 hours in duration.
- The reporting rule. Do not have activities longer than your reporting periods. For example, if you will be providing status monthly, no activity should be longer than one month.

Define any significant project milestones (such as completion of a critical activity or significant target). A good time to generate excitement among stakeholders is upon completing milestones.

> **Activities to remember**
>
> In addition to the obvious work that must be done, you should also allocate time for the project's support activities, such as:
> - Reporting
> - Updating project materials, updating process or procedures
> - Training staff and creating training materials
> - Conducting, attending and preparing for meetings, workshops or seminars.
>
> For additional information on support activities, research: "project plan and the 100% rule", which states that 100% of the activities in a project should be included in the project plan.

Baseline and monitoring

As the project plan is a living document that should be maintained throughout the project, it is important to keep a baseline of the plan with targeted start and finish dates. The baseline is not the working copy of the plan. Changes will happen. If changes are significant, you need to be able to determine how you are doing against the original plan.

Appendix A: Developing a Project Plan continued

Measuring against the original plan will help manage stakeholder expectations. It will also highlight risk areas that have diverged from the original plan so that corrective action can be taken to meet the project objectives.

Dependencies

When sequencing the activities in the plan, you must highlight any dependencies. In ORSC projects, for example, a data optimization should be performed before a procedure card optimization.   If you optimize your procedure cards first, you will need to redo the work after the data optimization as item descriptions and other details may have changed.

Estimating

There are many techniques to use when estimating the plan's resources and the duration of tasks:

- Expert estimate: Have someone who has performed this type of work before providing estimates.
- Historical estimates: Look at similar projects that were undertaken in the past and use those values to estimate.
- Published estimates: There are tools available online (potentially for a fee) that allow you to access published estimates for different types of work.
- Three-point estimates: These provide an expected duration based on a weighted average of your most likely, pessimistic and optimistic estimates.

> **How to calculate a three-point estimate**
> Your most likely time is the time required based on the resources you have and their availability, call this estimate TM. The most optimistic estimate is based on the best case scenario; call this estimate TO. The pessimistic estimate is based on your worst case scenario; call this estimate TP.   Your estimate then becomes a function of the equation:
> $$\text{Estimate} = ((4 \times TM) + TO + TP)/6$$

- Bottom up estimate: Break down your activities for the project to a very detailed level, do all estimates at this lowest level and aggregate the plan.

> **A Lesson Learned**
> During the ORSC projects, all sites underestimated the amount of time needed to perform the data optimization of the item master files.   When you have your estimate for this activity, consider adding some extra time to the activity.

When adding resources to the plan, there are a few key points to remember:

- Be conscious of how many hours the resource will be assigned to the project. If a resource is assigned to the project for 20 hours a week, and you assign them a 40-hour activity, that activity will take two weeks to complete.
- By the time you are working on the detailed plan, you should be able to include all the team's "planned" absences by factoring in vacations, holidays and other days off.
- Resources should not be assigned to 100% capacity. As a rule of thumb try to assign resources no more than 80% of their available time, this will allow time for overhead activities like meetings and unplanned activities.
- Make sure all resources on the plan are aware of the activities that are assigned to them, and when these activities should occur.
- Keep working schedules in mind, not all resources work on the same days or hours.
- You need to check that the activities assigned to the resources do not overlap. Remember, there are only so many hours in the day and no one can accomplish four different eight-hour tasks in the same day.

What is a Gantt chart?

A Gantt chart is a bar chart depicting the project schedule. It shows the activities and phases of the project in a manner that can be understood by a wide audience. It generally includes the major milestones and timelines of the project. (See following page for example.)

Appendix A: Developing a Project Plan continued

Gantt chart Example:

