

**REPORT OF THE  
SURGICAL PROCESS ANALYSIS  
AND IMPROVEMENT  
EXPERT PANEL**

**June 2005**

**Valerie Zellermeier  
Expert Panel Chair**

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## EXECUTIVE SUMMARY

Patients who need surgery depend on hospitals to provide operating resources and facilities in a timely manner. When surgery is delayed or cancelled, the result is poor access and increased wait times for surgery, backups in emergency services, longer lengths of hospital stay, staff stress, increased patient anxiety, and a decrease in the quality and safety of patient care.

Delayed and cancelled surgeries are symptoms of inefficient and ineffective practices that waste human, financial and capital resources. The magnitude of these resources is significant. In 2001/02, operating rooms accounted for about 5% of Canadian hospital expenditures or about \$2 billion.<sup>1</sup>

Surgical efficiencies are a critical enabler of Ontario's Wait Time Strategy. The Strategy focuses on reducing the time that adult Ontarians wait for MRI and CT scans and four types of surgery (cancer, selected cardiac, cataract, and total hip and knee joint replacements). Although adequate human, financial and capital resources are needed to increase the number of surgeries, improving surgical efficiencies will increase these numbers even more.

In October 2004, the Ministry of Health and Long-Term Care established the Surgical Process Analysis and Improvement Expert Panel to recommend a plan to improve surgical efficiencies in Ontario's hospitals. Chaired by Valerie Zellermeier, Program Director, Peri-operative Services, St. Michael's Hospital, and made up of experts involved in surgical care and management in Ontario hospitals, the Panel is providing its advice to the Minister of Health and Long-Term Care, George Smitherman, through Dr. Alan Hudson, Lead of Access to Services and Wait Times.

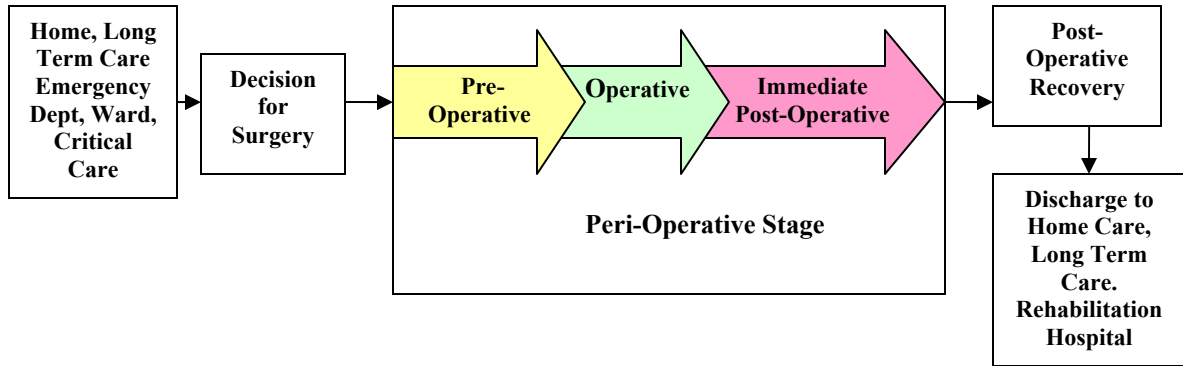
To inform its deliberations and recommendations, the Panel surveyed all hospitals that provide surgical services, reviewed the academic literature on surgical improvements, analysed the experience of other jurisdictions on surgical improvements, and reviewed available data on surgical efficiencies.

### THE CONTEXT FOR THE PANEL'S WORK

The Panel assessed the patient's journey and identified improvements *from the decision for surgery through the peri-operative stage*. The flow of the surgical patient through this stage should be seamless. Furthermore, improvements in surgical efficiencies cannot occur at the expense of patient safety and quality.

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<sup>1</sup> Canadian Institute for Health Information, *Health Care in Canada*, 2005.



## THE PANEL’S DELIBERATIONS AND RECOMMENDATIONS ON A PROVINCIAL PERI-OPERATIVE PLAN

Underlying principles that guided the development of the plan included surgical improvements that are patient- and family-centred, safe, and reflect high quality patient care. In addition, improvements need to make the most effective and efficient use of resources for the benefit of the patient, recognising that surgical improvements are an integral part of the broader continuum of care.

### An Accountability Framework

Peri-operative resources are valuable assets that must be used wisely. The Panel recommends that hospitals establish an accountability framework that makes:

- Boards and Chief Executive Officers accountable for governing and managing the efficient and safe use of their hospital’s peri-operative resources;
- A high performing Peri-Operative Leadership Team accountable to the CEO and responsible for the ongoing functioning of an effective peri-operative service; and
- A larger inter-disciplinary group that supports and advises the Team.

In addition to hospital-specific accountabilities, the Panel also recommends that LHINs measure the surgical performance of hospitals within their networks using agreed-upon benchmark targets, report a minimum data set of quality and efficiency indicators to the public, and make planning and resource decisions accordingly.

### Mapping Peri-Operative Processes

Hospitals need to understand their peri-operative processes. The Panel recommends that hospitals map their peri-operative processes, determine whether they are effective and make improvements. The Panel has developed a guiding tool to help assist hospitals to map and assess their peri-operative effectiveness.

## **Benchmark and Best Practice Targets**

*Surgical Benchmark Targets* are useful tools to evaluate how a hospital is performing compared to its peers, and to identify areas for surgical improvements. The Panel recommends that the Ministry support the development and implementation of an Ontario-wide program on surgical targets that takes into account the expectations of the Ontario public, and draws on the expertise of practitioners in the field. These targets should be used by hospitals to make improvements, and by the Ministry and LHINs to link funding with performance.

*Peri-Operative Best Practice Targets* can improve efficiencies and are critical for patient safety. The Panel identifies 11 targets including: pre-screening and education of patients before surgery; discharge planning before surgery; out-patient surgery where appropriate; same day admissions where possible; matching scheduled with actual operating time; surgeries beginning on time; “emergency surgeries” reflecting true emergencies; booking groups of similar surgical procedures; and surgeons working in consolidated blocks of time where possible. In addition to these targets, the Panel recommends that hospitals review their peri-operative best practice targets as part of their annual operating plan process, assess progress and identify steps for improvement.

*Supply Chain Best Practice Targets* focus on organised and effective processes that manage how products are selected and purchased. The Panel identified eight best practice supply chain targets including: sufficient instrumentation and supplies to support the operating room schedule; separate physical supports for clean and soiled instrumentation and supplies; management of instrumentation, and cleaning and sterilisation processes; management of an inventory supply replenishment process; the use of a limited but sufficient range of instrumentation and vendors to enable good choice and minimise inefficiencies and confusion; access management policies for vendors; standardisation of custom packs, case carts and pick lists by procedure or program rather than by individual physician; and a value analysis of new peri-operative technologies. The Panel also recommends that hospitals review their supply chain best practice targets as part of their annual operating plan process, assess progress and identify steps for improvement. The Panel also expects LHINs to bring a network perspective to supply chain targets through such initiatives as bulk purchasing, instrument sharing and joint inventory management, where appropriate.

*Best Practice Targets for Scheduling* focus on allocating operating resources using a number of factors. The Panel recommends that hospitals take into account patient need (wait time and patient urgency), community priorities as determined by the LHINs, the strategic priorities of the organisation, and the importance of retaining physicians by ensuring that they have sufficient operating time. The Panel also recommends that hospitals schedule urgent surgical cases as part of their planned activity.

## **Information Technology and Management**

Recognising that the Wait Time Strategy is developing the Wait Times Information System (WTIS) as a provincial registry, the Panel recommends a number of information initiatives to improve access and wait times through peri-operative efficiencies.

An *Operating Room Scheduling System* schedules and manages all the resources needed to complete a surgical case. The system will support performance improvements within individual hospitals, by LHIN and across the province. LHINs should take an active role in group purchasing OR Scheduling Systems and encouraging groups of hospitals within the LHIN to share these systems.

Hospitals should have *Peri-Operative Electronic Patient Record Systems (PEPR)* that link to, or are part of, the hospital's electronic patient record. Hospitals that do not have a PEPR in place should build the requirements for such a system into their strategic information management plan and capital plans. LHINs should take an active role in group purchasing PEPRs.

Hospitals need to develop a *Peri-Operative Supply Chain Management System* to help make better use of resources.

A *Peri-Operative Simulation System* would enable the peri-operative manager to model the impact of potential changes on OR operations and patient flow. The Panel recommends that the Ministry develop a request for proposals for a simulation system accessible to all Ontario hospitals, and which could be used by LHINS for planning.

A *Minimum Data Set* is necessary to monitor and improve peri-operative performance.

## **Human Resources**

The Panel recommends expanding surgical resources by supporting:

- Roles that complement and expand surgical resources provided by the surgical specialties, such as Registered Nurse First Assistants;
- A standardized peri-operative technician role open to Registered Practical Nurses and other health care personnel, with appropriate training, including foreign-trained healthcare providers who are not able to gain employment in their specialty field; and
- Interdisciplinary peri-operative teams that include other healthcare providers in addition to surgeons, anaesthesiologists and nurses.

The Panel also recommends expanding Anaesthesia resources by supporting:

- Advance practice roles that complement and expand anesthesia services currently provided by anaesthesiologists (e.g., GP Anaesthetists, Anaesthesia Assistants and Acute Care Nurse Practitioners with special training in anesthesia); and
- Teams to provide anesthesia services.

## **Education**

The Panel identifies the need for standardised specialty operating room training for nurses, and recommends that the Nursing Secretariat of the Ministry of Health and Long-Term Care, nursing regulatory bodies and academic institutions develop a standardized operating room nursing education program across Ontario that uses innovative teaching methods. Hospitals should have a peri-operative education resource available to help nurses maintain appropriate surgical clinical knowledge and skills.

In addition, the Panel supports the use of clinical skills laboratories and simulators to train students to develop basic technical skill sets. It recommends that the Ministry fund the development and operation of technical skills laboratories and high fidelity simulators in Academic Health Science Centres to teach basic surgical and anaesthesia techniques.

## **Funding**

The Panel believes that current funding arrangements do not support efficiencies and, in fact, promote surgical inefficiencies. Fee for service discourages the use of innovative team models and the use of other care providers, there is inadequate funding for instrumentation and supplies which leads to supply chain inefficiencies, and complex surgical patients take more time and require more resources. The Panel recommends that the Ministry review how surgical services are funded and staff compensated with the goal to align incentives so they support the efficient and effective use of OR resources.

## **Organisation of Regional Surgical Services to Increase Efficiencies**

The Panel believes that LHINs present an opportunity to develop regional surgical systems, and recommends that LHINs review the surgical services that exist, and identify opportunities to develop regional systems that promote efficiencies, safety and meet local needs. These systems should consider a range of options including Centres of Excellence for surgery, more specialised surgeries in a few hospitals, and less complex surgeries in a wider range of hospitals.

## **NEXT STEPS**

The Panel identifies a number of surgical efficiency issues that need to be examined further. In addition, the Panel recommends that the Ministry support the development of Peri-Operative Improvement Coaching Teams to help hospitals improve their peri-operative efficiencies. Made up of peers with experience in effective management of peri-operative resources, the Team will assist hospitals to make improvements. The Ministry should provide incentives to hospitals to participate in this initiative and help make improvements. Finally, a workplan with responsibilities and timelines is presented for the Ministry's consideration.

The Panel believes that its recommendations targeted to improve peri-operative processes will improve access and reduce waiting times for safe, high quality care.

## SECTION A: INTRODUCTION

### 1. BACKGROUND

Patients who need surgery depend on hospitals to provide operating resources and facilities in a timely manner. Efficient and effective surgical processes are needed to maintain safe, high quality patient care while making the best use of limited human and financial resources. Prior to the 1990s, significant healthcare investments resulted in expanded programs and growth. Since 1990, however, budget constraints have led to bed and operating room closures, program and service cutbacks, staff layoffs, the migration of healthcare providers out of Ontario, and competing demands for limited resources. In the face of these constraints, the demand for surgery has continued to increase due to a growing and aging population, technological innovations, and greater indications for different types of surgeries. As a result, there is a greater emphasis on making the most effective, efficient and innovative use of surgical resources.

Bottlenecks that lead to delayed and cancelled surgeries are symptoms of inefficient and ineffective practices that waste human, financial and capital resources. Bottlenecks can result in poor access and increased surgical wait times, backups in emergency services, longer lengths of hospital stay, staff stress, increased patient anxiety, and a decrease in the quality and safety of patient care. Bottlenecks can be found anywhere along the continuum of care. These include, but are not limited to, delays transporting surgical patients into the hospital and back to their home community hospital; insufficient education and preparation of the patient before surgery; not enough staff; lack of beds in the post-anesthetic care unit, critical care unit and on the wards; lack of specialised rehabilitation beds or services; lack of home care; and the lack of long-term care beds. Indeed, it is a challenge to focus on surgical process improvements since they are influenced by a large number of factors along the continuum of care. For example, a recent study of Ontario's critical care system concluded that critical care is a pivotal service that can "make or break" other hospital services. If critical care services are not available, surgeries can be delayed or cancelled, wait times for surgeries increased, fewer organs retrieved for life-saving transplants, and patient safety substantially reduced in our hospitals.<sup>2</sup>

Accurate and consistent information to describe, monitor and help improve surgical processes is often limited or unavailable. This has significant resource implications since surgery-related expenditures make up a significant portion of the healthcare budget. In 2004, Canadian hospitals accounted for 30% of healthcare expenditures or \$39 billion; operating rooms accounted for about 5% of these hospital expenditures (2001/02).<sup>3</sup> If operating room-related services are taken into account (e.g., in-patient nursing, support services), it is expected that this percentage would be higher.

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<sup>2</sup> *Final Report of the Ontario Critical Care Steering Committee* (Dr. Robert Bell and Lynda Robinson, Co-chairs), March 2005.

<sup>3</sup> Canadian Institute for Health Information, *Health Care in Canada*, 2005.



Surgical efficiencies have been the focus of much study in a number of jurisdictions. For example, between 2001 and 2004, the British National Health System Modernisation Agency identified organisational changes that hospitals can adopt for significant, measurable improvements in the way they deliver healthcare.<sup>4</sup> Changes directly relevant to surgical improvements include:

- Take a process view of patient flow across departmental and organisational boundaries.
- Work smarter by focusing on bottlenecks that prevent smooth patient flow, managing and reducing causes of variation in patient flow, segmenting patients according to their specific needs.
- Implement measurement systems for improvement that reveal the true performance of the system and the impact of any changes made in real time.

The focus on surgical improvements supports the Ontario government's Transformation Agenda. On September 9, 2004, George Smitherman – the Minister of Health and Long-Term Care – established the Health Results Team to lead a number of major healthcare transformation initiatives.<sup>5</sup> Dr. Alan Hudson was appointed as Lead of Access to Services and Wait Times, and charged with leading the implementation of the Wait Time Strategy.<sup>6</sup> The goal of the Strategy is to achieve a comprehensive, patient-centred care system that monitors and manages wait times, improves how efficiently and effectively care is delivered, and makes wait time information available to the public and providers. The Strategy is designed to improve access to healthcare services and thus reduce the time that adult Ontarians wait for services in five key areas by December 2006: MRI and CT scans, cancer surgery, selected cardiac surgeries, cataract surgery, and total hip and knee joint replacements. The five areas of focus are associated with a high degree of disease and disability, and are the beginning of an ongoing process to improve access to, and reduce wait times for, a broad range of healthcare services. Surgical efficiencies are a critical enabler of Ontario's Wait Time Strategy.

The Wait Time Strategy represents a transformation in the management of surgical services. Wait times, previously known only by individual physicians, will now be collected and available by hospital, Local Health Integration Network (LHIN) and the province, starting with the five key areas.

Clearly, adequate human, financial and capital resources are needed to support surgical efficiencies. In addition, however, there is a need to maximise the efficient and effective use of these resources, standardise safe processes, reduce variations in care, maintain quality outcomes, and identify surgical efficiency improvements at the hospital, LHIN and provincial levels.

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<sup>4</sup> National Modernisation Agency. *10 High Impact Changes for Service Improvement and Delivery*. National Health System, September 2004.

<sup>5</sup> In addition to the Wait Time Strategy, other initiatives include creating Family Health Teams for primary care, building information systems, developing Local Health Integration Networks, and encouraging greater community involvement in planning.

<sup>6</sup> See [www.health.gov.on.ca](http://www.health.gov.on.ca), click on Wait Time Strategy.

This is the report of the Surgical Process Analysis and Improvement Expert Panel. It presents a plan that identifies potential improvements in surgical processes in Ontario hospitals. These improvements focus on clear accountabilities, mapping peri-operative processes, benchmark and best practice targets, information technology and management, human resources, education, funding, and the organisation of regional surgical services to increase efficiencies.

## **2. THE SURGICAL PROCESS ANALYSIS AND IMPROVEMENT EXPERT PANEL**

In October 2004, the Ministry of Health and Long-Term Care (Ministry) established the Surgical Process Analysis and Improvement Expert Panel made up of leaders in healthcare administration, peri-operative processes, surgery, materials management and academia (see Appendix A for the list of Panel members). The purpose of the Panel is to:

- Examine the continuum of surgical care (i.e., pre- and post-operative, length of stay, discharge planning, etc.) to determine best practices for increasing capacity within available resources; and
- Make recommendations on the provision of quality health care to promote efficient surgical practices in the Ontario healthcare system.

The mandate of the Panel is to:

- Examine the full continuum of surgical care – pre-operative, operative and post-operative (peri-operative), length of stay, discharge planning, etc. – identifying *existing* models, practices and strategies that emphasise productivity and surgical efficiency (this will include the evaluation of appropriate utilisation, staffing standards, etc.);
- Examine *new* models, practices and strategies to promote efficient surgical practices in the Ontario healthcare system; and
- Recommend an implementation plan/strategy for moving forward.

The Panel is advising the Minister of Health and Long-Term Care, through Dr. Hudson.

## **3. METHODS USED TO GATHER INFORMATION**

The Panel used a number of strategies to conduct its review and deliberations: a survey of all Ontario hospitals that provide surgical services, a review of the academic literature on surgical improvements, an analysis of the experiences of other jurisdictions, and a review of available data on surgical efficiencies.

