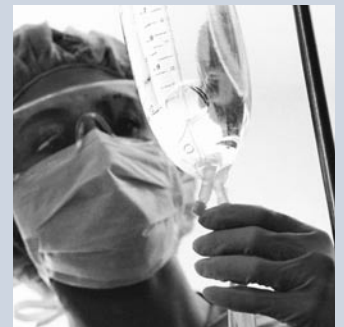
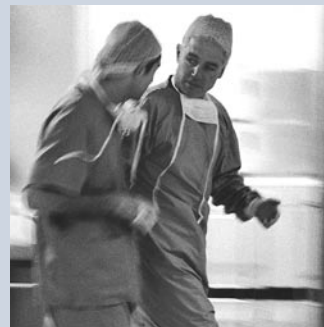




## Why Total Perioperative Automation is Essential for 21st Century Health Care Systems

By Christopher Grover, Grover Group

**Total perioperative automation (TPA)** improves competitive and financial viability. TPA systems reduce costs, help increase efficiency, and help improve quality of care by managing and integrating the entire perioperative environment from preop scheduling and assessment through post-anesthesia care.



**S**urgery is the fastest growing and most resource-intensive area of the hospital. On average, the surgical environment accounts for more than 50 percent of a hospital's total budget. Surgery-related care is also where the highest incidence of medical errors occur and where the nursing shortage is the most acute. Yet historically, managing the operating room – from a people, supply, and information system perspective – has been fragmented and decentralized. This has led to tremendous inefficiencies, redundancies, and performance bottlenecks.

For today's hospitals to remain competitive and financially viable, it is essential that the perioperative environment be managed in a much more efficient and cost-effective manner than it has been in the past. Total perioperative automation (TPA) is a critical component to achieving this vital goal.

## A changing environment

Traditionally, management of the operating room has been disconnected, with nursing, surgery, and anesthesiology often operating autonomously. Pockets of automation have developed within these independent fiefdoms, but the data captured is often trapped in a single application or group of applications without sharing critical information throughout the operating room enterprise. In addition, important clinical information – including intraoperative nursing and anesthesia documentation – is still frequently manually recorded and not available online.

Times are changing. As hospitals become more process-oriented and business-focused, many are merging all their surgical operations under a single management structure. The goal of this organization, often called perioperative services, is to improve operational performance by managing the entire perioperative environment from preop scheduling and assessment through the post-anesthesia care unit (PACU).

Since the OR is the most complex location in any hospital, the new organization's management responsibilities cover a diverse group of different functions and capabilities, including scheduling patients and clinicians; managing supplies and materials; improving operating room and employee utilization; managing clinical, administrative, and billing documentation; and much more. Controlling, synchronizing, and optimizing the various aspects of perioperative service is, to say the least, a challenging task.

Total perioperative automation is required to achieve the control and efficiency needed to succeed in this evolving environment. By uniting all OR-related applications in a comprehensive perioperative information system – and applying operational controls and techniques honed in the manufacturing and services industries – health care organizations can achieve remarkable improvements in organizational performance and patient safety. With a TPA system in place, costs can be reduced dramatically, efficiency can be boosted exponentially, and the overall quality of patient care and safety can be improved.

## TPA: The formula for high-quality, cost-effective care

The idea behind TPA is to provide a unified system that includes the clinical and administrative applications needed to efficiently operate the perioperative environment. Instead of autonomous systems for operating room management, procedure scheduling, and anesthesia information, these applications are fully integrated and use a single database server. The result: all data collected and documented by care providers and staff is available wherever and whenever it is needed. In addition, management gets the complete data needed to improve efficiency and make the best business decisions.

The integrated application areas that make up a TPA system include all the following perioperative functions:

- Scheduling
- Nursing documentation

- Preference card/supply management
- Billing
- Case/patient tracking
- Anesthesia documentation
- PACU documentation
- Quality management

The TPA system provides real-time clinical and administrative information that clinicians and managers need to make on-the-spot decisions, as well as delivering the reporting and data analysis tools required to extract meaningful information required for strategic decision making. The benefits of implementing TPA are far reaching and include:

- Better resource utilization and allocation
- More efficient use of OR time and facilities
- Lower cost of care delivery
- Better data analysis
- More time to spend on patient care
- Improved billing and reimbursements
- Promoting increased satisfaction of patients, staff, and physicians

In short, TPA helps provide the highest quality care in the most cost effective manner. Let's take a look at each of the major TPA functions and highlight the capabilities required for optimal performance.