O.R. Supply Chain Project: High Level Project Plan
Monday, December 21, 2009

ID	Phase & Deliverable	Start	Finish	Duration	% Complete
1	Phase 0 – Project Initiation -Project Charter -Communications Plan -Project Governance & Supporting Structure -Readiness & Mobilization -External Resources -Project Plan	4/8/2009	9/30/2009	25.2w	100%
2	Phase 1 – Current State Analysis -Product Evaluation, Selection and Standardization -Operational and Technical Current State Process Flow Documentation -Initial Preference Card Cleanse -Procedure Code Review -System Integration Review -Data Cleanse -Performance Metrics	3/9/2009	11/12/2009	35.8w	100%
3	Phase 2 – Business Requirement Development -Product Evaluation, Selection and Standardization -Facilitated Operational Business Requirements Sessions -Procedure Code, Tray and Equipment Nomenclature -Procedure Code Cleanse -WTIS Code Cleanse -Item & Equipment Dictionary Cleanse -Procedure Code Abbreviations -Inventory Optimization Review	9/23/2009	12/24/2009	13.4w	80%
4	Phase 3 – Future State Development -Surgeon Card Review Process & Preference Card Standardization -Surgical Booking Request System Training -ORSOS Training for Capture of Items Used and Not Used Metrics -Operational and Technical Future State Process Flow Documentation -Supply Storage assessment and redesign -Product Requirements, Selection and Procurement -HR Roles and Responsibilities Review -Technical Training Plan Development	12/28/2009	5/18/2010	20.4w	5%
5	Phase 4 – Design, Build and Test -Technical Design Plan Development -Technical Implementation Plan Development -Label, Interface, Supply Storage, Procedure Card and Supply Database Build -Acceptance Testing and Classroom Pilots -Transition and operating support plan	3/16/2010	9/23/2010	27.6w	0%
6	Phase 5 – Implementation -Deployment of storage equipment and supplies -Physical inventory count -Go Live and Go Live follow up	9/3/2010	10/4/2010	4.4w	0%
7	Phase 6 – Project Closure -Post implementation review -Contract closures -Performance measurement -Change Management	9/28/2010	12/14/2010	11.2w	0%

Project Status Report Template

The Project Status Report is a document that is used as a means of formal regular reporting on the status of a project to key project stakeholders, including the Project Sponsor and the Project Steering Committee.

PROJECT STATUS REPORT

Project Name:

Project Manager:

Phase X Project Status Report Date:

Last Project Status Report Date:

Phase X Status Report

Reporting Period	
From: yyyy/mm/dd	To: yyyy/mm/dd

General
Provide 2-3 sentences describing the activities and progress achieved in this phase.

Project Deliverables
Report on the project deliverables that were baselined for completion during this phase. If the project deliverable was completed as planned, indicate the "Actual Completion Date" otherwise indicate the "Revised Target Completion Date". Indicate status and provide additional comments as needed.

Project Deliverables	Target Completion Dates	Actual Completion Dates	Revised Target Completion Dates	Status & Comments
1.1. *Enter milestone name and description*				*Enter current status and comments*

Appendix B: Project Status Report Sample Template from OR Supply Chain Project continued

Project Deliverables	Target Completion Dates	Actual Completion Dates	Revised Target Completion Dates	Status & Comments
1.2				
1.3				
1.4				
1.5				
1.6 etc.				

Issues and Concerns:
1.
2.
3.
4.   etc.
Lessons Learned:
1.
2.
3.
Additional Comments :

Risk Management Report

This report can be part of the original business case and can be used throughout the project as part of project status reporting.

This report must be updated and submitted at each phase.

Risk	Expected Impact – Unmitigated Description and assessment (per the Risk Definitions below)	Mitigation Strategy	Responsibility	Timing	Expected Impact – After Mitigation
	Description: **Level of Risk**: **Impact**: **Likelihood**:	•			
	Description: **Level of Risk**: **Impact**: **Likelihood**:	•			
	Description: **Level of Risk**: **Impact**: **Likelihood**:	•			
	Description: **Level of Risk**: **Impact**: **Likelihood**:	•			

Risk Definitions:

Qualitative Measures of Impact		
Level	Descriptor	Description
1	Insignificant	The consequences would only briefly impede delivery of the activity and could be dealt with by routine operations.
2	Minor	The consequences would temporarily impair delivery of the activity but could be dealt with internally with limited impact.
3	Moderate	The consequences would temporarily stop delivery of an activity and trigger senior management review.
4	Major	The consequences would permanently stop delivery of an activity and trigger governor and stakeholder reviews.
5	Catastrophic	The consequences would threaten the survival of the entity itself and cause major problems for its governors and stakeholders.

Appendix C: Sample Risk Management Report from OR Supply Chain Project continued

Qualitative Measures of Likelihood		
Level	Descriptor	Description
1	Rare	The event may occur only in exceptional circumstances.
2	Unlikely	The event could occur at some time.
3	Moderate	The event should occur at some time.
4	Likely	The event will probably occur in most circumstances.
5	Almost certain	The event is expected to occur in most circumstances.