#### **4. OVERVIEW OF THE REPORT**

The report begins by presenting a profile of surgical activity in Ontario's hospitals as collected through a survey of these organisations. The section that follows presents the context for the Panel's deliberations including a definition of the peri-operative process, an analysis of inefficiencies and an ongoing focus on patient safety.

The Expert Panel's deliberations and recommendations are then presented as a provincial plan to support peri-operative improvements. This plan includes underlying principles, an accountability framework, mapping of peri-operative processes, benchmark and best practice targets, information technology and management, human resources, education, funding, and the organisation of regional surgical services to increase efficiencies. Finally, next steps are presented to support successful change.

The Panel believes that its recommendations will improve access and reduce waiting times for treatment, increase patient throughput, improve the patient and healthcare staff experience, and improve clinical outcomes and service delivery.

## SECTION B: PROFILE OF SURGICAL ACTIVITY IN ONTARIO'S HOSPITALS

### 5. RESULTS OF THE HOSPITAL SURVEY ON SURGICAL ACTIVITY

In February 2005, an electronic survey was sent out to all Ontario hospitals requesting information on their surgical activity. The intent of the survey was to identify best practice hospitals and opportunities for improvement. A total of 94 hospital corporations representing 120 sites responded to the survey (96% response rate). See Appendix B for the list of hospitals that responded to the survey.

Responses were received from:

- 32 small/rural hospitals (that perform less than 2,000 surgeries a year);
- 26 small community hospitals (that perform 2,001-7,999 surgeries a year);
- 36 large community hospitals (that perform more than 8,000 surgeries a year);
- 7 complex community hospitals (community hospitals that provide neurosurgery, trauma and/or heart surgery); and
- 19 teaching hospitals.

#### General Surgical Activity

When asked to estimate the percentage of in- and out-patient cases performed each year, Ontario hospitals reported performing a significant proportion of surgeries on an out-patient basis (Table 1). The Panel notes that performing surgeries on an out-patient basis, wherever possible, is a best practice target.

**Table 1: Percentage of In-patient and Out-patient Surgical Cases Performed in Ontario Hospitals**

	In-patient	Out-patient
Acute Teaching (17)	41%	59%
Complex Community (6)	60%	40%
Large Community (28)	43%	57%
Small Community (25)	40%	60%
Small/Rural (32)	38%	62%

It appears that few Ontario hospitals use their surgical capacity to perform elective surgeries on the weekend (Table 2). This indicates that Ontario hospitals have operating room capacity that could be used to improve patient access to surgery, assuming that sufficient funding, staff and equipment are available.

**Table 2: Hospitals That Perform Elective Surgeries on The Weekend**

	Yes	No
Acute Teaching (17)	2	15
Complex Community (6)	1	5
Large Community (28)	2	26
Small Community (25)	3	22
Small/Rural (32)	2	30
<b>Total</b>	<b>10</b>	<b>98</b>

The ten hospitals that perform elective surgery on the weekends noted that they are operating to meet their wait time volumes, performing cosmetic procedures, and/or conducting postponed surgeries.

### The Collection of Wait Time Data

Hospitals reported if they collect wait time data and if they do so electronically. Since most hospitals completed this survey prior to the 2005/06 wait time allocations, the responses indicate how many hospitals were collecting wait time data prior to the allocation (Table 3). A total of 50 hospitals reported collecting wait time data, 20 of them electronically. This suggests that collecting wait time data, especially electronically, will be a new activity for many Ontario hospitals.

**Table 3: Hospitals That Collect Wait Time Data**

	Yes	No	Electronic Data Collection
Acute Teaching (17)	13	4	9
Complex Community (6)	5	2	3
Large Community (28)	12	16	3
Small Community (25)	9	16	3
Small/Rural (32)	11	21	2
<b>Total</b>	<b>50</b>	<b>59</b>	<b>20</b>

Most hospitals collect wait time data manually, with information being managed through the individual surgeon's office. Some hospitals reported managing wait times through a surgical care committee/senior management team that monitors wait time data as a quality indicator and assigns OR time based on individual utilisation rates and wait times.

### Booking and Preparing the Patient

Booking and preparing the patient and the room for surgery are important mechanisms for keeping delays and cancellations at a minimum. Hospitals reported whether they asked surgeons five essential questions prior to booking a patient in the OR (Table 4):

**Table 4: Questions Asked of Surgeons When Booking OR Time**

	What implants/or equipment is required?	Has the patient been pre-screened?	What is the clinical priority of the patient?	Will an ICU bed be needed post-op?	Does the patient have special needs?
Acute Teaching (17)	17	11	12	15	17
Complex Community (6)	6	3	2	6	6
Large Community (28)	26	20	18	25	28
Small Community (25)	22	15	11	17	23
Small/Rural (32)	19	23	24	15	28
<b>Total</b>	<b>90</b>	<b>72</b>	<b>67</b>	<b>78</b>	<b>102</b>

Variations exist in the information asked of surgeons when booking OR time. The vast majority of hospitals – regardless of size – ask surgeons whether the patient has special needs. Responses to the other questions vary by hospital size. These results suggest that standardised questions are not asked of surgeons when booking OR time. Not asking these questions or not having this information communicated to the operating room can lead to surgical delays and cancellations.

### Sequencing Patients

Sequencing patients can help reduce bottlenecks and improve surgical efficiencies. When hospitals were asked how they sequence patients for the surgical day, the most common answers were:

- Out-patient cases are performed earlier in the day, with in-patient cases performed later.
- Sequencing is based on staff availability (i.e., longer cases booked earlier in the day to avoid overtime).
- Similar cases are grouped in sequence.
- Major cases are performed earlier in the day with minor cases later on in the day.
- Sequencing is based on patient priority.

Surprisingly, 28 hospitals reported that they do not have a system for sequencing patients (one teaching hospital, nine large community, three complex community, seven small community, and eight small/rural hospitals).

### Post-Operative Services Coordinated Prior To Surgery

An important efficiency indicator and best practice target is whether the post-operative needs of a patient are identified prior to surgery. Hospitals were asked whether post-operative rehabilitation services, long-term care and/or out-patient physiotherapy needs were identified prior to surgery (Table 5).

**Table 5: Hospitals That Coordinate Post-Operative Services Prior to Surgery**

	Rehabilitation Services	Long-term Care	Out-patient Physiotherapy
Acute Teaching (17)	9	6	5
Complex Community (6)	3	1	2
Large Community (28)	26	14	19
Small Community (25)	10	2	12
Small/Rural (32)	5	2	11
<b>Total</b>	<b>53</b>	<b>25</b>	<b>49</b>

A significant number of hospitals do not appear to coordinate post-operative services prior to surgery. This can result in delays in discharging patients, poor quality of care, and potentially poorer outcomes especially if necessary rehabilitation services are not available.

### Operative Services

Start time accuracy for the first case of the day is a significant indicator of surgical suite efficiency. Preparing the operating room prior to the start of the day shift will help ensure that the first case of the day starts on time. The majority of acute-teaching, complex and large community hospitals appear to follow this best practice (Table 6). Small community and small/rural hospitals may be less likely to follow this practice due to a lack of staff prior to the day shift.

**Table 6: Hospitals That Prepare the OR Prior to the Start of the Day Shift**

	Yes	No
Acute Teaching (17)	16	1
Complex Community (6)	5	1
Large Community (28)	23	5
Small Community (25)	16	9
Small/Rural (32)	18	13
<b>Total</b>	<b>78</b>	<b>29</b>

When asked whether they prioritise urgent/emergent cases, a significant number of small community and small/rural hospitals reported not having prioritisation schedules (Table 7). In these instances, volumes may be too low to justify implementing a system. As well, individual surgeons may make the decision using their professional judgement. The surgeon's preferences may determine patient priority, sequencing, scheduling and hours of operation. One teaching hospital noted that surgeons and anaesthesiologists have resisted priority booking feeling that it de-personalises the decisions about urgent/emergent case scheduling.

**Table 7: Hospitals That Have Prioritisation Schedules For Urgent/Emergent Cases**

	Yes	No
Acute Teaching (17)	16	1
Complex Community (6)	5	1
Large Community (28)	26	2
Small Community (25)	15	10
Small/Rural (32)	12	20
<b>Total</b>	<b>74</b>	<b>34</b>

The lack of a standardised priority rating system is a barrier to improving efficiency since it makes it impossible for hospitals to assess their activity over time and to compare their performance with their peers.

### Dedicated Educator

The survey indicated that only 48 hospitals have a dedicated OR nursing educator to help nurses maintain appropriate surgical clinical knowledge and skills (Table 8). Hospitals that do not have this function reported providing staff education through weekly in-service education, special seminars, visits with sales representatives when new equipment is purchased or a refresher is required, dedicated time for training every month, and conferences or workshops.

**Table 8: Hospitals That Have a Dedicated OR Nurse Educator**

	Yes	Title(s)
Acute Teaching (17)	15	Nurse or Clinical Educator
Complex Community (6)	6	Nurse Clinician, Clinical Educator
Large Community (28)	21	Clinical Facilitator, Clinical Practice Leader, Education Co-ordinator
Small Community (25)	5	Clinical Educator Facilitator, Nurse Clinician
Small/Rural (32)	2	Clinical Resource Nurse, Hospital Educator
<b>Total</b>	<b>48</b>	

### OR Efficiency Indicators

Hospitals varied widely in the indicators they collect that, in the opinion of the Panel, can be used to help monitor and track peri-operative performance (Table 9). As a condition of additional funding through the Wait Time Strategy, hospitals are required to collect certain efficiency indicators such as cancellations, delays, and unplanned operating room closures.



**Table 9: Hospitals That Use OR Indicators**

	Case Costing	Volumes to Service	Off hours surgery	Non prime-time utilisation	Prime-time utilisation	Start Time	Delays	Cancel-lations	Overall Utilisa-tion
Acute Teaching (17)	11	15	15	13	14	15	15	17	16
Complex Community (6)	1	3	4	2	3	5	3	6	5
Large Community (28)	10	23	24	17	22	23	23	20	25
Small Community (25)	4	15	20	10	15	17	13	16	15
Small/Rural (32)	8	11	12	5	12	17	13	10	14
<b>Total</b>	<b>34</b>	<b>67</b>	<b>75</b>	<b>47</b>	<b>66</b>	<b>77</b>	<b>67</b>	<b>69</b>	<b>75</b>

**Post-Anaesthesia Care Unit (PACU) and Second-Stage Recovery**

The vast majority of hospitals reported using scoring criteria to discharge patients (Table 10). The criteria used to discharge patients varied with the most common criteria being the Aldrete Score (or a variation of this score).

**Table 10: Hospitals That Use Scoring Criteria to Discharge Patients**

	Yes	No
Acute Teaching (17)	16	1
Complex Community (6)	5	1
Large Community (28)	28	0
Small Community (25)	24	1
Small/Rural (32)	29	3
<b>Total</b>	<b>102</b>	<b>6</b>

When asked if they have policies to by-pass the PACU, small/rural hospitals appeared less likely to have these policies (Table 11). A few of these smaller facilities indicated that the PACU may be the same as the discharge unit.

**Table 11: Hospitals With Policies to Bypass the Post Anesthetic Care Unit (PACU)**

	Yes	No
Acute Teaching (17)	13	4
Complex Community (6)*	4	1
Large Community (28)	19	9
Small Community (25)	16	9
Small/Rural (32)	14	18
<b>Total</b>	<b>66</b>	<b>41</b>

\*The Ottawa Heart Institute does not have a PACU. All patients go directly to the ICU.

Bypassing the PACU is a good practice target in certain instances. Hospitals were asked the extent to which they allow procedures that typically bypass the PACU to do so (i.e., cataracts, local anesthetic, conscious sedation and/or critical care). Table 12 indicates that a significant number of hospitals bypass the PACU when a local anesthetic is administered. Fewer hospitals bypass the PACU for cataracts, conscious sedation and critical care.

**Table 12: Procedures That Typically Bypass the PACU**

	Cataracts	Local Anesthetic	Conscious Sedation	Critical Care
Acute Teaching (17)	8	13	8	12
Complex Community (6)	5	5	2	3
Large Community (28)	22	25	12	17
Small Community (25)	11	21	11	7
Small/Rural (32)	3	19	8	7
<b>Total</b>	<b>49</b>	<b>83</b>	<b>41</b>	<b>46</b>

Hospitals were also asked whether staffing patterns are adjusted based on patient need (Table 13). This efficiency indicator is important since some patients may require 1:1 nursing care whereas others may require significantly less. If staffing cannot adjust to fluctuations, nursing resources may be inappropriately placed in the PACU when they could best be used elsewhere.

**Table 13: Hospitals That Adjust Staffing Patterns Based on Patient Need**

	Yes	No
Acute Teaching (17)	14	3
Complex Community (6)	4	1
Large Community (28)	25	3
Small Community (25)	22	3
Small/Rural (32)	28	4
<b>Total</b>	<b>93</b>	<b>14</b>

### Instrument Processing and Case Cart Preparation

Adequate support from the instrument processing department is essential for an efficient and effective OR. The Panel notes that a best practice target is standardisation of case carts and pick lists by procedure or program rather than by individual physician.

The majority of hospitals in Ontario reported using surgeon-specific pick lists (Table 14). Although it appears that small/rural hospitals are less likely to use these lists, this may be due to the fact that visiting surgeons bring their own equipment.

**Table 14: Hospitals Where Surgeon-Specific Pick Lists Are Available**

	Yes	No
Acute Teaching (17)	17	0
Complex Community (6)	5	1
Large Community (28)	28	0
Small Community (25)	24	1
Small/Rural (32)	26	6
<b>Total</b>	<b>100</b>	<b>8</b>

When asked whether the construction of instrument trays is standardised or based on utilisation rates, most hospitals used standardised practices to construct trays (Table 15). Utilisation rates were less common. Many hospitals reported that they use ad hoc processes to construct trays based on surgeon preferences.

**Table 15: Construction of Instrument Trays\***

	Based on Utilisation Rates	Standardised
Acute Teaching (17)	5	15
Complex Community (6)	0	6
Large Community (28)	8	25
Small Community (25)	6	25
Small/Rural (32)	6	25

\*Hospitals were able to select more than one way of constructing the instrument trays.

### Hospital Self-Assessment

Respondents were asked to assess how accurately the following statements reflected their hospitals:

- Cases start and finish on time;
- Turnover times are minimal;
- Rooms are fully utilised;
- Skill level is appropriate;
- Appropriate levels of instrumentation, supplies and equipment are available;
- A high level of standardisation is apparent among surgeons for similar cases;
- The ability to plan and anticipate case volumes for each day exists; and
- Unplanned or unpredictable case volumes are isolated

These statements reflect best practice targets, and point to an efficient and effective use of surgical resources. Respondents were also asked to give an overall efficiency ranking for their hospitals. The results of the self-assessment are provided in Table 16.

There is wide variation in how hospitals assess themselves, with significant opportunities for improvement depending on the area and the size of the hospital. For example, very few hospitals felt that the statement “cases start and finish on time” accurately reflected their facilities.

**Table 16: Hospital Self-Assessment\***

		<b>Very Accurate</b>	<b>Moderately Accurate</b>	<b>Somewhat Accurate</b>	<b>Moderately Inaccurate</b>	<b>Very Inaccurate</b>
<b>Cases Start And Finish On Time</b>	Acute Teaching	3	11	3	0	0
	Complex Community	0	3	2	1	0
	Large Community	3	9	10	4	0
	Small Community	1	16	5	3	0
	Small/Rural	4	13	9	2	2
<b>Turnover Times Minimal</b>	Acute Teaching	8	6	1	1	0
	Complex Community	1	2	2	1	0
	Large Community	9	8	7	1	1
	Small Community	11	6	6	2	0
	Small/Rural	11	9	6	2	0
<b>Rooms Fully Utilised</b>	Acute Teaching	7	8	2	0	0
	Complex Community	1	5	0	0	0
	Large Community	10	11	2	1	2
	Small Community	8	6	6	4	1
	Small/Rural	6	5	8	8	3
<b>Skill level of staff appropriate</b>	Acute Teaching	9	4	3	0	0
	Complex Community	3	1	2	0	0
	Large Community	12	10	3	0	1
	Small Community	14	8	2	1	0
	Small/Rural	19	9	2	0	0
<b>Appropriate levels of instrumentation, supplies and equipment</b>	Acute Teaching	3	5	7	1	0
	Complex Community	0	1	4	1	0
	Large Community	4	10	6	6	0
	Small Community	6	1	10	4	0
	Small/Rural	13	8	5	3	0
<b>High level of standardisation among surgeons for similar cases</b>	Acute Teaching	5	5	5	1	0
	Complex Community	1	1	3	1	0
	Large Community	3	10	8	4	1
	Small Community	10	8	2	4	1
	Small/Rural	15	6	6	2	0
<b>Ability to plan and anticipate the case volume for each day</b>	Acute Teaching	4	9	3	1	0
	Complex Community	1	3	2	0	0
	Large Community	9	13	3	0	1
	Small Community	10	9	5	1	0
	Small/Rural	12	12	3	3	0
<b>Unplanned or unpredictable case volumes are isolated</b>	Acute Teaching	8	3	6	0	0
	Complex Community	1	3	1	0	0
	Large Community	5	8	9	4	0
	Small Community	3	5	11	4	0
	Small/Rural	11	9	5	3	1
<b>Please rank the overall efficiency at your institution</b>	Acute Teaching	2	7	3	0	0
	Complex Community	0	4	2	0	0
	Large Community	6	9	5	0	0
	Small Community	5	9	4	1	0
	Small/Rural	11	8	5	1	0

\*Not all hospitals submitted a self-assessment.

