

Course: Patient Safety Solutions**Topic:** Patient safety and invasive procedures

Summary: This topic outlines the value of protocols and checklists in reducing errors and minimizing adverse events. But a protocol or a checklist is only useful if the people using it trust it and understand why its use leads to better patient care. Protocols can prevent the wrong patient from receiving the wrong treatment, as well as facilitate better communication among team members, including the patient.

Introduction

Over 230 million major surgical procedures are carried out worldwide every year. Evidence suggests that in 0.4–0.8% of these cases, patients die as a direct consequence of the surgical procedure. Patients experience complications following 3–16% of surgical procedures. This equates to 1 million deaths and a further 6 million disabilities each year worldwide. This is not only because surgeons or other health-care professionals are careless or incompetent. Rather, it is because there are many opportunities for things to go wrong during invasive procedures. Additionally, problems caused by surgical site infections account for a significant proportion of all health care-associated infections.

There are many validated tools now available to assist health-care teams in delivering safe surgical care including the WHO Surgical Safety Checklist.

Causes of adverse events associated with surgical and other invasive procedures

- Traditional thinking about adverse outcomes in surgery focused on the skills of the person performing the procedure and the age and physical condition of the patient.
- Nowadays, many other factors, such as the design of the workplace, teamwork and organizational culture, are thought to have a direct impact on surgical outcomes.

The main causes of adverse events in procedural care are:

Box 2: Five facts about surgical safety

1. Complications after inpatient operations occur in up to 25% of patients.
2. The reported crude mortality rate after major surgery is 0.5–5%.
3. In industrialized countries nearly half of all adverse events in hospitalized patients are related to surgical care.
4. At least half of the cases in which surgery led to harm are considered to be preventable.
5. Known principles of surgical safety are inconsistently applied even in the most sophisticated settings.

- **Poor infection control:** Surgical wound infections constitute the second largest category of adverse events and confirm the belief that hospital-based infections (e.g. *staphylococcal*) constitute a great risk for hospitalized patients, particularly those receiving surgical care. The implementation of better infection control practices, such as the appropriate administration of prophylactic antibiotics, has reduced the incidence of postoperative infections. In addition, efforts to raise awareness of the risks of transmission can help health-care providers minimize the risks of cross-infection.
- **Inadequate patient management:** The operating room and environment house intensely complex activities and processes, including high-tech equipment and involve a range of health-care providers. This may explain why more adverse events are associated with surgical departments than other hospital departments. The main adverse events associated with surgical care include infections and postoperative sepsis, cardiovascular, respiratory and thromboembolic complications. While analysing these events, a range of pre-existing conditions (latent factors) have been identified as contributing to adverse events. Latent factors include:

- inadequate implementation of protocols or guidelines;
- poor leadership and poor teamwork;
- conflict between different departments/groups;
- inadequate training and preparation of staff;
- inadequate resources;
- lack of evidence-based practice;
- poor work culture;
- overwork;
- lack of a system for managing performance.

In addition to latent factors listed above, individuals working at the sharp end (point of delivery) of perioperative care are prone to the following types of errors known to cause adverse events:

- failure to take precautions to prevent accidental injury;
 - delays in treatment or implementing a procedure;
 - failure to take adequate history or physical examination;
 - failure to do indicated tests;
 - failure to act upon the results of findings or tests;
 - practising outside the area of expertise (e.g. failure to consult senior colleagues or refer to specialists, transfer of patients);
 - communication failures (including situations where information is provided too late to be effective, is inconsistent or inaccurate, key people do not receive the necessary information, and situations in which there are unresolved issues in the team).
- **Failure to communicate effectively before, during and after procedures:** Miscommunication is one of the biggest problems in the operating environment. This may result in the wrong patient undergoing surgery, patient having operation on the wrong side or site or organ, and/or the wrong procedure being performed. The complexity of the surgical environment and the fact that health-care providers are often required to deal with many competing tasks, are major factors underpinning miscommunication.

Types of communication failure associated with doctors

Type of Failure	Definition	Illustrative example and analytical note (<i>in italics</i>)
Occasion	Problems in the situation or context of the communication event	The staff surgeon asks the anaesthesiologist whether antibiotics have been administered. At this point, the procedure has been under way for over an hour. <i>Since antibiotics are optimally given within 30 minutes of incision, the timing of this inquiry is ineffective both as a timely and as a safety redundancy measure.</i>
Content	Insufficient or inaccurate information being transferred	As they are preparing for the procedure, the anaesthesia fellow asks the staff surgeon if an ICU bed has been reserved for the patient. The staff surgeon replies that the "bed is probably not needed, and there is not likely one available anyway, so we'll just go ahead". <i>Relevant information is missing and questions are left unresolved: has an ICU bed been requested, and what will the plan be if the patient does need critical care and an ICU bed is not available? (Note: his example was classified as both content and a purpose failure.)</i>