Risk Analysis Matrix—Level of Risk					
Likelihood	Impact				
	1. (Insignificant)	2. (Minor)	3. (Moderate)	4. (Major)	5. (Catastrophic)
1 (rare)	L	L	M	S	S
2 (unlikely)	L	L	M	S	H
3 (moderate)	L	M	S	H	H
4 (likely)	M	S	S	H	H
5 (almost certain)	S	S	H	H	H

Legend:
L = low risk: manage by routine procedures,
M = moderate risk: requires specific allocation of management responsibility including monitoring
and response procedures,
S = significant risk: senior management attention needed,
H = high risk: detailed research and management planning required at senior levels

Sample Project Budget as of XX, 201X

Description	Original Budget	Actual Expenses To Date
Expenses		
Salaries & Benefits		
OR Materials Manager Coordinator		
OR Service Resource Nurse		
Admin Support		
Purchasing resource (Analyst)		
Other - Steering Committee		
External & Supplies/Equipment		
External Consulting - e.g., Project Manager		
External Consulting - e.g., Supply Chain Consultant		
Carts		
Wire Racks		
Training		
Miscellaneous supplies - Internal supplies		
Total		

Note:
Indicate the reason for the variances on the budget.
If required included a Revised Budget Column.
Add line items as required

Appendix E: Results and Benefits Report Sample from OR Supply Chain Project

Phase X Results and Benefits Report

Project Name:

Project Manager:

Prepared On:

Period Covered:

Description of Issues: *[Insert description of issues here. E.g., Transportation costs are increasing exponentially. Each inventory warehouse. Warehouses consistently run out of stock.]*

Description of Project: *[Insert project description here. E.g., This project involves 15 hospitals in the northern region. The project involves centralizing the 24 inventory warehouses in the region down to one single inventory warehouse.]*

The benefits in the table below represent the expected results and benefits in the Business Case. Below is a sample template that can be used to report the benefits and outcomes of the project against the business case.

Project Component	Improvement Opportunities	Baseline and Target Benefits	Performance Measures	Actual Project Attained	
				Financial Benefits (Cash and Capacity)	Qualitative Benefits
[Ex: Insert component of project. Ex: Stockless Inventory, e-Commerce Transactions, Contract Management, etc.]	*[Ex: Insert improvement opportunities here. Ex: Decrease # of shipments, consolidate transportation agreements, etc.]*	*[Ex: Identify current baseline. and. target benefits with a breakdown per year or other appropriate time interval. Ex: cost savings by reducing the number of truck runs, cost savings by consolidating transportation contracts, improved SLAs, no more stock outs, reduction in number of transportation contracts managed, etc.]*	*[Insert performance measures here. Ex: $ saved, # of shipments per day, # of stock out situations, supplier performance, etc.]*	*[Achievement of Financial Benefits, e.g., Cost Saving, Cost Avoidances, One-Time Cost Benefits]*	*[Achievement of Qualitative Benefits, e.g., [Impact on Customers, Impact on Suppliers, Impact on Stakeholders, Impact on Governance/Policies, Impact on People]*

Cost Benefit Analysis Sample

The following are examples of some benefits and costs that can be considered when developing a business case.

Examples of benefits
Financial (e.g., reduced inventory)
Process efficiency (e.g., time spent of low value activities such as purchase order reconciliation being used on high value activities like contract negotiation)
Staff satisfaction (e.g., to be measured before and after implementation)
Risk mitigation (e.g., reduction of errors on implant logs)
Supports patient care
Supports organization objectives
Standardization (e.g., reduction price per item based on product standardization)
Raising departmental/organizational profile (e.g., becoming the first in the province to implement a process)
Organizational realignment (e.g., reducing nursing time on supply chain activities and redeploying to patient care)
Quality improvement (e.g., reduction of error rates on custom packs)
Space savings (e.g., number of multiple storage locations to be reduced)
Compliance (e.g., conforming to a new legislated requirement)

Examples of costs
External resources (example consultants or subject matter experts)
Internal resources required (example cost of backfill, project manager, project sponsor)
IT (example implementation or upgrade of a system)
Space (example requiring physical movement of a department)
Capital (example purchase of carts)
Department charge backs (example use of IT resources, HR resources or finance)
Legal costs (example resource time to review contracts)

For costs and benefits in the business case, it is important to differentiate between those that are one-time versus those that are ongoing.

Use the following as a rule of thumb to develop the cost benefit analysis:
- Use net present value (NPV) and internal rate of return (IRR) analysis for projects that last more than five years.
- Use payback analysis for projects that last less than five years.