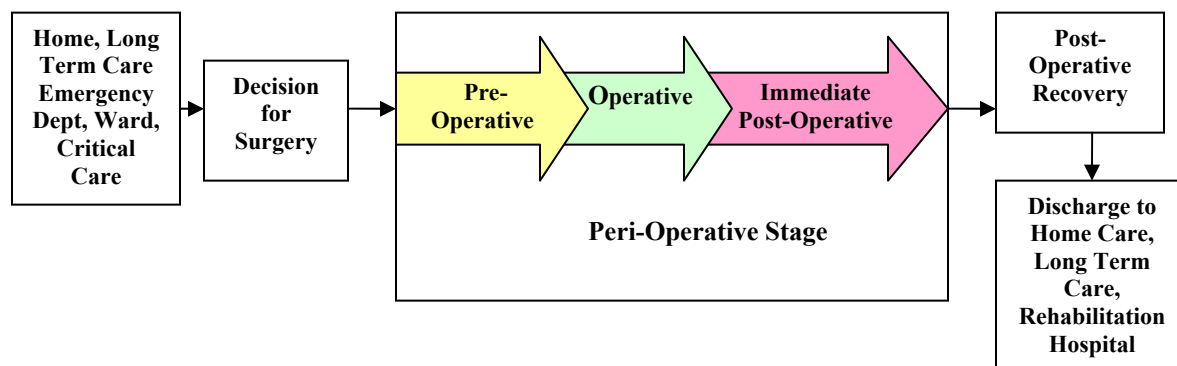
## SECTION C: THE CONTEXT FOR SURGICAL PROCESS ANALYSIS AND IMPROVEMENTS

### 6. THE PERI-OPERATIVE PROCESS AND ANALYSIS OF INEFFICIENCIES

#### 6.1 What is the Peri-Operative Process?

The Panel's mandate was to assess the patient's journey and identify improvements *from the decision for surgery through the peri-operative stage*. This stage includes surgical processes that are:

- Pre-operative: diagnostics, routine testing, patient education, preparation for surgery, preparation for discharge from the operating room and hospital.
- Operative: the surgical day.
- Immediate post-operative: recovery room, post-anesthetic care unit (PACU).

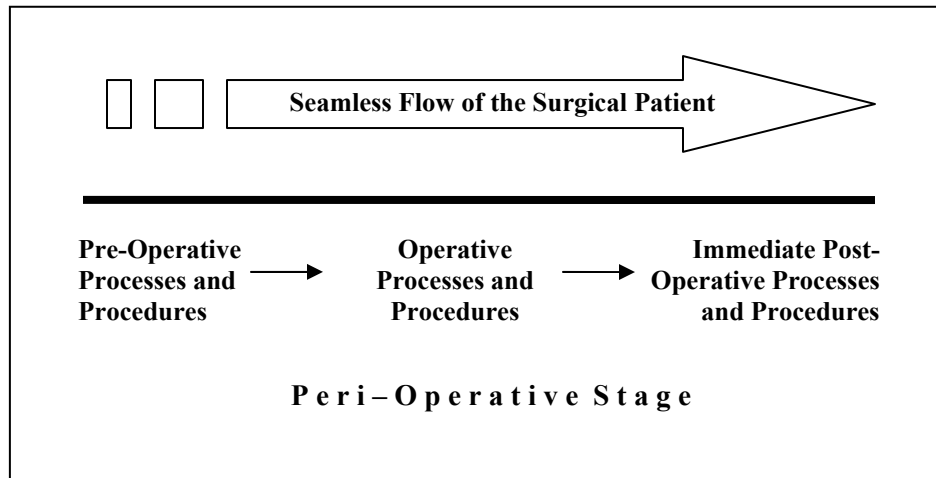


The portion of post-operative recovery that goes beyond immediate post-operative recovery may include a stay in critical care or on a general ward unit, and a discharge to home care, long-term care and a rehabilitation hospital.

As noted earlier, it was a challenge for the Panel to focus on surgical process improvements since these are influenced by many events along the broader continuum of care. The importance of these broader events is acknowledged but are beyond the scope of the Panel's work.

The flow of the surgical patient should be seamless. The patient should not be aware of all the processes and procedures that are in place to make the surgery effective, efficient and safe. Underlying the seamless flow of the surgical patient are all the processes and procedures in the pre-operative, operative and immediate post-operative stages.

Quite simply, operations should begin as scheduled. Patients need to be prepared and ready, the complete surgical team needs to be ready, and appropriate resources need to be in place. Bottlenecks and inappropriate processes at any point in the peri-operative stage will lead to delays, cancellations and inefficiencies.



## 6.2 Surgical Inefficiencies, Cancellations and Blockages

Surgical inefficiencies occur for a number of reasons.

1. The surgical path is complex. Many players coordinate many steps to get a patient to surgery. A delay or blockage in one part of the path will have a ripple effect and lead to delays throughout the whole pathway. This pathway includes the broad healthcare continuum, both within and outside the hospital's walls. A failure to understand the complexity of the path and the role that one delay has on the whole process can lead to surgical inefficiencies.
2. The "approach" of getting patients ready for surgery has become more fragmented with the significant shift from in- to out-patient surgery, and more same-day admissions for surgery. When the vast majority of surgeries were conducted on an in-patient basis, hospitals played a more active role preparing patients for surgery, ensuring that all appropriate tests and procedures were followed. Typically, patients were admitted the day before surgery where pre-operative diagnostics and final checks were conducted and any outstanding preparations could be made. With the shift to out-patient surgery and same-day admissions, individual surgeons and hospital clinics now play a more active role preparing surgical patients. Surgeons or clinics order all the appropriate tests and procedures for their patients using different processes, and communicate this information to hospital pre-admission or surgery departments. The lack of standardisation and the larger number of individuals

responsible for preparing patients and their charts for surgery can result in delays, cancellations and inefficiencies.

3. Surgical services appear to lack a team culture that focuses on the patient's journey. The patient and the physician decide if surgery will proceed. Once the decision is made, the surgical process needs to align with the continuum of patient care and be supported with a team culture that centres on the patient, rather than the individual surgeon or clinician performing a series of procedures. This team culture must respond in a seamless fashion to a number of patients each day, providing individual care within an organised and standardised model. The operating room is a valuable resource. Everyone needs to be accountable and responsible for getting the patient to surgery with a minimum of delay. A team culture that focuses on the patient's journey is paramount.

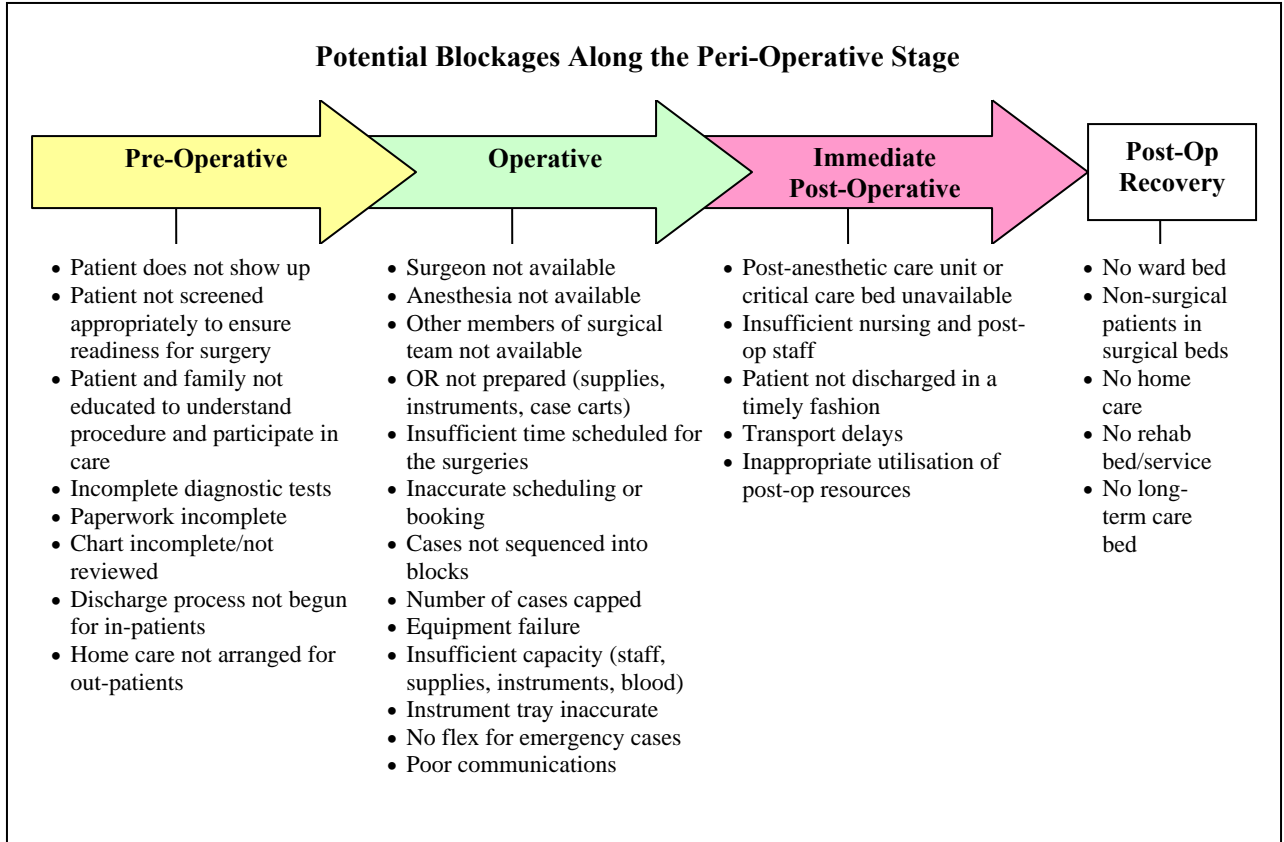
Delays and cancellation of surgery help to highlight areas for improvement. Surgeries are cancelled for a number of reasons. Britain's National Health Service Modernisation Agency Theatre Project conducted an in-depth analysis of cancelled operations to identify reasons for cancellations as well as opportunities for improvement.<sup>7</sup> *Although the proportion of each reason may vary in Ontario, the reasons for cancellation are similar.* The NHS study found that slightly over half of operations cancelled by the hospital for non-clinical reasons were cancelled on the day of surgery. Of all surgeries cancelled on the day of the operation:

- 23% were due to the unavailability of a ward bed. The study noted that bed unavailability is not necessarily due to bed shortages, but may be caused by other factors such as delayed discharges, or patients occupying in-patient beds who should be seen as day cases.
- 21% were due to patients who did not attend.
- 12% were due to patients unfit for surgery.
- 7% of surgeries were no longer required by the patient.
- 7% were due to list overruns.
- 6% were due to the consultant (i.e., surgeon) being unavailable.
- 4% were due to an inconvenient appointment, 4% to an emergency/trauma case, and 4% to an equipment failure or unavailability.

The reasons why cancellations occur provide insights into potential blockages along the peri-operative stage. These are summarised below.

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<sup>7</sup> *Tackling Cancelled Operations: Interim Guidance from the NHS Modernisation Agency Theatre Project*, December 2001.



## 7. AN ONGOING FOCUS ON PATIENT SAFETY

International research indicates that the rate of potentially avoidable adverse events in hospitals ranges from 7.5% to 17% of all hospital admissions.<sup>8</sup> The recent Canadian study of adverse events reported that 43% of adverse events among hospital patients were related to surgery.<sup>9</sup>

Preventing and controlling infections is critical for patient safety. According to the Institute for Healthcare Improvement (IHI), 40 to 60 percent of clean case infections are preventable.<sup>10</sup> Surgical site infections are the second most common adverse event in hospitalised patients,<sup>11</sup> and are known to increase mortality, readmissions, length of stay

<sup>8</sup> Baker GR, Norton PG et al. "The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada" *CMAJ* 2004; 25 May 170 (11): 1678-1686. Carthey J "Institutional Resilience in Healthcare Systems" *Quality in Health Care* 2001; 10: 29-32. Leape LL, Berwick DM "Safe Health Care: Are We Up to It?" *British Medical Journal* 2000; 320: 725-726. Vincent C et al. "How to Investigate and Analyse Clinical Incidents: Clinical Risk Unit and Association of Litigation and Risk Management Protocol" *British Medical Journal* 2000; 320: 777-781.

<sup>9</sup> Baker GR, Norton PG et al., *Ibid.*

<sup>10</sup> Institute for Healthcare Improvement. *Getting Started Kit: Prevent Surgical Site Infections How-to Guide. 100,000 Lives Campaign.* www.ihl.org/IHI/Programs/Campaign/

<sup>11</sup> Brennan, *New England Journal of Medicine* 1991; 324: 370-376.



and overall cost. IHI's recommendations<sup>12</sup> along with guidelines for the prevention of surgical site infections<sup>13</sup> are critically important for patient safety.

Communication is increasingly being identified as a cause of healthcare errors and adverse events.<sup>14</sup> Communication breakdowns among personnel were a factor in 43% of surgeon-reported adverse events.<sup>15</sup> A communication checklist or a "surgical pause" would help support team communication and safe practices. A "surgical pause" occurs before the surgery starts and is when the entire surgical team pauses, and confirms such things as the plan for the case, the location of surgery, and so on.

Surgical improvements and efficiencies cannot occur at the expense of patient safety. The complexity of the peri-operative stage means that there are a lot of opportunities for error. Errors can be minimised with adequate resources, standardised processes and protocols, best practices in infection control, effective communication between caregivers and between caregivers and patients, and a culture that uses errors to make improvements (e.g., "no blame and no shame" culture).

Physicians, clinicians, support staff and management must adopt a patient safety culture that characterises the peri-operative stage. This includes establishing processes to identify, assess and mitigate risks, developing best practices and supporting staff.

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<sup>12</sup> Institute for Healthcare Improvement, *Ibid.*

<sup>13</sup> Mangram AJ et al. "Guideline for Prevention of Surgical Site Infection, 1999." *Infection Control and Hospital Epidemiology* 1999; 20 (4).

<sup>14</sup> Lingard, L "Team Talk: Implementing a pre-operative checklist to promote communication and safety in the OR" Ontario Hospital Association Day on Surgical Wait Times, March 7, 2005.

<sup>15</sup> Gawande et al. as reported by Lingard L *Ibid.*

## **SECTION D: THE EXPERT PANEL'S DELIBERATIONS AND RECOMMENDATIONS**

### **8. A PROVINCIAL PERI-OPERATIVE PLAN**

The Panel identified the components of a provincial peri-operative plan that will minimise blockages and cancellations, and support improvements. The components of the plan include:

- Underlying principles;
- An accountability framework;
- Mapping peri-operative processes;
- Benchmark and best practice targets;
- Information technology and management;
- Human resources;
- Education;
- Funding; and
- The organisation of regional surgical services to increase efficiencies.

#### **8.1 Underlying Principles**

The Panel identified four underlying principles to guide the development of the provincial peri-operative plan.

1. Surgical improvements must be patient- and family-centred, and uphold the satisfaction and privacy of the patient.
2. Surgical improvements must support patient safety and maintain high quality care.
3. Provider access to peri-operative facilities must focus on making the most effective and efficient use of resources for the benefit of the patient.
4. Surgical improvements are an integral part of the broader continuum of care. Surgical efficiencies can be supported or hindered by many factors along the continuum.

#### **8.2 An Accountability Framework**

Peri-operative resources are valuable patient assets. Blockages and delays can negatively impact on patients and their families, the rest of the healthcare team, and the ability of the hospital to ensure access to surgery within a timely manner. The Panel identified the need for clear accountabilities for managing peri-operative resources early on in its deliberations. When asked to provide its advice on conditions for additional case funding in Phase I of the Wait Time Strategy, the Panel noted that hospitals should have a group

responsible and accountable for the planning and management of operating theatre performance and for collecting data to best improve efficiencies.

Consistent with this earlier advice, the Panel believes that hospitals providing surgical services should establish an accountability framework for peri-operative resources. This framework should include the following elements.

1. The hospital Board and the Chief Executive Officer should be accountable for governing and managing the peri-operative resources of their hospital. The Board and CEO are responsible for patient safety, quality, and the efficient and effective use of peri-operative resources, and should report to their communities on how well these resources are being governed and managed.
2. A Peri-Operative Leadership Team should be created. This small, high performing group made up of representatives from surgery, anesthesiology, other clinical groups and administration, should be accountable to the CEO and responsible for the ongoing functioning of an effective peri-operative service. The Team will:
  - Develop an objective process to monitor performance, allocate resources and set peri-operative management goals;
  - Initiate and oversee action-oriented continuous quality improvement initiatives;
  - Determine and monitor safe practice standards;
  - Develop surgical schedules and mechanisms to support timely access based on patient need;
  - Measure the effective and efficient use of resources, and identify strategies to reduce variations;
  - Recommend service-specific resource allocations;
  - Measure the number and types of procedures, and monitor quality and patient safety outcomes; and
  - Monitor performance by identifying blockages and issues at the level of the individual provider, service or system.
3. The Team should be supported and advised by a larger inter-disciplinary group made up of surgeons, anesthesiologists, nursing, operating room and program managers, and others, as appropriate.

Staff who are needed to support peri-operative efficiencies should be considered as an integral part of a hospital's accountability framework. For example, one key function could be someone who is a supply chain management expert with in-depth knowledge of the peri-operative supply chain. Considering that supplies make up about 50% of operating room costs, this function should have OR-related knowledge, understand the surgical equipment, instrumentation and products that are needed by all the surgical specialties, know the advantages and disadvantages of each piece of equipment, develop a partnership with vendors, research new equipment, oversee purchases, and conduct cost analyses. Hospitals need to determine the most appropriate way to fulfil this function based on local circumstances. What is critical is that operating room and supply chain

management expertise be brought to bear on supply decisions. This is explored further in Section 8.4, *Benchmarks and Best Practices* in the discussion of supply chain best practice targets

The Panel recommends that:

- R1 Hospitals that provide surgical services establish an accountability framework for peri-operative resources that include the following elements: i) the Board and Chief Executive Office (CEO) of the hospital are accountable for governing and managing the hospital's peri-operative resources, including patient safety, quality, efficiency and effectiveness; ii) an inter-disciplinary Peri-Operative Leadership Team is directly accountable to the CEO and responsible for the ongoing functioning of an effective peri-operative service; and iii) a larger inter-disciplinary group provides support and advice to the Leadership Team.**

The active participation of physicians in accountability for peri-operative resources is crucial. Traditionally, physicians, as independent practitioners, have not actively participated in managing a hospital's resources. This has made it difficult for some physicians to appreciate fully the impact of their decisions on patient flow and the smooth functioning of operating rooms. Physicians should be given the opportunity to bring their expertise to bear on managing peri-operative services.

A hospital accountability framework for peri-operative resources is consistent with increased accountabilities under the Wait Time Strategy. Under the Strategy, hospital boards will be held accountable for governing their organisation's surgical resources including access, appropriate use, quality and ongoing improvement. Government will monitor the performance of hospitals against established targets and hold organisations accountable, using funding incentives. The Panel expects that Local Health Integration Networks (LHINs) will measure the surgical performance of hospitals within their respective network using agreed-upon benchmark targets, report a minimum data set of quality and efficiency indicators to various communities, and make planning decisions accordingly.