## Traditional operating room management applications

The core group of applications known collectively as the operating room management system (ORMS) includes patient surgical scheduling, nursing perioperative documentation, preference cards, supply management, and billing. Most hospitals have some form of these applications implemented. In most cases, the existing software is an older generation product that lacks key capabilities and is not fully integrated with other TPA modules and existing hospital-wide systems. The majority of hospitals are currently seeking to upgrade or replace their ORMS software modules. Here is what to look for in each application:

### Patient surgical scheduling

Obviously the modern operating room cannot be run without an automated scheduling system. That's why just about every system provider, from hospital information system vendors to perioperative system specialists, offers a product in this category. But despite what it says on specification sheets, all surgical scheduling systems are not created equal. The scheduling system selected must have the flexibility to match its environment, whether it is a stand alone OR or a multi-campus integrated delivery network. Its ability to adapt easily to your facility's unique needs and procedures is fundamental to delivering a high level of patient and surgeon satisfaction.

Among the key features and functions to look for in an operating room scheduling system are:

- Multifacility capabilities with the flexibility to tailor procedures to accommodate individual facility differences
- Flexible block utilization, enabling you to manage the schedule by physician services, physician groups, room type, setup, etc.
- Flexibility in how information is displayed, allowing different data and different views depending upon the viewer, location, etc. (in accordance with HIPAA regulations)

*Don't Forget About the Web.* Make sure your scheduling system offers remote scheduling so that surgeons can make appointments and access schedules securely online from their office.

### Online nursing documentation

It is important to have a system that facilitates online charting from the beginning to the end of a surgical patient's visit. That means the nursing documentation application should integrate preoperative assessment, intraoperative charting, and PACU flow sheet log documentation, as well as automating both the clinical and administrative documentation needs of your organization. Since not every hospital collects data the same way, easily customized documentation screens and workflow are very desirable. The system must also support the Association of Perioperative Registered Nurses' Perioperative Nursing Data Set documentation standards and incorporate SNOMED® terminology. This helps facilitate accurate outcomes and completeness, and makes it possible to benchmark outcomes across facilities

and organizations (see Figure 1).

*You need speed to lead.* While online charting is essential to getting full benefit from TPA – especially for billing and tracking cases in real time – it is estimated that only 25 percent of hospitals currently chart online. To ensure maximum compliance, benchmark all the systems you are considering to make sure they offer the tools your nurses need to document a case quickly and precisely. Otherwise, without speed and ease of use, you will find yourself in a losing battle against manual record keeping.

**Preference cards/supply management**

Better supply management offers one of the biggest paybacks of any area within the perioperative environment. By implementing a fully integrated supply management and inventory control system, your facility can optimize resources, significantly reduce waste and lost charges, and help pinpoint the actual cost of surgical care.

Integration is essential. Your OR supply management system must interact dynamically with the hospital-wide materials management system to automatically decrement inventory and trigger reordering. The software should also update pricing, calculate supply and non-supply management costs, and transmit charges to the billing system. Integration with other ORMS modules is also required. For example, online documentation should provide a point-and-click option to let nurses quickly track inventory by exception.

An important component of supply management is preference cards. Automation of preference cards can dramatically increase the accuracy of OR supplies and reduce the time needed to manage this crucial function. Among the features and capabilities desired from online preference cards are:

- An easy and intuitive way to set up and maintain cards across facilities (including global updates)
- Generation of picklists by case, room, and inventory location with one request
- Cards that automatically collapse for complex multi-procedure cases
- Cards with multi-facility flexibility

With an effective preference card/supply management system, you should be able to reduce back-table waste, avoid manual inventories, and receive up-to-the-minute usage reports – all while saving precious nursing time.

*Demand intelligence in preference card management.* Let the system do the work for you. Some systems have built-in, embedded logic that notify staff of possible inaccuracies in physician preference cards based upon the actual pattern of usage. Using these usage statistics, the system can then automatically update the item on a preference card. This is yet another way to save nursing time and improve inventory accuracy.

**Billing**

A TPA system should capture and automatically calculate all perioperative charges as a natural offshoot of its day-to-day operation. Once a surgical case is complete, the OR system should transmit supply usage, OR time, procedures, equipment, staffing, and other data directly to the hospital’s enterprise billing system – allowing patient charges to be calculated and communicated seamlessly. This streamlined approach reduces lost charges and helps improve the accuracy and timeliness of patient bills, thus providing a significant return on investment.