Note: If your organization has a method, use it.

Payback analysis is the expected number of years required to recover the initial investment in the project. It allows users to calculate the time it takes for benefits to pay for the associated costs in a simple and straightforward manner. It is less sophisticated then NPV or IRR because it does not incorporate the time value of money, but it is used widely as a simple yet meaningful tool.

A payback analysis example: The purchase of a new cart washer at $95,000 versus manual cleaning costs of $250/week and the salary increase of 2-4% per year.

Appendix G: Determining and Using Project Metrics

Determining and Using Project Metrics

Determining project metrics:

The notion of metrics is founded in the "what gets measured gets done" philosophy. But, it is important to determine, particularly in an ongoing organizational effort, whether the metrics are realistic and whether the underlying data can be easily captured.

Things to consider when determining project metrics include the following:
- Do I have too many metrics?
- Have I reviewed my metrics lately to see if they still make sense and are still the most valuable metrics for me to track?
- Have I documented the baseline?
- Have I set a target for the metric?

How to use project metrics:

The correct way to use metrics is to establish a baseline measurement of the current state and continue to measure against this baseline looking for improvement to measure success. In this way, metrics foster continuous improvement.
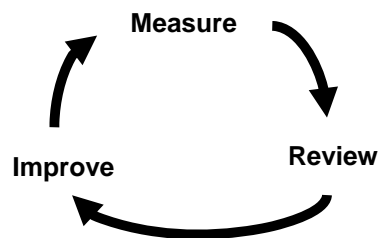
The metric cycle:

Metrics will help you measure your progress so that you can review and improve your processes. By following the **measure -> review -> improve** cycle you should be able to determine if your target is aggressive but achievable or it was initially set too low.

Additional resources on defining and measuring metrics are available from the Ministry of Finance's OntarioBuys website
- Performance Measurement Phase II - Framework for Action
(www.fin.gov.on.ca/en/bpssupplychain/documents/perf_meas_framework.html)
- Performance Measurement Phase II - User Guide
(www.fin.gov.on.ca/en/bpssupplychain/documents/perf_meas_userguide.html)
- Performance Measurement: A Report by the Hospital Supply Chain Metrics Working Group
(www.fin.gov.on.ca/en/bpssupplychain/documents/perfmetrics.html)

The difference between a measure, a metric, and an indicator

The terms measure, metric, and indicator are often used interchangeably. This causes confusion even among project management professionals. The following example serves to illustrate the differences:

When a patient undergoes the very standard procedure of having his temperature checked, the **measure** of his temperature is 37.5C.

When the patient's temperature is taken an hour later, it is found to be 37.3C. The **metric** is the comparison of two or more measures, in this case it is the patient's temperature over time.

The **indicator** compares a metric with a baseline. In this example we could compare the metric (a series of measures) on the hourly temperature of our patient and compare it to the relatively normal human temperature of 37C, so that here, our comparison would indicate that our patient's temperature is trending above the norm.

Source: http://www.stsc.hill.af.mil/crosstalk/1995/03/Measure.asp

The following are several ways to use metrics and measures:

- **Metrics and measures can help quantify the opportunity and sell the project to higher levels of management.** For example, if you know surgeries are being cancelled because you do not have the right supplies on hand to perform the procedures, you can collect the number of surgeries cancelled due to stock outs, the cost of the delay (OR down time, staff idle time, etc.), or number of errors on procedure cards. These metrics can help build a business case for the need to improve replenishment processes.

- **Metrics and measures can be used to control variables so that proactive, preventative or corrective measures can be taken.** For example, you want all suppliers to have 95% on-time delivery rate, but you have one supplier that seems to not deliver on time, or reschedules deliveries regularly creating rush orders, shortages and panic. If you measure the supplier's on-time delivery metrics and delivery accuracy, you will have the data available for taking corrective measures, whether that's breaking a contract or choosing another vendor.

- **Metrics and measures can help determine whether what you are doing is making things better or worse.** For example, if you undertake a project to reset your PAR levels, you can determine if they have been set too low by measuring stock outs.

- **Metrics and measures should be balanced and should not be used in isolation.** If you were running a project and decided to measure success based only on schedule, for example, you could add resources to your project to finish sooner, but the cost of your project would likely be over budget as you did not allot for the additional resources. To truly have a successful project, often the constraints of schedule, budget and quality need to be balanced.