The Panel recommends that:

- R2 Local Health Integration Networks measure the surgical performance of hospitals within their respective networks using agreed-upon benchmark targets, report a minimum data set of quality and efficiency indicators to the public and government, and make planning and resource decisions accordingly.**

### 8.3 Mapping Peri-Operative Processes

Effective planning and management are critical for effective and efficient peri-operative performance. It is important for hospitals to examine their peri-operative processes, determine whether they are effective, and make improvements to match capacity to demand.

The Panel believes that hospitals need to map the main stages in the typical in- and out-patient's visit, analyse the demand for services at each stage and the capacity to meet this demand, assess the variation between demand and capacity, and identify why these variations exist.<sup>16</sup> This mapping exercise would help hospitals to predict the maximum patient flow throughout the day, identify bottlenecks under various assumptions, and determine opportunities to improve processes and maximise the use of resources.

The Panel recommends that:

**R3 Hospitals map their peri-operative processes, analyse the results, and systematically identify areas for improvement.**

The Panel identified a number of tools that hospitals can use to map their peri-operative processes.

Considerable work has been done to identify the requirements and common performance targets at each stage of the peri-operative process. Building on this work and the expertise of Panel members, Appendix C presents a tool to help assist hospitals with mapping and assessing the effectiveness of their peri-operative processes.

The Panel explored training opportunities in process analysis and improvement similar to those offered by the Institute for Healthcare Improvement in the United States.<sup>17</sup> Taking into account the Ontario context, courses should target the needs of specific groups and use fairly simple methods that could be applied quickly. Potential topics include process mapping, performance measurement, efficiency, effectiveness, benchmarking, cause and effect diagrams, quality assurance, statistical process control, flowcharting, Pareto analysis, lean management (eliminating waste), workforce scheduling, work measurement, project management, forecasting, decision analysis, failure mode and effects analysis and queuing analysis. Opportunities need to be explored to develop courses that are available throughout the province and use innovative education methods (e.g., videoconferencing).

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<sup>16</sup> Mango PD, Shapiro LA. "Hospitals Get Serious About Operations." *The McKinsey Quarterly* 2001 (2).

<sup>17</sup> [www.ihl.org](http://www.ihl.org)

## **8.4 Benchmark and Best Practice Targets**

Increasingly, hospitals are focusing on improving quality by incorporating clinical and non-clinical benchmark and best practice targets into their daily practices. The Ministry has supported a number of these initiatives. For example, the Ontario Guidelines Advisory Committee (GAC), is a joint body of the Ontario Medical Association and the Ontario Ministry of Health and Long-Term Care with ex-officio representation from the Institute for Clinical Evaluative Sciences. Formed in 1997, the GAC assesses the rigour and clinical relevance of existing clinical practice and recommends one guideline over all others to be used by practising physicians. The GAC also develops and recommends appropriate strategies for guideline implementation and evaluation. Another example is the Ministry's Innovation and Education Fund which is supporting the development and implementation of evidence-based quality improvement activities to promote surgical and operational efficiencies.

The Panel examined benchmark and best practice targets in the following areas:

- Surgical benchmark targets;
- Peri-operative best practice targets;
- Supply chain best practice targets; and
- Best practice targets for scheduling.

### **Surgical Benchmark Targets**

Benchmark targets are useful tools to evaluate how a hospital is performing compared to its peers, and to identify areas for improvements. For example, targets for the average time it takes to perform various surgeries would help identify potential bottlenecks and areas for improvement. Standard measurement times would include the time it takes to do the procedure, from when the patient enters the operating room to when the patient leaves, including set up times, anesthetic/preparation time, surgical (cut) time and closure, and the patient leave time.

Currently, Ontario hospitals with surgical programs do not collect and assess surgical targets on a provincial basis. Fourteen large Ontario hospitals do participate in a private proprietary surgical benchmarking program with other hospitals across Canada. Data is collected on performance indicators such as labour hours and expenses, productivity ratios, staffing ratios, patient case mix and utilisation percentages. This data enables hospitals to assess their performance in comparison to others, and identify areas for improvement. Data from this benchmarking program indicates wide variations in surgical practices. For example, the median time taken by hospitals for in-patient surgical cases was 135 minutes, with a range of 168 to 114 minutes at the 25<sup>th</sup> and 75<sup>th</sup> percentile, respectively (October 2003-March 2004).<sup>18</sup> The range for out-patient

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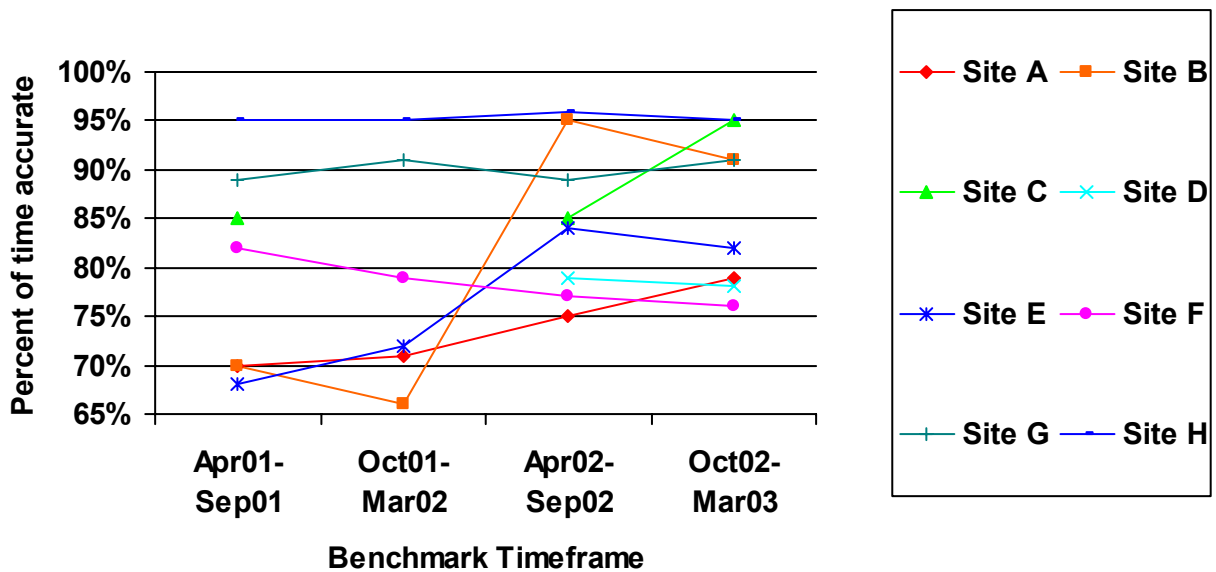
<sup>18</sup> Sullivan Healthcare Consulting Canada Co.

surgical cases was smaller, with a median time of 67 minutes, and a range of 85 to 54 minutes at the 25<sup>th</sup> and 75<sup>th</sup> percentile, respectively.

Variation between hospitals and opportunities for hospitals to improve are evident when examining the accuracy of starting the first surgical case of the day on time (see figure below). Start time accuracy for the first case of the day is a significant indicator of surgical suite efficiency. In eight hospitals, start time accuracy ranged from 75%-95%.

### Start Time Accuracy: First Case of the Day

Source: Sullivan Healthcare Consulting



The Panel believes that all hospitals in Ontario that provide surgical services need to collect information on their surgical practices, and participate in a process to develop provincial surgical benchmarking targets and focus on improving efficiencies. Taking into account the expectations of the Ontario public, and drawing on the expertise of practitioners in the field, the Ministry should support the development and implementation of a surgical targets program. Hospitals should use these targets to make improvements, and the Ministry and LHINs should link funding with meeting performance targets.

The Panel recommends that:

- R4 The Ministry of Health and Long-Term Care support the development and implementation of an Ontario-wide program to develop surgical targets that draws on the expertise of practitioners in the field. These targets should be used by hospitals to make improvements, and by the Ministry and Local Health Integration Networks to link funding with performance.**

The five Expert Panels established for the Wait Time Strategy need to develop benchmark targets for their particular areas. To date, the Expert Panel on MRI and CT has identified efficiency standards for the number of MRIs and CTs to perform depending on the body part being scanned.<sup>19</sup> The other four panels need to conduct similar work.

### **Peri-Operative Best Practice Targets**

There is a need for hospitals to standardise peri-operative best practice targets. This is not only important for efficiencies but is critical for patient safety. The Panel identified a number of peri-operative best practice targets that should be used to improve processes. In addition, potential indicators are presented that could be used to measure progress towards these targets.

The Panel believes that hospitals should review these peri-operative best practice targets as part of their annual operating plan process. Hospitals should then assess their progress in meeting each target and identify steps for improvement.

The Panel recommends that:

**R5 Hospitals review peri-operative best practice targets as part of their annual operating plan process, assess their progress in meeting each target and initiate steps for improvement.**

The Panel identified 11 peri-operative best practice targets. These are presented below as well as summarised in Appendix D.

***Best Practice Target 1:*** *All electively scheduled patients will be screened either by telephone or in person to ensure that they are ready for surgery.*

(Indicator: The number of patients who are screened. The number of patients who have their surgery cancelled because they are “not ready.”)

***Best Practice Target 2:*** *All patients and their families will be educated to ensure that they understand the procedure and participate in care.*

(Indicator: The number of patients and families who are educated about the procedure and care.)

***Best Practice Target 3:*** *Discharge planning will begin before surgery.*

(Indicator: The number of patients who have clear discharge goals and services scheduled prior to surgery, such as home care, rehabilitation, long-term care.)

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<sup>19</sup> MRI and CT Expert Panel Phase I Report (Dr. Anne Keller, Chair), April 2005.



**Best Practice Target 4:** *Surgery will be conducted on an out-patient basis in a separate location, wherever possible.*

(Indicator: The number of in-patient and out-patient surgeries, by type of surgery.)

**Best Practice Target 5:** *Surgical patients will be admitted on the same day as the surgery, wherever possible.*

(Indicator: The number of same day admits, by type of surgery.)

**Best Practice 6:** *The time the patient goes into the operating room to the time the patient leaves the operating room will be equal to the time that was booked for the case.*

(Indicator: The time the patient goes into the operating room compared to the time the patient leaves the operating room, and the time that the case is booked for, by type of surgery. Turnover time.)

**Best Practice 7:** *The amount of time scheduled for surgery will be as close to the expected time that the surgery should take.*

(Indicator: The hours scheduled for the surgery and the hours used for the surgery, by service and surgeon.)

**Best Practice 8:** *Surgeries will begin at the scheduled start time.*

(Indicator: The number of surgeries that are delayed more than 15 minutes, by service and surgeon. Reason for the delay in surgery.)

**Best Practice 9:** *The “emergency surgeries” that are conducted will reflect true emergencies.*

(Indicator: The number of surgical emergencies, by service and surgeon. A prototype definition of emergency is the surgery is required due to a threat to life or limb and/or surgery needs to be done on the same day or within “N” hours. Existence of standardised booking procedures that allow for case review.)

**Best Practice 10:** *Surgical cases that have similar procedures will be grouped as a block, where possible.*

(Indicator: The number of times that “like” cases are scheduled in an ad hoc fashion.)

**Best Practice 11:** *Surgeons will work in consolidated blocks of time, where possible.*

(Indicator: The number of surgeries conducted on days that are less than fully booked. Operating room use by surgeon compared to the time allocated and the expected case volume.)

### **Supply Chain Best Practice Targets**

A range of support services is needed to ensure that the continuum of patient care services can be provided. The Panel identified the need to standardise supply chain processes that support the peri-operative stage. The supply chain refers to organised and effective processes that manage how products are selected and purchased. Each hospital's surgical suite is different. The investments, systems and processes needed to

support a high volume operating room suite in a large hospital will differ substantially from those required in a small hospital. Nevertheless, there are a number of standardised best practice targets for supply chain processes that are relevant to all hospitals. The Panel believes that hospitals should review supply chain best practice targets as part of their annual operating plan process. Hospitals should then assess their progress in meeting each target and identify steps for improvement. In addition, Local Health Integration Networks need to bring a network perspective to supply chain targets through such initiatives as bulk purchasing, sharing instruments between hospitals and taking a joint approach to inventory management, where appropriate.

The Panel recommends that:

**R6 Hospitals review supply chain best practice targets as part of their annual operating plan process, assess their progress in meeting each target and initiate steps for improvement. In addition, Local Health Integration Networks should bring a network perspective to supply chain targets through such initiatives as bulk purchasing, instrument sharing and joint inventory management, where appropriate.**

The Panel identified eight best practice supply chain targets. These are presented below as well as summarised in Appendix E.

***Best Practice Target 1: Sufficient Capacity to Support the OR Schedule***  
*Peri-operative services will ensure that there is sufficient instrumentation and supplies to support the operating room schedule. Appropriate investments will be made to support surgical activity and throughput.*

As technology has advanced and the equipment, instrumentation and supplies required for the operating room have increased in number and complexity, the space available to accommodate instruments and supplies has decreased. Furthermore, hospitals often do not have sufficient instrumentation due to capital resource limits. This means that greater attention is needed to replenish instruments and supplies more often, with a focus on minimising cost and error. Greater attention is also needed to maintain the quality of expensive instruments so they can be used to the full life of the instrument. Sufficient instrumentation and supplies to support the operating room schedule are critical for a well-functioning peri-operative service. A balance is required between having sufficient instruments available for surgery, and optimising central processing service operations.

***Best Practice Target 2: Separate Physical Supports for Clean and Soiled Instrumentation and Supplies***  
*Surgical suites will have separate dedicated physical supports for clean and soiled instrumentation and supplies between peri-operative and central processing services.*

A balance needs to be achieved between investing in a sufficient number of instruments and supplies, and investing in processing throughput. To reduce cleaning and

sterilisation time as well as transportation time between the operating room and central processing services, there needs to be separate dedicated physical supports for clean and soiled instrumentation and supplies (e.g., elevators, corridors, storage bins). It is recognised that separate larger supports may not be possible in some hospitals (e.g., elevators), however, this is a best practice target.

***Best Practice Target 3: Instrument Management***

*Systems will be used to help manage instrumentation, and cleaning and sterilisation processes.*

Instrument management systems should be used to help track instruments – which includes fully using the instrument until it must be replaced – manage the cleaning and sterilisation processes, and produce standardised trays.

***Best Practice Target 4: Supply Management***

*Hospitals will link supply consumption to surgical activity by actively managing the inventory supply replenishment process using automated systems and material management support.*

Surgical suites are one of the highest consumers of hospital supplies. In many cases, the system that is used to manage central medical/surgical supplies does not include managing the bulk of operating room supplies. Generally, clinical staff or vendors manage supply. It is important to free up scarce and valuable clinical staff from managing supply as well as remove vendors from conducting this task. Controls need to be put in place to link supply consumption with surgical activity.

***Best Practice Target 5: Standardisation of Instrumentation***

*To the extent appropriate to the clinical activity of the hospital, peri-operative services will use a limited but sufficient range of instrumentation to enable good choice and minimise inefficiencies and confusion.*

Standardisation of instrumentation helps reduce confusion, inefficiencies and unsafe practices. In addition, reducing the number of products such as sutures results in savings in inventory and supply management. Hospital standardisation committees should review all supplies for opportunities to standardise. These committees should develop an instrumentation inventory that includes a list of approved instruments that have been evaluated and approved for use in the facility. Clear cleaning and sterilisation instructions should be part of the approval process for putting instruments on this formulary list. Currently, inconsistent cleaning standards and sterilisation instructions between Health Canada, Europe and vendors are a significant source of frustration and inefficiency for central processing service departments. As well, “loaner instruments” provided by vendors for less common techniques often arrive without cleaning instructions.

***Best Practice Target 6: Standardisation of Vendors***

*To the extent appropriate to the clinical activity of the hospital, peri-operative services will use a limited but sufficient number of vendors to enable good choice and minimise inefficiencies and confusion.*

Standardising vendors (i.e., limiting their number) results in the need for fewer supplies and instruments, and cost savings related to contract negotiation and management. In addition, limiting the number of vendors results in less confusion about supply management.

***Best Practice Target 7: Access Management of Vendors***

*Hospitals will develop access management policies for their vendors.*

Often hospitals let vendors manage their consignment inventories due to resource constraints. Since vendors are motivated to increase consumption and introduce expensive new technologies, hospitals may not always receive objective advice. In addition, some hospitals allow vendors in operating rooms to advise on the use of instruments. Various organisations have developed access management policies for vendors that address such things as donations, gifts, the distribution of service-oriented items, hospitality, and sponsorship to conferences. Hospitals need to develop access management policies for their vendors in the peri-operative stage.

***Best Practice Target 8: Standardisation by Procedure or Program***

*To the extent appropriate for the facility, custom packs, case carts and pick lists will be standardised by procedure or program, rather than by individual physician.*

Custom packs, case carts and pick lists that are specific to a physician result in significantly more variation in supplies, higher costs and greater inefficiencies than if standardised by procedures or program area.

***Best Practice Target 9: Value Analysis of New Technologies***

*Hospitals will use clearly defined processes to analyse the value of new peri-operative technologies.*

Analysing the value of new technologies that offer clinical improvements is a challenge. Often new products are offered at introductory prices that quite similar to the products they replace. Once adopted as the standard, the price is often increased significantly. It is complex to evaluate cost in relation to the benefit of improved clinical outcomes. Is a new product that costs 50% more really worth the additional cost from a clinical effectiveness and or patient/staff safety perspective? Hospitals should use surgical product value analysis committees to analyse the value of new technologies before they are adopted. The introduction of new technologies should not be left solely to the discretion of individual surgeons.

Hospitals can benefit from the work of organisations that assess medical technologies. For example, the Ministry of Health and Long-Term Care's Ontario Health Technology

Advisory Committee (OHTAC) assesses new and upcoming diagnostic and treatment-related medical devices and services, equipment and supplies, and laboratory tests and procedures used in any health services delivery setting. OHTAC also commissions field studies of emerging technologies.

### **Best Practice Targets for Scheduling**

The Panel identified the need for hospitals to develop best practice targets for scheduling operating room time. Traditionally, surgeons have been allocated blocks of operating time based on past letters of agreement. Individual surgeons and services are allocated a certain number of operating room days, and operating resources are allocated by the type of case and in return for emergency care coverage. Surgeons use their scheduled operating time regardless of the demands of patients in other surgical areas.