*Look for a quick-change artist.* Flexibility and quick adaptation are prerequisites for any OR billing package. The system must be able to accommodate your organization’s billing structure, as well as billing differences that may arise from site-to-site within your organization. Since billing requirements change regularly, the system should be rules-based (with an unlimited number of billing and costing rules), so that you can change billing formulas quickly and easily.

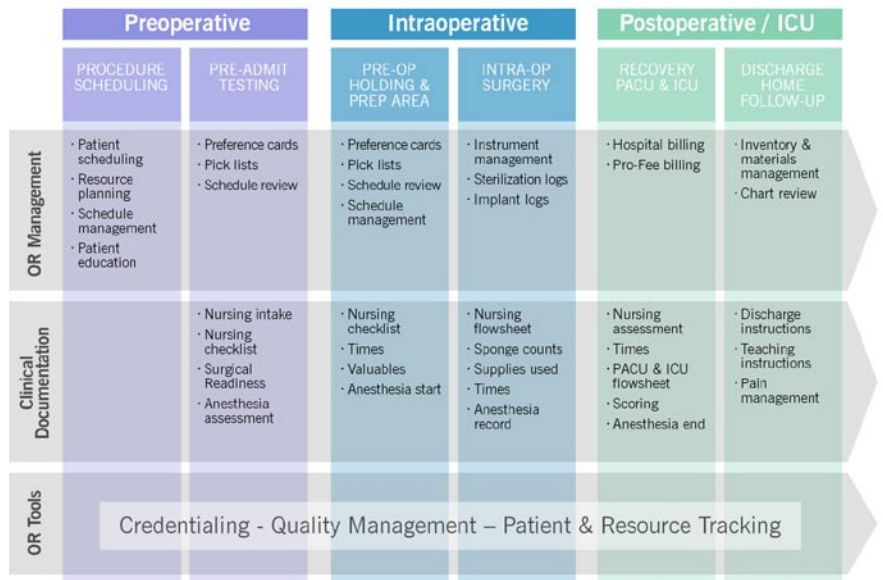


Figure 1 - The Workflow of Total Perioperative Automation

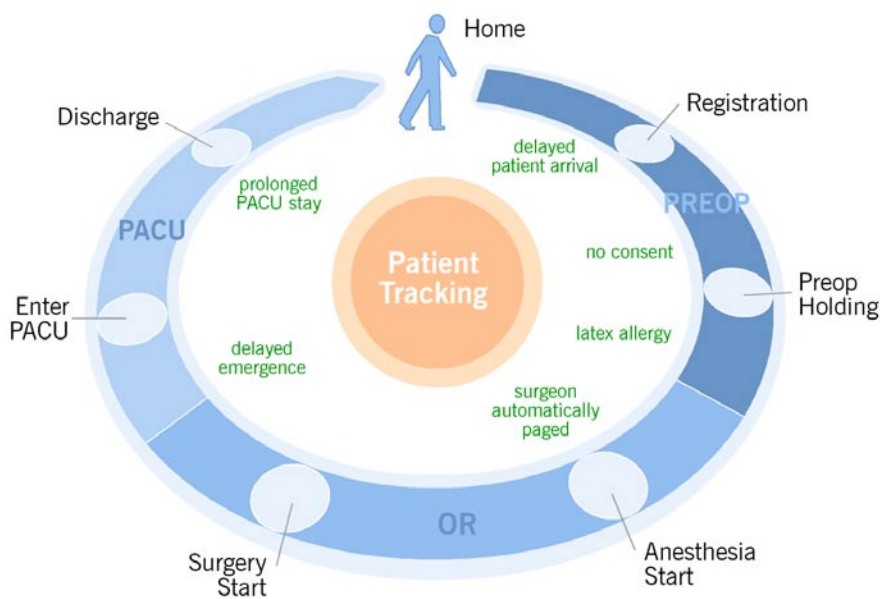


Figure 2 - Case Tracking Throughout the Perioperative Patient Experience

## Interactive case tracking improves OR utilization

*It is 8:45AM and surgery is scheduled for 9AM. OR calls preop to check on the patient's status and learns that they have not yet seen the patient. OR then places a call to the registration desk where the patient was scheduled to post at 8AM. Unfortunately, the patient has not yet reported to registration either. Now, 15 minutes before the scheduled surgery, OR realizes that the case will be delayed and this will trigger a domino effect throughout the surgery schedule. That leaves precious little time to make adjustments.*

One of the biggest expenses for an OR department is staff overtime because of scheduling delays like these. That's why one of the newest and potentially most rewarding applications in the perioperative world is case tracking. This interactive tool monitors the status and location of surgical patients and resources throughout the perioperative process, from registration to discharge. A truly effective tracking system allows a set of critical

checkpoints to be attached to the patient's surgical episode. Using this data, the system can automatically notify staff of delays in advance so they can proactively adjust the day's surgery schedule accordingly (see Figure 2).