  From an operational point of view, if you were running a hospital ORSC and decided that the only metric you would use is total dollars spent on OR supplies, this could prove misleading. The cost of an item must be balanced against its ease of use, availability and reliability. A singular and narrow focus on cost however, may have an adverse effect on desired project outcomes.

Ultimately your project planning and risk mitigation/management strategy must take into account and reflect the risks to schedule, budget, and project quality. Additionally your project (and its budget, schedule, and quality aspects) must also be weighed and balanced against the ongoing operational aspects of the perioperative department and the hospital as a whole

Appendix H: ORSC Program Current Sample State High Level Process Map
(provided by North York General Hospital)

NYGH Operating Room Supply Chain (ORSC) Project: High Level ORSC Process
April 3, 2009

(NN) = Number of steps/activities in the detailed process flow

Total Number of Steps/activities in Detailed Process = 373

Swim lanes:
- Accounts Payable (18)
- Anaesthesia (14)
- Material Management/Stores (71)
- OR Team Attendants (14)
- Material Management Coordinators (29)
- Vendor
- Purchasing (75)
- OR Inventory Coordinator (65)
- Central Processing Department (CPD) (65)
- Booking Office (20)
- Surgeons' Offices (5)

Process steps:

Surgeons' Offices
- 1 Patients referred to Surgeon (1)
- 2 Online SBR generated (2)
- 3 Changes/additions to bookings requested (2)

Booking Office
- 4 Block Schedule developed and approved (2)
- 5 Surgeries booked/ adjusted (12)
- 6 OR Schedule List approved (12)
- 7 OR Schedule List printed and posted by 10:00am for next day's surgeries (8)

Central Processing Department (CPD)
- 8 Scheduled Replenishment Counts by CPD Supervisor (2)
- 9 Scheduled Replenishment Counts/Reviews by Inventory Aide (Ortho) (4)
- 10 Supply Request Sheets faxed to Purchasing/delivered to OR Inventory Coordinator (12)
- 11 Tray maintenance (11)
- 12 Pick/Receipt and Put Away of supplies (14)
- 13 Preference Card preparation (4)
- 14 Case Cart assembly (7)
- 15 Case Carts and/or product delivered to OR (7)
- 16 Surgery completed (1)
- 17 Clean Return processed (4)

OR Inventory Coordinator
- 18 Counts/Reviews (13)
- 19 Replenishment request for Non-Stock, Consignment and Special requests (10)
- 20 Expediting function (20)
- 21 Pick/Receipt and Put Away of Non-Stock and Consignment products (21)
- 22 Non-Stock Anaesthesia supplies delivered (1)

Purchasing
- 23 Requisition created (6)
- 24 PO created (27)
- 25 PO Confirmation received (5)
- 26 Invoice problem solving/expediting (37)

Vendor
- 27 Receive PO
- 28 Confirmation of PO
- 29 Product delivered to Hospital

Material Management Coordinators
- 30 Daily scheduled Counts for OR Centre Core Stock (3)
- 31 Items Picked from Stores (6)
- 32 Items Put Away (3)
- 33 Pick Confirmation in MMIS (3)
- 34 Daily scheduled Counts for CPD Stock (3)
- 35 Items Picked from Stores (6)
- 36 Items Put Away (2)
- 37 Pick Confirmation in MMIS (3)

OR Team Attendants
- 38 Daily scheduled Count for OR Theatre Stock (4)
- 39 Items Picked from Centre Core/or CPD (7)
- 40 Items Put Away (3)

Material Management/Stores
- 41 Scheduled Counts (10)
- 42 Requisition created (4)
- 43 PO created (5)
- 44 PO Confirmation received (5)
- 45 Expediting (10)
- 46 Receipt of Stock, Non-Stock and Consignment products (33)
- 47 Stock is Put Away (2)
- 48 Delivery of Non-Stock and Consignment products to End User (2)

Anaesthesia
- 49 Scan Count of Non-Stock and Stock supplies (2)
- 50 Manual Requisition request for Stock and Non-Stock supplies (5)
- 51 Receipt of Stock and Non-Stock by Anaesthesia Tech. (4)
- 52 Put Away function (3)

Accounts Payable
- 53 Invoice received from Vendor (3)
- 54 QA completed against PO (10)
- 55 "End of Day" Process (2)
- 56 Cheque run generated (2)
- 57 Cheques mailed (1)

Surgeon Booking Request Process (ORFS 1.0)

NYGH ORSC Future State Process: Surgical Services

Surgeon Booking Request Process (ORFS 1.0)