The Panel believes that this historical approach to allocating operating time by surgeon or service must be transformed into allocating operating resources based on other factors. One factor is patient need which should be determined by the length of the waiting list for a procedure and the urgency of the patient's condition. The five service Expert Panels in the Wait Time Strategy have or are in the process of developing urgency rating scores and maximum wait time targets in their respective areas (i.e., cancer, cardiac, cataract, hip and knee total joint replacement, and MRI and CT). Another factor to consider when allocating operating time is the community's priorities which LHINs can determine in consultation with their constituencies. Yet other factors to consider include the strategic priorities of the organisation and the importance of retaining physicians in local hospitals by ensuring that they have sufficient operating time.

The Panel recommends that:

**R7 Hospitals allocate their operating room resources based on a number of factors including patient need (e.g., length of the waiting list, the urgency of the patient's condition), community priorities as determined by Local Health Integration Networks, the strategic priorities of the organisation, and the importance of retaining physicians by ensuring that they have sufficient operating time.**

Another best practice target for scheduling is to treat urgent cases as part of regular operating room time. Generally, urgent cases tend to be regarded as unpredictable and unscheduled cases that are treated at the end of the regular surgical day. Urgent cases also tend to be treated on a "first come, first served" basis which may not be appropriate.

Urgent cases can account for a large proportion of a larger hospital's surgical load (upwards of 25%). Hospitals should assess how much of their average surgical work load is "urgent", and coordinate and schedule these cases within a planned and organised surgical schedule. This would help avoid unnecessary patient waits, ensure that

instruments are ready, and result in prompt discharges of in-patients from the surgical floor.

The Panel recommends that:

**R8 Hospitals coordinate and schedule their urgent surgical cases as part of their regular planned activity.**

## **8.5 Information Technology and Management**

Properly configured, implemented and maintained peri-operative information technology and management can support automated day-to-day scheduling of OR resources, documentation of peri-operative activities, standardised reporting and performance improvement. The Panel discussed:

- Operating Room Scheduling System
- Peri-Operative Electronic Patient Record System
- Peri-Operative Supply Chain Management System
- Peri-Operative Simulation System
- Minimum Data Set to Monitor and Improve Peri-Operative Performance

### **Operating Room Scheduling System**

A properly functioning operating room has all the appropriate resources available and ready when needed. An OR scheduling system schedules and manages all the resources that are needed to complete a surgical case (e.g., OR room, surgical instruments, implants or prosthetics, supplies, staff). Generally, the OR scheduling system does not include detailed clinical patient information that is in a patient's chart, but does include information on how an OR functions (e.g., cancellation rates, room utilisation, room delays and resource utilisation).

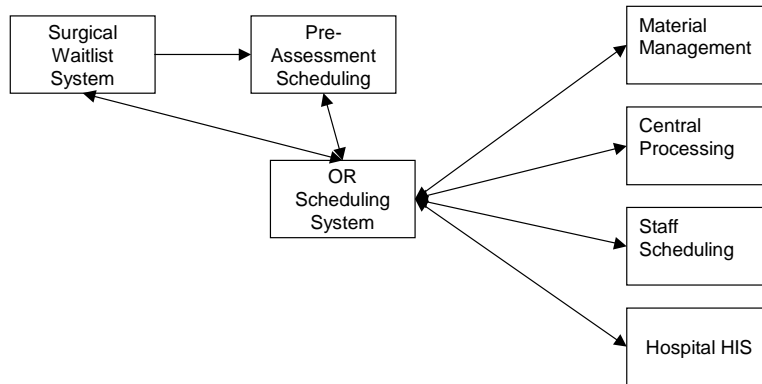
Some hospitals have a Surgical Pre-Assessment scheduling system that may be part of their OR system or their Health Information System (HIS), or be a separate scheduling system. The Surgical Pre-Assessment scheduling system ensures that the tests and procedures required prior to surgery are completed in a timely and efficient fashion. This reduces OR cancellations and delays, and optimises the use of pre-assessment staff and resources.

The diagram illustrates how the OR Scheduling System links to other hospital electronic systems.

With regard to a surgical waitlist system, the Wait Time Strategy is developing the Wait Times Information System (WTIS) which hospitals will be required to implement. Initially, the WTIS will collect and report wait time data on the five service areas for

hospitals, LHINs and surgeons. The objective is to improve the management of waitlists, monitor performance, and provide public reports by hospital and LHIN.

The OR Scheduling System also links with systems in material management, central processing and staff scheduling, and with the hospital's health information system. These linkages need to be examined further.



While the WTIS will not feed directly into hospitals' information systems, information produced by the WTIS should be used in managing these functions within the hospital. For example, when a patient goes from being on a surgical wait list to being scheduled for surgery, information must be provided from the surgical waitlist system to the pre-assessment scheduling system and the OR scheduling system. Information must also be made available to the hospital's Health Information System (HIS) so that the hospital – outside of the peri-operative setting – is prepared for the patient's arrival. This includes ensuring the patient's charts are properly prepared, accommodation or insurance information is collected, and post-surgical care is arranged. Potentially, the OR Scheduling System must also integrate with material management, central processing and staff scheduling systems.

As the diagram illustrates, the OR Scheduling System has a two-way information flow that provides feedback from other systems about resource availability, and enables the OR schedule to be adjusted accordingly.

OR Scheduling Systems can provide reports on OR functioning and efficiency. This helps identify issues or bottlenecks that impact on the ability to complete a surgical case. Some important performance measures include:

- Cancellations: number and reason;
- Case delays: time of delay and root cause;
- First case start times;
- OR resource utilisation: rooms that are used, type of equipment and staff;
- OR case mix: emergency, urgent or elective, ambulatory or in-patient, etc.; and
- Case time: actual vs. scheduled.

Not all Ontario hospitals have an electronic OR scheduling system. Those hospitals that do, use a number of OR systems. The Panel believes all hospitals should have an OR scheduling system to support performance improvements within individual hospitals, by Local Health Integration Networks and across the province. These improvements include tracking and reporting on a minimum data set, supporting standardisation of surgical processes, and integrating with other hospital-based information systems (e.g., wait list, pre-assessment scheduling, materials management, central processing and hospital HIS).

Additional work is required to identify standard definitions and standard requirements of an OR Scheduling System and the skills that are needed to use these systems effectively. LHINs should explore opportunities to short-list or group purchase these scheduling systems. As well, LHINs should take an active role in encouraging groups of hospitals to partner in sharing these systems.

The Panel recommends that:

**R9 Hospitals have an Operating Room Scheduling System to support performance improvements within individual hospitals, by Local Health Integration Network (LHIN) and across the province. These improvements should include tracking and reporting on a minimum data set, supporting standardisation of surgical processes, and integrating with other hospital-based information systems. LHINs should take an active role in group purchasing OR Scheduling Systems and encouraging groups of hospitals within the LHIN to share these systems.**

### **Peri-Operative Electronic Patient Record System**

Peri-operative Electronic Patient Record (PEPR) systems record patient information that becomes part of the hospital's electronic patient record and the patient's longitudinal electronic health record. The PEPR includes diagnostic test results, procedure details, and clinical information about the surgical event. The PEPR must include all clinical activity that occurs through the peri-operative process including pre-surgical assessment, day-of-surgery preparation, and surgical and surgical recovery documentation. This information can be completed by any member of the team including nurses, surgeons, anesthesiologists and other healthcare professionals.

It is critical that PEPR systems be structured so they inform users about the care provided, and permit data to be analysed for continuous improvements and to measure the impact of process changes. The PEPR must link to the hospital's electronic patient record so that clinicians outside of the peri-operative setting have information that will help them provide care and follow-up to surgical patients. As with OR Scheduling Systems, standardised performance measures and definitions are needed if results are to be compared across institutions.



The Panel believes that the Ministry needs to support the development of an electronic patient record in Ontario hospitals. Recognising that this is a longer-term goal, in the short term, the Ministry needs to fund efforts to identify standardised measures and definitions to support a PEPR. LHINs should explore opportunities to short-list or group purchase PEPRs, and provide a best practices implementation guide.

The Panel recommends that:

**R10 Hospitals have a Peri-Operative Electronic Patient Record System (PEPR) that links to, or is part of, the hospital's electronic patient record. Hospitals that do not have a PEPR in place should build the requirements for such a system into their Strategic Information Management Plan and capital plans. Local Health Integration Networks should take an active role in group purchasing PEPRs.**

Additional work is needed to identify standard definitions and standard requirements for PEPR systems.

### **A Peri-Operative Supply Chain Management System**

Appropriate investments in computer systems will support the supply chain management process. Although investing in computer systems for clinical functions usually takes precedence over investing in support systems, the value and quantity of supplies being consumed as well as the value of instruments and other components are significant. Appropriate computer systems are needed to manage the supply chain. Purchasing and logistics systems as well as instrument management systems are necessary components of a broader peri-operative supply chain management system. It is important to integrate these systems with operating room scheduling systems, and patient care and financial systems to have a fully functioning surgical suite.

The Panel recommends that:

**R11 Hospitals support the development of a peri-operative supply chain management system.**

### **Peri-Operative Simulation System**

Peri-operative scheduling and electronic patient record systems operate at the patient level. Simulation systems enable the peri-operative manager to review processes and procedures without patients, and model the impact of potential changes on OR operations and patient flow. For example, a simulation system can identify the impact of ten additional total joint cases per week on a hospital's peri-operative services (e.g., on pre-assessment services, OR operations, recovery room resources, post-surgical bed utilisation, and wait times for other types of patients). These results can enable managers

to identify ways to mitigate these outcomes (e.g., increase staffing, use a different method to prepare patients for surgery). The ability to simulate peri-operative performance can help managers shift from reacting to crises to proactively identifying issues and taking corrective measures.

The Panel believes that peri-operative simulation systems have an important role to play in improving surgical efficiencies. Simulation systems are based on computer models that use historical data. A fairly large number of hospitals in Canada and elsewhere have developed simulation models to help them with their allocation decisions. Unfortunately, most hospitals are not large enough to consider this type of simulation capability, whereas larger hospitals with resources to develop this system often lack the modeling expertise in-house.

The Panel believes that an appropriate solution to enable hospitals to simulate the impact of peri-operative decisions is to develop a general and portable peri-operative simulation model. It should be possible to design a commercial quality software package that can be used provincially. The Ministry should consider a request for proposals to support the development of such a system. It is noted, however, that simulation modelling will only be useful when hospitals map and understand their peri-operative processes (see Recommendation 3).

The Panel recommends that:

**R12 The Ministry of Health and Long-Term Care develop a request for proposals to support the development of a Peri-Operative Simulation System that would be accessible to all Ontario hospitals, and could be used by Local Health Integration Networks for planning purposes. Hospitals should use this system to simulate the impact peri-operative decisions after they have mapped and clearly understand their peri-operative processes (see Recommendation 3).**

### **Minimum Data Set to Monitor and Improve Peri-Operative Performance**

Peri-operative processes need to be continually monitored and improved. Mango and Shapiro note that the most important thing that hospitals can do to improve efficiency is to collect and analyse relevant data about process efficiency.<sup>20</sup> Studies have shown that performance measures that are most useful to clinicians include appropriate groupings of meaningful indicators, a strong basis in high quality data using a valid methodology, and results that are published in a timely manner.<sup>21</sup>

The hospitals surveyed by the Panel collect a wide range of surgical-related data such as case costing, volumes to service, off hours surgery, non prime-time and prime time

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<sup>20</sup> Mango PD, Shapiro LA. "Hospitals Get Serious About Operations." *The McKinsey Quarterly* 2001 (2).

<sup>21</sup> Morris K, Zelmer J. *Public Reporting of Performance Measures in Health Care: Health Care Accountability Papers No 4*. Canadian Policy Research Networks, Inc. 2005.

utilisation, start time, delays, cancellations, overall utilisation, and wait time data. It is unclear whether hospitals are using standardised definitions for this data.

The Panel believes that a minimum data set needs to be developed, and used to monitor peri-operative performance and identify areas for improvement. In addition, performance improvement should be connected with funding. In its deliberations, the Panel identified a long list of data elements that should be considered when a minimum data set is selected (see Appendix F).

## **8.6 Human Resources**

Peri-operative services are being impacted by human resource shortages in healthcare. Some of the most notable professional shortages are for surgeons, anesthesiologists and nursing staff. Fewer young people are choosing healthcare as a career since they have more career opportunities. The number of new trainees is not sufficient to replace the number of professionals who are retiring. The healthcare workforce is aging. The average age of physicians and nurses has increased significantly. It is estimated that Canada will lose about 29,746 RNs aged 50 or older to retirement or death by 2006, an amount equivalent to 13% of the 2001 Canadian nursing workforce.<sup>22</sup>

The shortage of human resources in peri-operative services has been studied and solutions suggested for over 10 years. Although the literature describes the shortage as “cyclical,” it will result in significant restrictions to surgical access unless innovative approaches are used. Human resource shortages can result in delays and cancellations of surgeries.

The Panel examined:

- Expanding surgical resources;
- Expanding anesthesia resources; and
- Recognising the role of program support staff.

### **Expanding Surgical Resources**

Surgical resources can be expanded through:

- First Assist Surgical Assistants, and Registered Nurse First Assistant and Registered Nurse First Assistant (Advanced Practice)
- Peri-Operative Technical Assistants
- Interdisciplinary Peri-Operative Teams

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<sup>22</sup> Canadian Institute for Health Information, *Bringing the Future Into Focus*, 2003.

***First Assist Surgical Assistants, and Registered Nurse First Assistant and Registered Nurse First Assistant (Advanced Practice)***

Residents and fellows in teaching hospitals, and general practitioners and hospitalists in community hospitals, have traditionally filled the role of the *First Assist Surgical Assistant*. Hospitals that do not have these disciplines may experience delayed or inappropriate assistance during surgery. The First Assist Surgical Assistant role needs to be formally acknowledged.

Nurses can be used to expand surgical resources. The *Registered Nurse First Assistant (RNFA)* is a role that is recognised and well developed in the US. In 1999, the College of Nurses of Ontario acknowledged that the RNFA functioned within the scope of nursing practice. As of 2000, all provinces have acknowledged that the RNFA role falls within the scope of nursing practice.

The RNFA role is slowly growing in Canada, however, funding for the RNFA position continues to be a large challenge. In Ontario, First Assist Surgical Assistants who are physicians can bill the provincial healthcare system directly whereas hospitals must pay RNFAs – who are not physicians – from the global budget.<sup>23</sup>

In the US, the RNFA has two distinct levels with associated scopes of practice and skills:

- The RNFA is typically open to a diploma or BScN prepared nurse with peri-operative training and experience who has a one year post diploma course. The RNFA provides an expert first assistant during surgery, and assists the patient and surgeon in the immediate pre- and postoperative phases of care.
- The RNFA (Advanced Practice) – also known as an Acute Care Nurse Practitioner – is Masters prepared. The RNFA (AP) fully supports the peri-operative patient at an advanced practice level of care.

The Panel recommends that:

**R13 The Ministry of Health and Long-Term Care support the implementation of roles that complement and expand surgical resources provided by the surgical specialties (e.g., Registered Nurse First Assistants).**

***Peri-Operative Technical Assistants***

Peri-operative technical assistants expand the role of nurses and the peri-operative team in the OR. In Ontario hospital ORs, technical support has largely been limited to Registered Practical Nurses (RPNs) with postgraduate training. Usually their role is limited to the “scrub” role (i.e., handling of sterile instruments and assisting the surgeon). In the US, Surgical or Operating Room Technicians have been used in the “scrub” role for many years, and have recently become recognised as certified health care providers.

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<sup>23</sup> [www.rmfa-ontario.ca](http://www.rmfa-ontario.ca)

As the number of registered nurses working in the peri-operative field decreases, there is a need to develop, more fully, roles such as the peri-operative technical assistant to meet the technical needs of the surgical team. The Panel concludes that in Ontario, the traditional “scrub” role of the RN in the operating room should be maintained, however, the role of the Operating Room Technician should be formally recognised and developed. This role should be open to Registered Practical Nurses and other healthcare personnel with appropriate basic health care education, including foreign-trained healthcare providers who are not able to gain employment in their specialty field. Individual hospitals should determine whether appropriately trained RPNs, RNs or other healthcare personnel are most appropriate for the peri-operative technical assistant role in their operating rooms. This will vary depending on the complexity of the patient.

The Panel recommends that:

- R14 The Ministry of Health and Long-Term Care support the development of a standardised Peri-operative Technician role. This role should be open to Registered Practical Nurses and other health care personnel with appropriate basic health care education, including foreign-trained healthcare providers who are not able to gain employment in their specialty field.**

#### *Interdisciplinary Peri-Operative Teams*

Traditionally, peri-operative care in the operating room has been provided by surgeons, anesthesiologists and registered nurses. This model will increasingly become more difficult and costly to maintain in the future, as well as potentially inappropriate as operating rooms become more technologically complex. Interdisciplinary peri-operative teams that include the use of technical assistants and others may be more appropriate to this environment. These teams will increase efficiencies while maintaining safety and quality, and help minimise nurses doing non-nursing duties.

The Panel recommends that:

- R15 Hospitals support the development of innovative interdisciplinary peri-operative teams that include the use of other healthcare providers in addition to surgeons, anesthesiologists and nurses.**

#### **Expanding Anesthesia Resources**

It has been estimated that Canada is short 200-250 anesthesiologists (Engen 2005 and Ryten 2000); 80-100 of these shortages are in Ontario (Engen 2005).<sup>24</sup> Many factors have led to the shortage of anesthesiologists including cutbacks in medical school

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<sup>24</sup> Written communication with John P Cain, Assistant Professor Department of Anesthesiology, Queen's University and Kingston General Hospital, June 6, 2005.

enrolments; a reduction in residency slots; a curtailment of international anesthesiologists from entering the licensing and certification process; the expansion of anesthesiology out of the operating room into acute pain, chronic pain, pre-assessment, intensive care unit, and the post-anesthetic care unit; and the out migration of anesthesiologists to the US and other jurisdictions. The shortage of anesthesiologists is a significant barrier to the utilisation of peri-operative resources.