*Make sure that everyone can be kept in the know.* With an effective case-tracking tool in place, everyone involved is kept informed of the case's progress. This information can be instantly communicated throughout the health care organization, allowing medical staff, administrators, family members, and other personnel to know the status and location of patients at all times. Comprehensive tracking promotes a smooth flow of patients, enhances productivity, and saves big money throughout the organization.

## Automating anesthesia and the PACU

Anesthesia and PACU clinical systems are much less prevalent than ORMS applications. Yet these point-of-care systems – when integrated as part of a TPA strategy – not only help improve quality of care and patient outcomes, but also have a direct effect on efficiency, costs, billing, and risk management. Let's look more closely.

### Anesthesia care documentation

An anesthesia documentation system automatically collects, manages, integrates, and stores vital information required to help evaluate the patient's condition and manage the care process. It also organizes the workflow of doctors, nurses, and other caregivers. Important capabilities to look for in an anesthesia system include:

- Automation of the entire anesthesia record including pre-anesthesia evaluation, the intraoperative record, and postoperative recovery
- Connectivity to all leading medical devices, as well as the lab and other hospital information systems
- Presentation of information and advanced data correlation to aid in making informed patient decisions
- The ability to provide the retrospective data required to drive process improvement and implement best practice standards

The benefits you can expect from an anesthesia documentation system are that it facilitates improved accuracy and clinical outcomes, reduced patient/hospital risk, improved billing and charge capture, reduced anesthesia drug costs, and improved efficiency of nurses and anesthesia providers.

*Remember that time is money.* An integrated TPA system also ensures that both anesthesia time documentation (anesthesia start, anesthesia stop, enter PACU, exit PACU, etc.) and nursing time documentation (enter room, exit room, surgery start, surgery stop) are accurate and agree. If the times

from nursing and anesthesia are not logical and consistent – as can happen with paper documentation or stand-alone applications – it can cost the hospital millions in denials from payors as guided by the Center for Medicare and Medicaid Services (CMS).

### PACU care documentation

Without an automated online postoperative record, an inordinate amount of time is spent recording data, while much of the vital information needed to help make the right decisions – both at the point of care and later for analysis – is not available. By automating the documentation of patient vital signs and physiologic data, and organizing standard case protocols – including key assessments, treatments, scores and medications – an automated PACU system is able to save time while improving record accuracy, legibility, and availability.

Like the anesthesia information system, connectivity to all leading medical devices and hospital information systems is essential. This application helps improve patient care, reduce overtime charting costs, minimize errors, and promote better documentation of anesthesia times.

### Reporting and advanced data analysis

A TPA system collects volumes of rich data almost every minute of every day. The challenge is to transform this raw data into the business, operational, and medical knowledge needed to make the best strategic and operational decisions possible. Reporting and research tools are key. Clinicians and business users need to be able to get information out of the system quickly, without requiring intensive training or technical assistance (see Figure 3).

#### Standard reports

Your TPA system should provide numerous standard reports that can be run on demand. For example, room utilization, block time utilization, surgeon utilization, turnaround time analysis, and preference card analysis are some of the standard reports that should be available from the system. In addition, bedside reports should be available online from your clinical care applications to allow clinicians to access and analyze patient data at their convenience.

#### Ad hoc reports

Standard reports alone are not enough. You also need to be able to extract customized information from the system and present it in a variety of forms. That’s why the system must provide point-and-click tools that allow non-technical users to get ad hoc reports and lists without having to learn to use a report writer. The system should also let you easily export data to off-the-shelf products such as Microsoft® Excel.

#### Advanced data analysis

As one of the largest cost centers in most hospitals, the OR suite presents many unique opportunities to streamline care delivery, reduce expenditures, and help improve clinical outcomes. Putting advanced data analysis tools into the hands of clinical and business users will enable your facility to uncover knowledge that can drive improvements in efficiency and outcomes management

The detail and complexity of clinical and procedural data from the OR is well suited for the utilization of business intelligence software such as online analytical processing (OLAP) tools. These high-end tools – in combination with a database optimized for reporting – allow users to perform queries across large volumes of data quickly. As a result, hospitals can answer questions such as:

- How much does a case really cost?
- How can we lower drug costs without impacting care?
- What surgery teams are the most efficient?