There are a number of opportunities to expand anesthesia resources with the following human resource initiatives:

- GP Anesthetists, Anesthesia Assistants and Advanced Practice Nurses
- Anesthesia Team Model

***GP Anesthetists, Anesthesia Assistants and Advanced Practice Nurses (Acute Care Nurse Practitioners)***

A national curriculum exists for *General Practitioner Anesthetist* training, which could easily be adapted to Ontario. After two years of family practice training, general practitioners take one year intensive anesthesia training. Graduates of the GP Anesthesia Programs have a variety of skills which enable them to provide anesthesia services for routine cases in rural Ontario. Ideally, they combine their anesthesia practice with family medicine but some also engage in emergency medicine. GP Anesthetists need to be supported with mentors, continuing medical education, locums and electronic support.

With regard to *Anesthesia Assistants*, Registered Nurses and/or Registered Respiratory Therapists can, within their scope of practice, be used to expand services provided by anesthesiologists. The role of the Anesthesia Assistant is currently being considered in Ontario. Select providers would receive one year of additional training to work in surgical settings under the direction of the staff anesthesiologist.

Anesthesia assistants, trained nurses and respiratory therapists can provide conscious sedation and defined anesthesiology services to support cataract surgery, endoscopy, therapeutic dilatation and curettage (D and Cs), and other monitored sedation cases. It is estimated that developing the role of anesthesia assistants would free up about 30-50 anesthesiologists in Ontario to help with the wait list initiative.<sup>25</sup>

The Canadian Anesthesiologist's Society recognises the formal job designation of *Anesthesia Assistant*.<sup>26</sup> According to the Society, anaesthesia assistants may provide, with the approval of the governing board of the hospital, certain ancillary assistance in providing anesthetic, resuscitative and intensive care services. These individuals must have specific training in anesthesiology assistance. Their scope of practice in a specific institution must be approved by the Department of Anesthesia, the local hospital administration and/or the Medical Advisory Committee. An anesthesiologist can only

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<sup>25</sup> Written communication with John P Cain, Assistant Professor Department of Anesthesiology, Queen's University and Kingston General Hospital, June 6, 2005.

<sup>26</sup> *Canadian Anesthesiologist's Society Guidelines*, 2005.

delegate duties or tasks to anesthesia assistants that are consistent with government regulations, the policies and guidelines established by the professional regulatory agencies, and local hospital policies.

With regard to *Advance Practice Nurses*, both the Registered Nurses Association of Ontario and the College of Nurses of Ontario support an expanded practice role for registered nurses at the graduate level with additional anesthesia skills (i.e., Master's prepared). Currently, Acute Care Nurse Practitioners (ACNPs) are widely used in Ontario's acute care hospitals but do not play a prominent role in peri-operative services except for pre-operative screening and pain management. Here, ACNPs have been instrumental in developing and maintaining education, safe practice and clinical care for patient-controlled analgesia and other post-operative pain relieving modalities. Working in a team model with the anesthesiologist, ACNPs typically provide pain management services and consult across the organisation.

The Panel recommends that:

**R16 The Ministry support the implementation of advance practice roles to complement and expand anesthesia services currently provided by anesthesiologists. Potential roles include the General Practitioner Anesthetist, the Anesthesia Assistant and the Acute Care Nurse Practitioner with special training in anesthesia. The type of hospital will influence the model that is adopted.**

### *Anesthesia Team Model*

Kingston General Hospital, St. Michael's Hospital and others use anesthesiology teams for cataracts. One anesthesiologist covers two rooms and provides clinical support to nurses who establish IVs, provide sedation and monitor patients. This team model has doubled the throughput of cataract patients without affecting patient safety. Kingston, along with other centres, is exploring moving these cases out of the OR entirely to a clinic setting without direct anesthesia support.

A number of Ontario hospitals provide services traditionally conducted in operating rooms with anesthesia support in alternative practice settings. For example, Kingston already provides therapeutic D and Cs in a separate clinic rather than in a traditional operating room. Anesthesia is provided by para-cervical block plus some intravenous sedation given by either a nurse or gynaecologist. Patient satisfaction is excellent. Other organisations have moved to a model where topical anesthesia is the norm and the nurse manages and monitors the patient.

Quebec uses an anesthesia team model that includes anesthesia assistants, advanced care nurse practitioners and anesthesiologists. Depending on the facility and the surgery, anesthesia teams could include a combination of anesthesiologists, anesthesia assistants,

advanced care nurse practitioners, and respiratory therapists. An alternate funding plan would be needed to support such a model.

The Panel recommends that:

**R17 Ontario hospitals incorporate the use of teams to provide anesthesia services. Depending on the type of hospital and the surgery, anesthesia teams could include a combination of anesthesiologists, anesthesia assistants, advanced care nurse practitioners, respiratory therapists and others.**

### **Recognising the Role of Program Support Staff**

Program support staff make a significant contribution to peri-operative efficiencies. These staff include professional and clinical staff, and program environmental support.

#### ***Professional and Clinical Staff***

Professional and clinical staff include, but are not limited to, clinical pharmacists, peri-operative respiratory therapists and biomedical engineers. These individuals provide patient care services within their scope of practice. They help prepare the patient or the environment, and assist the healthcare team in meeting clinical or technical needs in a timely manner. Some staff, such as biomedical engineers, are associated with more specialised surgical programs.

Professional and clinical staff play an important role in preventing cancellations and delays. To illustrate, a large complex operating room will spend approximately \$1 million annually on drugs. An onsite Clinical Pharmacist provides immediate patient education, supports right time-right drug antibiotic programs, ensures safe practices in drug handling, supplies anesthesiology and medical staff with just-in-time drug information, and uses methodologies to reduce costs. Respiratory therapists and biomedical staff also provide critical support to anesthesiology staff through clinical assistance and overall accountability for specialty equipment.

#### ***Program Environmental Support Staff***

Program environmental support staff play an important role in minimising surgical delays. Typically, many peri-operative delays are due to waiting for a patient or critical or routine resources to arrive, or for episodic cleaning to occur. Delays can be minimised if these support staff are trained to take on multiple roles.

Dedicated support staff – or Operating Room Attendants – ensure an effective flow of patients and resources. These staff, specifically trained to work in the peri-operative environment, provide timely support services in day surgery, operating rooms and post anesthetic care units. OR Attendants provide a wide range of services such as transporting patients, assisting with room setup, preparing rooms, providing equipment



and supplies to ORs, assisting patients and the surgical team during the setup of specialty equipment, holding limbs during patient preparation, transporting specimens, conducting errands as required during surgery, restocking general supplies, and maintaining support areas of each unit.

OR attendants should be recognised as an integral member of the team responsible for the plan and flow of OR patients. Generally, hospitals that understaff OR Attendants, will tend to use more expensive professional staff to complete support or technical roles, or find that professional staff waste time waiting for the assistance of the OR Attendant.

## 8.7 Education

The Panel addressed standardised operating room nursing education and simulation training.

### **Standardised Operating Room Nursing Education**

Currently, operating room nurses in Ontario hospitals do not have standardised specialty operating room training. Rather, individual community colleges provide this training, or in some cases, hospitals provide limited “in house’ or “on the job training.” To attract scarce nursing resources, many hospitals recruit and sponsor nurses through their post graduate training courses. Clinical placements are typically in teaching or large community hospitals. There is a need to standardise nursing education across the province for OR nurses. To ensure standardisation, these courses should be certified through associations such as the Operating Room Nurses Association of Canada (ORNAC). Hospitals also need to have a peri-operative education resource or expertise to ensure that nurses maintain appropriate surgical clinical knowledge and skills. Where possible, this training should be provided in innovative ways such as distance training.

The Panel recommends that:

**R18 The Nursing Secretariat of the Ministry of Health and Long-Term Care, nursing regulatory bodies and academic institutions develop a standardised operating room nursing education program across Ontario. Innovative methods should be used to support this program such as distance education. In addition, hospitals should have a peri-operative education resource available to help nurses maintain appropriate surgical clinical knowledge and skills.**

The Panel recommended the development of a standardised Peri-operative Technician role (Recommendation 14). Open to Registered Practical Nurses and other health care personnel with appropriate basic health care education, this role will require critical thinking and standardised clinical training in theory and didactics. A standardised education program needs to be developed.

## Simulation Training

Historically, anesthesiologists, surgeons and to a lesser extent nurses have received peri-operative training in the operating room using a direct hands-on approach. This approach to education increases the length of time for surgeries, results in surgical inefficiencies, and can have a negative impact on patient safety. In the Panel's view, junior members of the surgical and anesthesia team should come to the operating room with a basic technical set of skills to enable them to maximise their intra-operative learning.

Many aids have been developed to support peri-operative learning outside of the operating room. These range from simple models to teach venipuncture, arterial cannulation, nerve blocks, chest tube insertion and bronchoscopy, to high fidelity simulators to teach minimally invasive surgery, anesthesiology and trauma care.

Research has shown that simulators enhance learning.<sup>27</sup> Some Academic Health Science Centres in Ontario have clinical skills laboratories and simulators. These need to be used more effectively so students develop basic technical skill sets. Hospitals that do not use simulation or technical skills laboratories should be encouraged and supported to do so.

The Panel recommends that:

**R19 The Ministry of Health and Long-Term fund the development and operation of technical skills laboratories and high fidelity simulators at all Academic Health Science Centres for teaching purposes. Academic surgical and anesthesiology departments should use these resources to develop modules that teach basic surgical and anesthesia techniques, and would result in greater operating room efficiencies and improved safety and quality.**

## 8.8 Funding

Over the course of its review, it became apparent to the Panel that current funding arrangements do not support efficiencies and, in fact, promote surgical inefficiencies. Examples include:

- Fee for service potentially discourages the use of innovative team models and the use of other care providers to expand surgical and anesthesia resources. For example, hospitals must pay Registered Nurse First Assistants, Acute Care Nurse Practitioners and Respiratory Therapists from their global budgets, whereas physicians who fulfil surgical and anesthesia roles generally bill OHIP for their services. These physician costs remain "invisible" to the hospital even though they may cost the system significantly more than using appropriately trained alternate providers. Alternate funding programs have encouraged the use of these providers leading to innovation and surgical efficiencies. The Alternate Funding Program in Kingston (South East

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<sup>27</sup> For example, see Macrae HM et al. "Teaching practising surgeons critical appraisal skills with an Internet-based journal club: A randomised, controlled trial" *Surgery* 2004; 136 (3): 647-649.

Academic Medical Organisation) has enabled the Department of Anesthesiology to expand its clinical and academic productivity, and transfer cases from unfavourable evening, night and weekend hours to the day. The Department has successfully recruited and retained anesthesia staff. There is a strong desire by other established departments of anesthesiology to enter into a specialty specific Alternate Funding Program for anesthesiology to stabilise the workforce, support a transformation in the delivery of anesthesia services, and enable the development of an anesthesia team (anesthesiologist, anesthesia assistants and clinical nurse specialists).

- Inadequate funding for instruments and equipment leads to supply chain inefficiencies. When hospitals do not have sufficient instruments and equipment, they must spend more time cleaning and replenishing instruments and supplies. This impacts negatively on surgical efficiencies and throughput, and can result in cancelled surgeries if instruments cannot be safely turned over in a timely manner.
- Complex surgical patients take more time and require more resources. There is a lack of sufficient remuneration by patient acuity.

The Panel believes that there is a need to review how surgical services are funded and how staff are compensated with the view to align incentives with surgical efficiencies.

The Panel recommends that:

**R20 The Ministry of Health and Long-Term Care review how surgical services are funded and how staff are compensated with the goal of aligning incentives to support the efficient and effective use of peri-operative resources.**

## **8.9 Organisation of Regional Surgical Services to Increase Efficiencies**

Ontario is in the process of establishing a regional structure of Local Health Integration Networks (LHINs) that will be given the authority to plan, coordinate and fund healthcare services in their respective regions. LHINs present an opportunity to develop regional surgical systems with a range of service options. The Panel discussed three potential options.

One service option is to develop Centres of Excellence for surgery that support a critical mass of patients, and specialised resources and skilled staff. These centres are most appropriate in urban centres with a high population density. Services could be amalgamated and provided by one facility. The Centres of Excellence option is also appropriate for highly complex, low volume surgeries that need specialised resources and staff (e.g., sarcoma cancer surgery). Centres such as these may be more appropriately planned provincially or between groups of LHINs.

A second service option is to enable a few select centres in a LHIN or between groups of LHINs to provide certain surgeries. For example, surgeries that are fairly specialised where the volume is too large for one hospital but where critical mass is insufficient to treat safely in many centres could be provided in a few hospitals.

A third service option is for all hospitals that have a critical mass of patients and providers to offer less complex surgeries within a LHIN. Hospitals with low volumes of surgery should seriously consider closing their operating rooms and partnering with other facilities in the LHIN for surgical services.

As they develop, LHINs should examine opportunities to develop regional surgical systems that include this range of options. Groups of LHINs should review the range of surgical services that exist, and determine the most appropriate configuration that would promote efficiencies, safety and meet local needs. LHINs could begin with the five key services of the Wait Time Strategy, and later expand to other health services. In addition, the service-based Expert Panels for the Wait Time Strategy should also examine these service options. To date, the MRI and CT Expert Panel has identified a range of service options for siting future CT scanners.<sup>28</sup>

The Panel recommends that:

**R21 Local Health Integration Networks review the surgical services that exist, and identify opportunities to develop regional surgical systems that promote efficiencies, safety and meet local needs. These systems should consider a range of options including as Centres of Excellence for surgery, more specialised surgeries in a few hospitals, and less complex, higher volume surgeries in a wider range of hospitals.**

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<sup>28</sup> The MRI and CT Expert Panel recommended that three approaches be used to site future CT scanners: 1) Single scanners should only be sited in geographically isolated communities that are far from large population centres, where access is a major concern and there is a critical mass of patient volumes. 2) Additional MRI and CT scanners should be placed in hospitals that currently have these scanners, to consolidate equipment and maximise operational efficiencies. 3) Consideration should be given to establishing non-hospital based Diagnostic Imaging Centres equipped with multiple MRI and CT scanners, and located in high density population areas.

## SECTION E: NEXT STEPS

In its discussion of next steps, the Panel identified the need for Peri-Operative Improvement Coaching Teams, and issues that need to be examined further. In addition, the Panel recognised the importance of implementing the recommendations in a timely fashion.

### Peri-Operative Improvement Coaching Teams

The Panel determined that hospitals could benefit a great deal by having their peers work with them to make peri-operative improvements. Peri-Operative Improvement Coaching Teams would be responsible for coaching hospitals in effective peri-operative management techniques such as planning, mapping processes, and determining optimal human resource use and scheduling. The Teams could play a valuable role helping hospitals implement Recommendation 3: mapping their peri-operative processes, analysing the results, and systematically identifying areas for improvement. Teams would be made up of 4-6 people from across the province with demonstrable experience in effective peri-operative management.

It is proposed that a committee be established to oversee the development of the Teams and the implementation of this project. The committee would be responsible for:

- Determining the key objectives of the coaching teams;
- Identifying the selection process and criteria for the members of the team;
- Developing the Team training program;
- Evaluating the success of the Teams;
- Assessing improvements in hospital performance; and
- Engaging in knowledge transfer activities to communicate to the broader healthcare community what has been learned by the Teams and hospitals (e.g., symposiums, communiqués, educational sessions, etc.).

In the short-term, hospitals will be able to request an assessment by the Team. In the longer-term, the committee will use benchmark targets to identify hospitals that need targeted improvements and coaching.

In addition to supporting the development of the Teams, the Ministry should provide incentives to hospitals to participate in this initiative and help implement the Team's recommendations.

The Panel recommends that:

**R22 The Ministry of Health and Long-Term Care support the development of Expert Improvement Coaching Teams to help hospitals improve their peri-operative efficiencies. Made up of peers with experience in effective management of peri-operative resources, the Teams should assist hospitals with planning, mapping their processes, analysing the results and identifying**

**areas for improvement (as noted in Recommendation 3), and determining optimal human resources and scheduling. Furthermore, the Ministry should provide incentives to hospitals to participate in this initiative and help make improvements.**

### **Issues To Be Examined Further**

The Panel identified a number of issues that need to be examined further including:

- Exploring opportunities to develop training courses in process analysis and improvement that would be available throughout the province and would use innovative education methods (e.g., videoconferencing).
- Developing additional best practice targets such as the optimal design of an efficient operating room.
- Identifying the optimal links between the OR Scheduling System, systems in material management, central processing and staff scheduling, and the hospital's health information system.
- Determining a minimum data set to monitor surgical efficiencies, as well as standard data definitions.
- Identifying standard requirements for a Peri-Operative Electronic Patient Record.

Additional work is also needed in human resources. For example, the Ministry's provincial human resource planning processes would benefit from input on:

- Modeling the impact of changes in surgical volumes due to efficiencies on the additional services and healthcare providers who would be needed (e.g., rehabilitation and home care staff).
- Assessing the impact of advanced roles in surgical and anesthesia services on the professions that would take on these additional roles (e.g., nursing, respiratory therapy).
- Designing the best approach to train professionals to take on advanced roles (e.g., on-the-job training or modules to increase competence gradually, or an advanced credential obtained through intensive academic training).
- Assessing the impact of regulatory, legislative and workplace policies on expanding roles (e.g., *Public Hospitals Act*, *Health Promotion and Protection Act*, *Regulated Health Professions Act*).

### **Implementing the Recommendations in a Timely Manner – A Workplan**

The Panel recognised the importance of implementing the recommendations in a timely fashion. A workplan with the recommendations, responsibility and timing has been developed for the Ministry's consideration.

Recommendations can be implemented in the short term (1-6 months), medium term (6-12 months) or long term (12 months and beyond). Some recommendations are ongoing in nature. A number of medium and long-term recommendations require planning and development before they can be implemented. Planning should begin immediately.

<b>RECOMMENDATIONS</b>	<b>RESPONSIBILITY</b>	<b>TIMING</b>
<b>AN ACCOUNTABILITY FRAMEWORK</b>		
<p><b>R1</b></p> <p>Hospitals that provide surgical services establish an accountability framework for peri-operative resources that include the following elements: i) the Board and Chief Executive Office (CEO) of the hospital are accountable for governing and managing the hospital's peri-operative resources, including patient safety, quality, efficiency and effectiveness; ii) an inter-disciplinary Peri-Operative Leadership Team is directly accountable to the CEO and responsible for the ongoing functioning of an effective peri-operative service; and iii) a larger inter-disciplinary group provides support and advice to the Leadership Team.</p>	Individual Hospitals	Short Term
<p><b>R2</b></p> <p>Local Health Integration Networks measure the surgical performance of hospitals within their respective networks using agreed-upon benchmark targets, report a minimum data set of quality and efficiency indicators to the public and government, and make planning and resource decisions accordingly.</p>	Local Health Integration Networks	Long Term
<b>MAPPING PERI-OPERATIVE PROCESSES</b>		
<p><b>R3</b></p> <p>Hospitals map their peri-operative processes, analyse the results, and systematically identify areas for improvement.</p>	Individual Hospitals	Short Term
<b>BENCHMARK AND BEST PRACTICE TARGETS</b>		
<p><b>R4</b></p> <p>The Ministry of Health and Long-Term Care support the development and implementation of an Ontario-wide program to develop surgical targets that draws on the expertise of practitioners in the field. These targets should be used by hospitals to make improvements, and by the Ministry and Local Health Integration Networks to link funding with performance.</p>	Ministry of Health and Long-Term Care	Short Term

RECOMMENDATIONS	RESPONSIBILITY	TIMING
<p>R5 Hospitals review peri-operative best practice targets as part of their annual operating plan process, assess their progress in meeting each target and initiate steps for improvement.</p>	Individual Hospitals	Medium Term
<p>R6 Hospitals review supply chain best practice targets as part of their annual operating plan process, assess their progress in meeting each target and initiate steps for improvement. In addition, Local Health Integration Networks should bring a network perspective to supply chain targets through such initiatives as bulk purchasing, instrument sharing and joint inventory management, where appropriate.</p>	Individual Hospitals	Medium Term
<p>R7 Hospitals allocate their operating room resources based on a number of factors including patient need (e.g., length of the waiting list, the urgency of the patient's condition), community priorities as determined by Local Health Integration Networks, the strategic priorities of the organisation, and the importance of retaining physicians by ensuring that they have sufficient operating time.</p>	Individual Hospitals	Medium Term
<p>R8 Hospitals coordinate and schedule their urgent surgical cases as part of their regular planned activity.</p>	Individual Hospitals	Short Term
<b>INFORMATION TECHNOLOGY AND MANAGEMENT</b>		
<p>R9 Hospitals have an Operating Room Scheduling System to support performance improvements within individual hospitals, by Local Health Integration Network (LHIN) and across the province. These improvements should include tracking and reporting on a minimum data set, supporting standardisation of surgical processes, and integrating with other hospital-based information systems. LHINs should take an active role in group purchasing OR Scheduling Systems and encouraging groups of hospitals within the LHIN to share these systems.</p>	Individual Hospitals and Local Health Integration Networks	Medium Term
<p>R10 Hospitals have a Peri-Operative Electronic Patient Record System (PEPR) that links to, or is part of, the hospital's electronic patient record. Hospitals that do not have a PEPR in place should build the requirements for such a system into their Strategic Information Management Plan and capital plans. Local Health Integration Networks should take an active role in group purchasing PEPRs.</p>	Individual Hospitals and Local Health Integration Networks	Long Term



RECOMMENDATIONS	RESPONSIBILITY	TIMING
R11 Hospitals support the development of a peri-operative supply chain management system.	Individual Hospitals	Long Term
R12 The Ministry of Health and Long-Term Care develop a request for proposals to support the development of a Peri-Operative Simulation System that would be accessible to all Ontario hospitals, and could be used by Local Health Integration Networks for planning purposes. Hospitals should use this system to simulate the impact peri-operative decisions after they have mapped and clearly understand their peri-operative processes (see Recommendation 3).	Ministry of Health and Long-Term Care	Long Term
<b>HUMAN RESOURCES</b>		
R13 The Ministry of Health and Long-Term Care support the implementation of roles that complement and expand surgical resources provided by the surgical specialties (e.g., Registered Nurse First Assistants).	Ministry of Health and Long-Term Care	Short Term
R14 The Ministry of Health and Long-Term Care support the development of a standardised Peri-operative Technician role. This role should be open to Registered Practical Nurses and other health care personnel with appropriate basic health care education, including foreign-trained healthcare providers who are not able to gain employment in their specialty field.	Ministry of Health and Long-Term Care	Long Term
R15 Hospitals support the development of innovative interdisciplinary peri-operative teams that include the use of other healthcare providers in addition to surgeons, anesthesiologists and nurses.	Individual Hospitals	Long Term
R16 The Ministry support the implementation of advance practice roles to complement and expand anesthesia services currently provided by anesthesiologists. Potential roles include the General Practitioner Anesthetist, the Anesthesia Assistant and the Acute Care Nurse Practitioner with special training in anesthesia. The type of hospital will influence the model that is adopted.	Ministry of Health and Long-Term Care	Short Term
R17 Ontario hospitals incorporate the use of teams to provide anesthesia services. Depending on the type of hospital and the surgery, anesthesia teams could include a combination of anesthesiologists, anesthesia assistants, advanced care nurse practitioners, respiratory therapists and others.	Individual Hospitals	Long Term

RECOMMENDATIONS	RESPONSIBILITY	TIMING
<b>EDUCATION</b>		
<p>R18 The Nursing Secretariat of the Ministry of Health and Long-Term Care, nursing regulatory bodies and academic institutions develop a standardised operating room nursing education program across Ontario. Innovative methods should be used to support this program such as distance education. In addition, hospitals should have a peri-operative education resource available to help nurses maintain appropriate surgical clinical knowledge and skills.</p>	Nursing Secretariat of the Ministry of Health and Long-Term Care	Long Term
<p>R19 The Ministry of Health and Long-Term fund the development and operation of technical skills laboratories and high fidelity simulators at all Academic Health Science Centres for teaching purposes. Academic surgical and anesthesiology departments should use these resources to develop modules that teach basic surgical and anesthesia techniques, and would result in greater operating room efficiencies and improved safety and quality.</p>	Ministry of Health and Long-Term Care	Long-Term
<b>FUNDING</b>		
<p>R20 The Ministry of Health and Long-Term Care review how surgical services are funded and how staff are compensated with the goal of aligning incentives to support the efficient and effective use of peri-operative resources.</p>	Ministry of Health and Long-Term Care	Short Term
<b>ORGANISATION OF REGIONAL SURGICAL SERVICES TO IMPROVE EFFICIENCIES</b>		
<p>R21 Local Health Integration Networks review the surgical services that exist, and identify opportunities to develop regional surgical systems that promote efficiencies, safety and meet local needs. These systems should consider a range of options including as Centres of Excellence for surgery, more specialised surgeries in a few hospitals, and less complex, higher volume surgeries in a wider range of hospitals.</p>	Local Health Integration Networks	Long Term

RECOMMENDATIONS	RESPONSIBILITY	TIMING
<b>NEXT STEPS</b>		
<p>R22                      The Ministry of Health and Long-Term Care support the development of Expert Improvement Coaching Teams to help hospitals improve their peri-operative efficiencies. Made up of peers with experience in effective management of peri-operative resources, the Teams should assist hospitals with planning, mapping their processes, analysing the results and identifying areas for improvement (as noted in Recommendation 3), and determining optimal human resources and scheduling. Furthermore, the Ministry should provide incentives to hospitals to participate in this initiative and help make improvements.</p>	<p>Ministry of Health and Long-Term Care in collaboration with the Ontario Hospital Association</p>	<p>Short Term</p>

## **SECTION F: CONSOLIDATED LIST OF RECOMMENDATIONS**

### **An Accountability Framework**

The Panel recommends that:

- R1 Hospitals that provide surgical services establish an accountability framework for peri-operative resources that include the following elements: i) the Board and Chief Executive Office (CEO) of the hospital are accountable for governing and managing the hospital's peri-operative resources, including patient safety, quality, efficiency and effectiveness; ii) an inter-disciplinary Peri-Operative Leadership Team is directly accountable to the CEO and responsible for the ongoing functioning of an effective peri-operative service; and iii) a larger inter-disciplinary group provides support and advice to the Leadership Team.
- R2 Local Health Integration Networks measure the surgical performance of hospitals within their respective networks using agreed-upon benchmark targets, report a minimum data set of quality and efficiency indicators to the public and government, and make planning and resource decisions accordingly.

### **Mapping Peri-Operative Processes**

The Panel recommends that:

- R3 Hospitals map their peri-operative processes, analyse the results, and systematically identify areas for improvement.

### **Benchmark and Best Practice Targets**

The Panel recommends that:

- R4 The Ministry of Health and Long-Term Care support the development and implementation of an Ontario-wide program to develop surgical targets that draws on the expertise of practitioners in the field. These targets should be used by hospitals to make improvements, and by the Ministry and Local Health Integration Networks to link funding with performance.
- R5 Hospitals review peri-operative best practice targets as part of their annual operating plan process, assess their progress in meeting each target and initiate steps for improvement.

- R6 Hospitals review supply chain best practice targets as part of their annual operating plan process, assess their progress in meeting each target and initiate steps for improvement. In addition, Local Health Integration Networks should bring a network perspective to supply chain targets through such initiatives as bulk purchasing, instrument sharing and joint inventory management, where appropriate.
- R7 Hospitals allocate their operating room resources based on a number of factors including patient need (e.g., length of the waiting list, the urgency of the patient's condition), community priorities as determined by Local Health Integration Networks, the strategic priorities of the organisation, and the importance of retaining physicians by ensuring that they have sufficient operating time.
- R8 Hospitals coordinate and schedule their urgent surgical cases as part of their regular planned activity.

### **Information Technology and Management**

The Panel recommends that:

- R9 Hospitals have an Operating Room Scheduling System to support performance improvements within individual hospitals, by Local Health Integration Network (LHIN) and across the province. These improvements should include tracking and reporting on a minimum data set, supporting standardisation of surgical processes, and integrating with other hospital-based information systems. LHINs should take an active role in group purchasing OR Scheduling Systems and encouraging groups of hospitals within the LHIN to share these systems.
- R10 Hospitals have a Peri-Operative Electronic Patient Record System (PEPR) that links to, or is part of, the hospital's electronic patient record. Hospitals that do not have a PEPR in place should build the requirements for such a system into their Strategic Information Management Plan and capital plans. Local Health Integration Networks should take an active role in group purchasing PEPRs.
- R11 Hospitals support the development of a peri-operative supply chain management system.
- R12 The Ministry of Health and Long-Term Care develop a request for proposals to support the development of a Peri-Operative Simulation System that would be accessible to all Ontario hospitals, and could be used by Local Health Integration Networks for planning purposes. Hospitals should use this system to simulate the impact peri-operative decisions after they have mapped and clearly understand their peri-operative processes (see Recommendation 3).

## **Human Resources**

The Panel recommends that:

- R13 The Ministry of Health and Long-Term Care support the implementation of roles that complement and expand surgical resources provided by the surgical specialties (e.g., Registered Nurse First Assistants).
- R14 The Ministry of Health and Long-Term Care support the development of a standardised Peri-operative Technician role. This role should be open to Registered Practical Nurses and other health care personnel with appropriate basic health care education, including foreign-trained healthcare providers who are not able to gain employment in their specialty field.
- R15 Hospitals support the development of innovative interdisciplinary peri-operative teams that include the use of other healthcare providers in addition to surgeons, anesthesiologists and nurses.
- R16 The Ministry support the implementation of advance practice roles to complement and expand anesthesia services currently provided by anesthesiologists. Potential roles include the General Practitioner Anesthetist, the Anesthesia Assistant and the Acute Care Nurse Practitioner with special training in anesthesia. The type of hospital will influence the model that is adopted.
- R17 Ontario hospitals incorporate the use of teams to provide anesthesia services. Depending on the type of hospital and the surgery, anesthesia teams could include a combination of anesthesiologists, anesthesia assistants, advanced care nurse practitioners, respiratory therapists and others.

## **Education**

The Panel recommends that:

- R18 The Nursing Secretariat of the Ministry of Health and Long-Term Care, nursing regulatory bodies and academic institutions develop a standardised operating room nursing education program across Ontario. Innovative methods should be used to support this program such as distance education. In addition, hospitals should have a peri-operative education resource available to help nurses maintain appropriate surgical clinical knowledge and skills.
- R19 The Ministry of Health and Long-Term fund the development and operation of technical skills laboratories and high fidelity simulators at all Academic Health Science Centres for teaching purposes. Academic surgical and anesthesiology departments should use these resources to develop modules that teach basic surgical and anesthesia techniques, and would result in greater operating room efficiencies and improved safety and quality.

## **Funding**

The Panel recommends that:

- R20 The Ministry of Health and Long-Term Care review how surgical services are funded and how staff are compensated with the goal of aligning incentives to support the efficient and effective use of peri-operative resources.

## **Organisation of Regional Surgical Services to Increase Efficiencies**

The Panel recommends that:

- R21 Local Health Integration Networks review the surgical services that exist, and identify opportunities to develop regional surgical systems that promote efficiencies, safety and meet local needs. These systems should consider a range of options including as Centres of Excellence for surgery, more specialised surgeries in a few hospitals, and less complex, higher volume surgeries in a wider range of hospitals.

## **Next Steps**

The Panel recommends that:

- R22 The Ministry of Health and Long-Term Care support the development of Expert Improvement Coaching Teams to help hospitals improve their peri-operative efficiencies. Made up of peers with experience in effective management of peri-operative resources, the Teams should assist hospitals with planning, mapping their processes, analysing the results and identifying areas for improvement (as noted in Recommendation 3), and determining optimal human resources and scheduling. Furthermore, the Ministry should provide incentives to hospitals to participate in this initiative and help make improvements.

**APPENDIX A: MEMBERS OF THE SURGICAL PROCESS ANALYSIS AND IMPROVEMENT EXPERT PANEL**

Valerie Zellermeier, Chair	Program Director, Peri-operative Services, St. Michael's Hospital
Louis Andrighetti	Administrative Director, Surgical Program, Sudbury Regional Hospital
Ross Baker	Professor, Health Policy, Management and Evaluation, University of Toronto
John Cain	Assistant Professor, Department of Anesthesiology, Queen's University and Kingston General Hospital
Kelly Campbell	Director, Peri-operative Services, Hamilton Health Sciences
Michael Carter	Professor of Mechanical and Industrial Engineering, University of Toronto
Melissa Farrell	Program Analyst, Ontario's Wait Time Strategy, Ministry of Health and Long-Term Care
Jeffrey Gollish	Orthopaedic Surgeon and Head of the Arthroplasty Program, Sunnybrook and Women's College Health Sciences Centre
Eleanor Groh	Director, Peri-operative Services, Hotel Dieu Grace Hospital
David Healey	Orthopedic Surgeon and Medical Director, Sudbury Regional Hospital
Randy Heiser	Chief Operating Officer, Sullivan Healthcare Consulting
Helena Hutton	Associate VP, Strategic Initiatives, Trillium Health Centre
Bruce Jackson	Chief of Ophthalmology, Ottawa Eye Institute
Bernadette MacDonald	Vice President, Surgery Clinical Business Unit, London Health Sciences Centre
Gord Manning	Director, Materiel Management, Kingston General Hospital
Paul McAuley	IT Consultant, Kingston General Hospital



Keith Rose	Vice President and Chief Medical Officer, North York General Hospital
John Rowsom	General Surgeon, Peterborough Regional Health Centre
Blair Schoales	Chief-of-Ophthalmology, Thunder Bay Regional Health Sciences Centre
Heather Sherrard	Vice President, Clinical Services, University of Ottawa Heart Institute
Mae Squires	Program Director, Critical Care, Cardiac Care and Orthopaedic Care, Kingston General Hospital
Tom Stewart	Director, Critical Care Medicine, Mount Sinai Hospital and University Health Network
Betty Watt	Consultant, Toronto General and Toronto Western Foundations, University Health Network

The Panel wishes to thank Joann Trypuc for working with the members to develop this report.