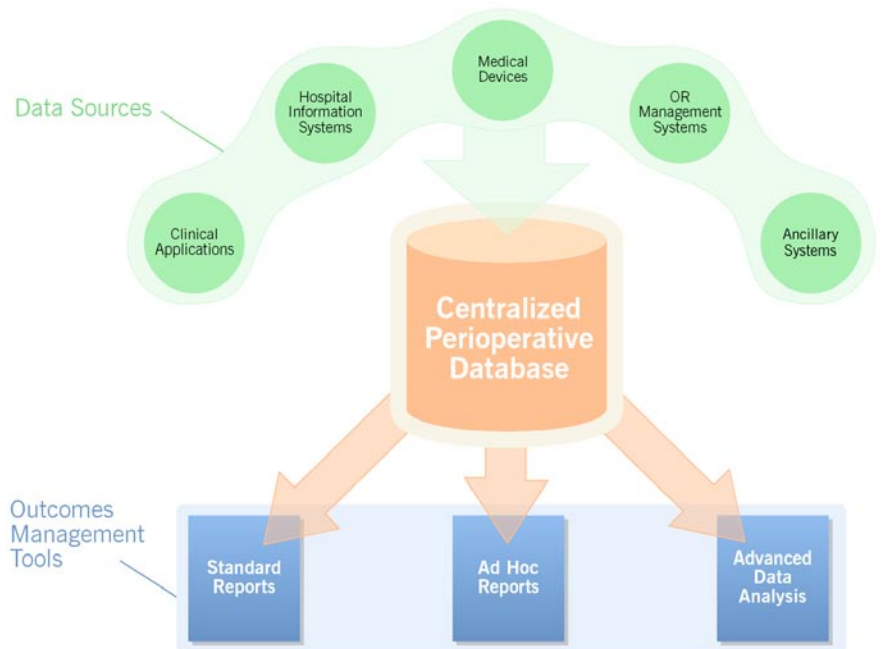


Figure 3 - Reporting and Advanced Data Analysis

- How do our facilities compare?
- Are we truly utilizing block time efficiently?
- How has the type of anesthesia impacted the postoperative outcome?
- How has automation impacted supply usage and waste?
- Has automation reduced our billing days cycle?

Implementing a solution that enables you to easily convert your valuable data into knowledge will not only help you take better care of your patients, but also make it easier to realize a return on the investment in perioperative automation.

## What is the best route for implementing TPA?

The age-old question is whether to buy “best of breed” systems from different vendors and interface them or to implement a fully integrated solution from a single source. In the case of TPA, the answer is clear. An integrated system with a single database server is a vital necessity. One solution from one vendor is the simplest, most effective choice. The main reason is that the sharing of information across the organization is so intense and time-critical that it would be difficult or impossible to do fast and efficiently through an interface. In addition, the data analysis capabilities described above would be next to impossible with data stored in different databases.

Another point to consider is cost. The cost of ownership would substantially increase with multiple systems because of the need to build and maintain complex interfaces between your ORMS applications and clinical systems. In addition, separate systems will require additional staff time for training and maintenance, not to mention that redundant hardware that may be necessary as well.

Also beware of HIS vendors that want you to purchase their OR component as part of their enterprise-wide offering. These vendors simply do not have the expertise or focus to provide the complex and comprehensive functionality demanded by a total perioperative automation system.

The bottom line is that if you can find a system that meets the functional needs of your diverse users and your organization as a whole, an all-encompassing solution is the only way to go.

## Conclusion

Total perioperative automation is essential for hospitals to remain competitive in an increasingly demanding financial and regulatory environment. The automation tools now exist to pull together the vast and varied information resources of surgical care into a single system that can dramatically improve every aspect of this critical and resource-intensive endeavor. It is no longer a question of if, but rather when. The sooner a hospital moves to TPA, the better its chance for long-term survival and success. ■

### Author Information:

**Christopher Grover** is president of the Grover Group, a marketing and consulting firm in the Washington, D.C., area. Mr. Grover has nearly 20 years of experience in the health care industry, most recently with SunGard Healthcare, now part of Eclipsys. Prior to that, he was vice president of the health care division of Intelus, Inc. He has also held positions at Martin Marietta and GE. He has been widely published in health care, information technology, and business journals. He can be reached via email at [cgrover@erols.com](mailto:cgrover@erols.com).