## APPENDIX B: SURVEY RESPONDENTS

Small/Rural (Hospitals That Perform <= 2,000 Surgeries)		
Hospital Name	Site	Local Health Integration Network
Alexandra Hospital		South West
Alexandra Marine And General Hospital		South West
Arnprior And District Memorial Hospital (The)		Champlain
Campbellford Memorial Hospital		Central East
Carleton Place And District Memorial Hospital		Champlain
Collingwood General And Marine Hospital		North Simcoe Muskoka
Don Mills Surgical Unit Limited*		Toronto Central
Dryden Regional Health Centre		North West
Hanover And District Memorial Hospital		South West
Huntsville District Memorial Hospital		North Simcoe Muskoka
Huron Perth Health Alliance		
	Seaforth Community Hospital	Southwest
	Listowel/Wingham Hospital	Southwest
	Clinton Public Hospital	Southwest
Lake-Of-The-Woods District Hospital		North West
Lennox And Addington County General Hospital		South East
Manitoulin Health Centre		North East
North Wellington Health Care Corporation		Waterloo Wellington
Notre-Dame Hospital*		North East
Margaret Cochenour Memorial Hospital (The)		North West
Quinte Healthcare Corporation		
	Prince Edward County	South East
Renfrew Victoria Hospital		Champlain
Sensenbrenner Hospital		North East
South Bruce Grey Health Centre		
	Walkerton Site	South West
	Kincardine Site	South West
South Muskoka Memorial Hospital		North Simcoe Muskoka
St Joseph's General Hospital, Elliott Lake		North East
Tillsonburg District Memorial Hospital		South West
West Haldimand General Hospital (The)		Hamilton Niagara Haldimand Brant
West Lincoln Memorial Hospital		Hamilton Niagara Haldimand Brant
West Nipissing General Hospital (The)		North East
West Parry Sound Health Centre		North East
Winchester District Memorial Hospital		Champlain

Small Community (Hospitals That Perform 2,001 - 7,999 Surgeries)		
Hospital Name	Site	Local Health Integration Network
Brockville General Hospital		South East
Cambridge Memorial Hospital		Waterloo Wellington
Chatham Kent Health Alliance (The)		
	Wallaceburg Site	Erie St. Clair
Cornwall Community Hospital		Champlain
Halton Healthcare Services Corp		
	Milton District Hospital	
Headwaters Health Care Centre-Dufferin		Central West
Hotel Dieu Hospital, St. Catherine's		Hamilton Niagara Haldimand Brant
Hopital Montfort		Champlain
Huron District Hospital		North Simcoe Muskoka
Huron Perth Health Alliance		
	Stratford General Hospital	
Leamington District Memorial Hospital		Erie St. Clair
Norfolk General Hospital		Hamilton Niagara Haldimand Brant
Northumberland Hills Hospital		Central East
North York General Hospital		
	Branson Site	Central
Markham Stouffville Hospital		
	Uxbridge Site	Central East
Middlesex Hospital Alliance		
	Strathroy Middlesex General Hospital	
Perth & Smiths Falls Dist		
	Great War Memorial Hospital	
	Smiths Falls Community Hospital	
Quinte Healthcare Corporation		
	Belleville Site	South East
	Trenton Site	South East
Ross Memorial Hospital		Central East
Stevenson Memorial Hospital		Central
St Thomas-Elgin General Hospital		South West
Temiskaming Hospital		North East
Timmins & District General Hospital		North East
Woodstock General Hospital		South West

Large Community (Hospitals That Perform >=8,000 Surgeries)		
Hospital Name	Site	Local Health Integration Network
Bluewater Health		Erie St. Clair
Brantford General Hospital (The)		Hamilton Niagara Haldimand

Large Community (Hospitals That Perform >=8,000 Surgeries)		
Hospital Name	Site	Local Health Integration Network
		Brant
Chatham Kent Health Alliance (The)		
	Chatham Site	Erie St. Clair
Credit Valley Hospital (The)		Mississauga Halton
Grand River Hospital Corporation		
	Kitchener/ Waterloo Site	
Grey Bruce Health Services		South West
Guelph General Hospital		Waterloo Wellington
Halton Healthcare Services Corp		
	Oakville Site	Mississauga Halton
Humber River Regional Hosp		
	Church Street Site	Central
	Finch Avenue Site	Central
Joseph Brant Memorial Hospital		Hamilton Niagara Haldimand Brant
Lakeridge Health Corporation		
	Oshawa Site	Central East
Markham Stouffville Hospital		
	Markham Site	Central East
Niagara Health System		
	Douglas Memorial Hospital Site	
	Greater Niagara General Site	
	Niagara -On-The-Lake Site	
	Niagara Rehab Site	Hamilton Niagara Haldimand Brant
	Port Colborne General Site	
	Shaver Hospital Site	Hamilton Niagara Haldimand Brant
	St. Catherines General Site	
	Welland General Site	Hamilton Niagara Haldimand Brant
North Bay General Hosp-Civic/St Joseph's		North East
North York General Hospital		
	General Site	Central
Orillia Soldiers' Memorial Hospital		North Simcoe Muskoka
Peterborough Regional Health Centre		Central East
Queensway-Carleton Hospital		Champlain
Rouge Valley Health System		Central East
Royal Victoria Hospital (The)		North Simcoe Muskoka
Sault Area Hospital		North East
Scarborough Hospital (The)		Central East
St Joseph's Health Centre, Toronto		Toronto Central
St Mary's General Hospital		+ South West
Toronto East General Hospital (The)		Toronto Central

Large Community (Hospitals That Perform >=8,000 Surgeries)		
Hospital Name	Site	Local Health Integration Network
William Osler Health Ctr		Central We
Windsor Regional Hospital		
	Metropolitan Campus	Erie St. Clair
York Central Hospital		Central

Complex Community (Those Hospitals That Provide Neurosurgery, Trauma, And/Or Heart Surgery)		
Hospital Name	Site	Local Health Integration Network
Hopital Regional De Sudbury		North East
Hotel-Dieu Grace Hospital, Windsor		
	General Site	Hamilton Niagara Haldimand Brant
	Grace Site	Hamilton Niagara Haldimand Brant
Southlake Regional Health Centre		Central East
Thunder Bay Regional Hlth Sciences Ctr		North West
Trillium Health Centre		
	Mississauga Site	Mississauga Halton
University Of Ottawa Heart Institute		Champlain

Acute/Teaching		
Hospital Name	Site	Local Health Integration Network
Childrens Hospital Of Eastern Ontario		Champlain
Hamilton Health Sciences Corporation		Hamilton Niagara Haldimand Brant
Hospital For Sick Children (The)		Toronto Central
Hotel Dieu Hospital, Kingston		Hamilton Niagara Haldimand Brant
Kingston General Hospital		South East
London Hlth Sciences Ctr		South West
Mount Sinai Hospital		Toronto Central
Ottawa Hospital ( The )		
	Civic Campus	Champlain
	General Campus	Champlain
	Riverside Campus	Champlain
St Joseph's Health Care System, Hamilton		Hamilton Niagara Haldimand Brant
St.Joseph's Health Care, London		South West
St Michael's Hospital		Toronto Central
Sunnybrook & Women's Coll Hsc-Sunnybrook		
	Orthopaedic And Arthritic Centre	

<b>Acute/Teaching</b>		
<b>Hospital Name</b>	<b>Site</b>	<b>Local Health Integration Network</b>
	Sunnybrook Site	Toronto Central
	Women's College Site	Toronto Central
University Health Network		
	Princess Margaret Hospital	
	Toronto General Hospital	
	Toronto Western Hospital	Toronto Central

Note:

- 1) Hospitals were classified using best available evidence (survey responses to the following question: please estimate your institutions approximate Operating Room case volumes or when unavailable 2002/03 hospital reported surgical cases from the Provincial Health Planning Database)
- 2) Not all hospitals submitted separate surveys for each site.
- 3) All hospitals represented are public institutions except for the Don Mills Surgical Unit and Notre-Dame Hospital.

## APPENDIX C: A GUIDING TOOL FOR HOSPITALS TO MAP AND ASSESS PERI-OPERATIVE EFFECTIVENESS

The following information presents a guiding tool for hospitals to help them map and assess their peri-operative effectiveness. The information addresses the following major components of a peri-operative program:

- Peri-operative screening
- Day surgery/same day admission
- Intra-operative process
- Post-anesthesia care unit and second-stage recovery
- Instrument processing and case cart preparation
- Scheduling process

Peri-operative practices are guided by national standards that include, but are not limited to, standards for operating room nursing, infection control, processing and anesthesiology. Hospitals should incorporate these standards into their assessments.

A number of the characteristics reflect peri-operative best practice targets as noted in Appendix D.

### PERI-OPERATIVE SCREENING

Peri-operative screening helps prepare the patient for surgery. It includes pre-operative testing based on the needs of the patient and may include detailed assessments by consultants such as anesthesiology.

#### Characteristics of an Effective Peri-Operative Screening Program

√	1. All electively scheduled patients are screened either by telephone or in person to ensure patients are ready for surgery.
√	2. Patients who have similar clinical conditions and are scheduled for similar procedures are screened and tested in a like manner regardless of surgeon, anesthesiologist or surgical procedure.
√	3. Programs include assessment, patient education and discharge planning.
√	4. Patients are medically optimised before surgical admission.
√	5. The pre-operative chart is completed and available at least one day prior to surgery.

## DAY SURGERY/SAME DAY ADMISSION

An effective Day Surgery Unit makes pre-operative preparations for all out-patient procedures and same day admit surgery procedures, and makes preparations for second stage recovery and discharge for all out-patient procedures.

### Characteristics of an Effective Day Surgery Unit

√	1. Day surgery units are in the same physical location rather than in different locations.
√	2. Fully prepared charts are received in advance of surgery.
√	3. Staff are cross-trained to function effectively in the same day admit, PACU and second stage recovery.
√	4. The unit is strategically located adjacent to the Operating Suites.

## INTRA-OPERATIVE PROCESS

An effective surgery program will reflect an effective intra-operative process.

### Characteristics of an Effective Intra-Operative Process

√	1. Data is collected and performance is monitored on start, finish and turnover times, utilisation including hours available and hours used, and patient safety (Note: start time is patient in the operating room).
√	2. Performance is benchmarked against peer group standards.
√	3. The staffing model is matched to patient need and complexity of the service.
√	4. There is adequate and dedicated support staff for ancillary functions (i.e., transportation, housekeeping etc.).
√	5. There are sufficient levels of instrumentation, supplies and equipment to meet the OR schedule providing for the “right instruments at the right time” and “just in time” delivery.
√	6. Instrument trays are standardisation for similar cases.
√	7. The OR schedule confirmed 24 hours in advance.
√	8. Urgent volumes are incorporated into the regular daily OR schedule.
√	9. Activities are performed in parallel rather than serial fashion, whenever possible (i.e., room set up and patient induction occurs concurrently).
√	10. Theatres are staffed for cases with a target room utilisation of 80%.
√	11. Unplanned OR day extensions and overtime are regularly evaluated for opportunities to determine a need for extended hours or revised staffing patterns.
√	12. Off hours and weekend utilisation are monitored and reviewed to ensure that utilisation meets the criteria for emergency care.
√	13. Alternate settings are considered based on case type and acuity (e.g., cataracts and endoscopy may be done outside of a traditional OR setting).



**Characteristics of an Effective Intra-Operative Process**

√	14. A supply chain model is used that includes product evaluation, standardised purchasing processes and specific policies that manage access of vendor representatives to the OR.
√	15. Supply acquisition is managed by contract and/or on consignment.
√	16. A Peri-operative information system is used that allows for automated data capture with a goal of case costing.

**POST-ANESTHESIA CARE UNIT AND SECOND STAGE RECOVERY**

An effective surgical program needs an effective Post-Anesthesia Care Unit (PACU) and Second Stage recovery program.

**Characteristics of an Effective Post-Anesthesia Care Unit and Second Stage Recovery**

√	1. Patient discharge policies and procedures are based on the clinical condition of the patient. Time-based standards or minimum lengths of stay are not recommended. Discharge policies may direct who, in addition to physicians, may discharge a patient from the PACU.
√	2. Policies should be developed to bypass the PACU and enable patients who have received a general anesthetic to be included in the bypass group. As a general rule, most patients receiving a local anesthetic should bypass the PACU.
√	3. A staffing model should be in place that includes professional staff and ancillary staff based on the case mix. Staffing should reflect the peri-operative schedule, predicted patient need and complexity of the service.

**INSTRUMENT PROCESSING AND CASE CART PREPARATION**

An effective surgical program needs adequate instrument processing and case cart preparation.

**Characteristics of Effective Instrument Processing and Case Cart Preparation**

√	1. Accurate procedure-specific pick lists are used.
√	2. Instrument trays are standardised by procedure and service with minimum instrumentation for a typical case.
√	3. Robust quality assurance processes address the accuracy of instrument trays and case carts, where used.
√	4. Instrument tracking and management programs are in place and are monitored. Larger organisations should consider automated systems for instrument tracking and management.

## SCHEDULING PROCESS

Effective surgical scheduling and booking programs support an efficient and effective program.

### Characteristics of an Effective Scheduling Process

√	1. Clear policies and guidelines are in place based on the organisation's goals that are communicated, implemented and consistently upheld.
√	2. The surgeon's office or requesting clinic provides all the information that is required to develop and prepare a slate.
√	3. The duration of cases are scheduled based on real (average) time performance.
√	4. Each resourced OR block is fully booked based on duration estimates and established block time allocations.
√	5. Cases are sequenced based on clinical need, effective use of resources, access to resources and clearly defined criteria.
√	6. Block lengths may vary based on established practice patterns, patient or case needs, and available staff and physician resources.
√	7. Block release times are clearly established and determined based on patient needs and service demands (i.e., highly elective or predominantly urgent).
√	8. Booking offices have predetermined processes for managing waiting cases and unutilised or released scheduled time.
√	9. Block allocations are allocated to service and /or surgeon based on clear criteria that include patient access to care.
√	10. Block utilisation and allocations are reviewed on a regular basis and reallocated based on clear criteria.
√	11. The schedule is closed 24 hours before the surgical day. Any additional changes are directed through the operating room process and are based on defined clinical priorities (e.g., it may be appropriate to add urgent cases 12-24 hours before the surgical day).

## APPENDIX D: PERI-OPERATIVE BEST PRACTICE TARGETS

These peri-operative best practice targets are presented in Section 8.4, *Benchmark and Best Practice Targets*.

### Peri-Operative Best Practice Targets

√	1. All electively scheduled patients will be screened either by telephone or in person to ensure that they are ready for surgery.
√	2. All patients and their families will be educated to ensure that they understand the procedure and participate in care.
√	3. Discharge planning will begin before surgery.
√	4. Surgery will be conducted on an out-patient basis in a separate location, wherever possible.
√	5. Surgical patients will be admitted on the same day as the surgery, wherever possible.
√	6. The time the patient goes into the operating room to the time the patient leaves the operating room will be equal to the time that was booked for the case.
√	7. The amount of time scheduled for surgery will be as close to the expected time that the surgery should take.
√	8. Surgeries will begin at the scheduled start time.
√	9. The “emergency surgeries” that are conducted will reflect true emergencies.
√	10. Surgical cases that have similar procedures will be grouped as a block, where possible.
√	11. Surgeons will work in consolidated blocks of time, where possible.

## APPENDIX E: SUPPLY CHAIN BEST PRACTICE TARGETS

These supply chain best practice targets are presented in Section 8.4, *Benchmark and Best Practice Targets*.

### Supply Chain Best Practice Targets

√	1. Peri-operative services will ensure that there is sufficient instrumentation and supplies to support the operating room schedule. Appropriate investments will be made to support surgical activity and throughput.
√	2. Surgical suites will have separate dedicated physical supports for clean and soiled instrumentation and supplies between peri-operative and central processing services.
√	3. Systems will be used to help manage instrumentation, and cleaning and sterilisation processes.
√	4. Hospitals will link supply consumption to surgical activity by actively managing the inventory supply replenishment process using automated systems and material management support.
√	5. To the extent appropriate to the clinical activity of the hospital, peri-operative services will use a limited but sufficient range of instrumentation to enable good choice and minimise inefficiencies and confusion.
√	6. To the extent appropriate to the clinical activity of the hospital, peri-operative services will use a limited but sufficient number of vendors to enable good choice and minimise inefficiencies and confusion.
√	7. Hospitals will develop access management policies for their vendors.
√	8. To the extent appropriate for the facility, custom packs, case carts and pick lists will be standardised by procedure or program, rather than by individual physician.
√	9. Hospitals will use clearly defined processes to analyse the value of new peri-operative technologies.

## **APPENDIX F: CONSOLIDATED LIST OF DATA ELEMENTS TO BE CONSIDERED IN THE DEVELOPMENT OF A MINIMUM DATA SET**

The consolidated list of data elements presented below include:

- Data that hospitals were asked to collect as a condition of funding for additional surgical cases; and
- Data elements identified by the Panel and presented in various sections of the report.

These data elements should be reviewed and considered in the development of a minimum data set for surgical efficiencies.

### **Data Elements for Additional Funding in Phase I of the Wait Time Strategy**

Hospitals were asked to collect the following data elements as a condition of funding for additional surgical cases:

- Cancellations: Number of operations cancelled on the day of surgery (cancelled by patient, by hospital for non-clinical reasons, by hospital for clinical reasons).
- Cancellations: Total number of patients cancelled within 48 hours of the surgical day (cancelled by patient, by hospital for non-clinical reasons, by hospital for clinical reasons).
- Delays (First case start-time accuracy – greater than 15 minutes): delays driven by patient action (i.e., late arrival, etc.), due to clinical reasons, due to non-clinical reasons (i.e., equipment failure, ICU delay, etc.).
- First Case Start-Time Accuracy (delay greater than 15 minutes): Defined as first patient in the room.
- Unplanned OR closures: due to unplanned events (i.e. no scheduled cases, lack of Anesthesia, lack of staff, etc.).
- Pre-Admission Process: percentage of scheduled surgical cases pre-assessed and/or pre-screened through a pre-admission process.

### **Data Elements for Peri-Operative Best Practice Targets (see Section 8.4, *Benchmark and Best Practice Targets*)**

The following data elements were identified in the discussion of peri-operative best practice targets.

#### **Pre-operative**

- The number of patients who are screened.
- The number of patients who have their surgery cancelled because they are “not ready.”
- The number of patients and families who are educated about the procedure and care.
- The number of patients who have clear discharge goals and services scheduled prior to surgery, such as home care, rehabilitation, long-term care.

#### Operative

- The number of in-patient and out-patient surgeries, by type of surgery.
- The number of same day admits, by type of surgery.
- The time the patient goes into the operating room compared to the time the patient leaves the operating room, and the time that the case is booked for, by type of surgery. Turnover time.
- The hours scheduled for the surgery and the hours used for the surgery, by service and surgeon.
- The number of surgeries that are delayed more than 15 minutes, by service and surgeon. Reason for the delay in surgery.
- The number of surgical emergencies, by service and surgeon. A prototype definition of emergency is the surgery is required due to a threat to life or limb and/or surgery needs to be done on the same day or within “N” hours.
- Existence of standardised booking procedures that allow for case review.
- The number of times that “like” surgical cases are scheduled in an ad hoc fashion.
- The number of surgeries conducted on days that are less than fully booked.
- Operating room use by surgeon compared to the time allocated and the expected case volume.

#### **Data Elements for Supply Chain Best Practice Targets (see Section 8.4, *Benchmark and Best Practice Targets*)**

The following data elements were suggested by the discussion of supply chain best practice targets.

- Number of cancellations or delays due to insufficient instrumentation and supplies.
- Magnitude of investments in instrumentation and supplies to support surgical activity and throughput.
- Existence of separate physical supports for clean and soiled instrumentation and supplies.
- Existence of an instrument tracking system.
- Number of instruments and supplies used in the OR.
- Number of peri-operative supply vendors.
- Existence of access management policies for vendors.
- Standardisation of packs, case carts and pick lists by procedure or program, rather than by individual physician.
- Process in place to analyse the value of new peri-operative technologies.

#### **Data Elements for Best Practice Targets for Scheduling**

The following data elements were suggested by the discussion of best practice targets for scheduling in Section 8.4, *Benchmark and Best Practice Targets*.

- Existence of methodology to allocate operating room resources that takes into account patient need, urgency of the patient's condition, strategic priorities of the organisation and retaining physicians with sufficient operating time.
- Number of urgent cases in the average surgical work load.

In addition, the following data elements were identified in the discussion of operating room scheduling systems (see Section 8.5, *Information Technology and Management*):

- Cancellations: number and reason;
- Case delays: time of delay and root cause;
- First case start times;
- OR resource utilisation: rooms that are used, type of equipment and staff;
- OR case mix: emergency, urgent or elective, ambulatory or in-patient, etc.; and
- Case time: actual vs. scheduled.