Audience	Gaps in the composition of the group engaged in the communication	<p>The nurses and the anaesthesiologist discuss how the patient should be positioned for surgery without the participation of a surgical representative.</p> <p><i>Surgeons have particular positioning needs, so they should participate in this discussion. Decisions made in the absence of the surgeon may lead to necessary repositioning.</i></p>
Purpose	Communication events in which purpose is unclear, not achieved or inappropriate	<p>During a living donor liver resection, two nurses discuss whether ice is needed in the basin they are preparing for the liver. Neither knows. No further discussion ensues.</p> <p><i>The purpose of this communication—to find out whether ice is required—is not achieved. No plan to achieve it is articulated.</i></p>

Verification processes for improving surgical care: guidelines, protocols and checklists

A verification process ensures that the correct procedure is performed on the right patient, right side, site and the right organ. Effective methods exist, such as evidence-based guidelines, protocols or checklists, to support health-care providers achieve safer care. These **evidence-based tools** are often developed by groups of multidisciplinary experts using the latest evidence.

- A **guideline** gives recommendations about a certain topic. Guidelines are necessary because the complexity of health care and the level of specialization, together with the range of health professionals involved, have made personal or professional opinion and organizational preferences unsafe. There are now hundreds of validated guidelines to help health-care providers practise more safely.
- A **protocol** is a set of sequential steps that should be followed in a particular order, enabling the task to be completed.
- A **checklist** is used to ensure that certain mandatory items are not forgotten. A WHO global study, carried out in 2007-2008, which looked at the effects of a simple surgical checklist, found that postoperative complications were reduced by more than one third and deaths were halved when the checklist was used. The Checklist is intended to give teams a simple, efficient set of priority checks to encourage effective teamwork and communications and thus active consideration of the safety of patients in every operation performed. The checklist ensures consistency in patient safety and introduces a culture that values achieving this.

The WHO Checklist is a practical tool that any surgical team in the world can use to ensure that the preoperative, intraoperative and postoperative steps that have been shown to benefit patients are undertaken in a timely and efficient way. It follows an established framework for safe intraoperative care in hospitals.

This involves a routine sequence of events — preoperative patient evaluation, surgical intervention and preparation for appropriate postoperative care—each with specific risks that must be reduced. In the **preoperative phase** obtaining informed consent, confirming the patient's identity, the surgical site and the procedure to be undertaken, checking the safety of the anaesthetic machine and medications and adequately preparing for intraoperative events are all amenable to intervention. During the **operative phase** appropriate and judicious use of antibiotics, the availability of essential imaging, appropriate patient monitoring, efficient teamwork, competent anaesthetic and surgical judgement, meticulous surgical technique and efficient communication among team members of the various disciplines (surgery, anaesthesia and nursing) are all necessary to ensure good outcomes. In the **postoperative phase** a clear plan of care, an understanding of intraoperative events and a commitment to quality improvement can all advance surgical care, thereby promoting patient safety and enhancing outcomes.

The aim of the WHO Surgical Safety Checklist is not to prescribe a single approach, but to ensure that key safety elements are incorporated into the operating room routine. This will maximize the likelihood of the best outcome for patients without placing an undue burden on the system and the providers. It is understood that, in nearly all settings, the standards will represent a change in routines. However, the standards were included on the basis of sound evidence or expert consensus that they could produce tangible, life-saving improvements in care in all environments, from the richest to the poorest.

The Checklist divides the operation into three phases, each corresponding to a specific time period in the normal flow of a procedure: the period **prior to induction of anaesthesia** (Sign In), the period after induction and **before surgical incision** (Time Out), and the period during or immediately after wound closure and **before patient leaves the operating room** (Sign Out).

Surgical Safety Checklist		
Before induction of anaesthesia (with at least nurse and anaesthetist)	Before skin incision (with nurse, anaesthetist and surgeon)	Before patient leaves operating room (with nurse, anaesthetist and surgeon)
<p>Has the patient confirmed his/her identity, site, procedure, and consent?</p> <input type="checkbox"/> Yes	<p><input type="checkbox"/> Confirm all team members have introduced themselves by name and role.</p> <p><input type="checkbox"/> Confirm the patient's name, procedure, and where the incision will be made.</p> <p>Has antibiotic prophylaxis been given within the last 60 minutes?</p> <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	<p>Nurse Verbally Confirms:</p> <input type="checkbox"/> The name of the procedure <input type="checkbox"/> Completion of instrument, sponge and needle counts <input type="checkbox"/> Specimen labelling (read specimen labels aloud, including patient name) <input type="checkbox"/> Whether there are any equipment problems to be addressed
<p>Is the site marked?</p> <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	<p>Anticipated Critical Events</p> <p>To Surgeon:</p> <input type="checkbox"/> What are the critical or non-routine steps? <input type="checkbox"/> How long will the case take? <input type="checkbox"/> What is the anticipated blood loss? <p>To Anaesthetist:</p> <input type="checkbox"/> Are there any patient-specific concerns? <p>To Nursing Team:</p> <input type="checkbox"/> Has sterility (including indicator results) been confirmed? <input type="checkbox"/> Are there equipment issues or any concerns? <p>Is essential imaging displayed?</p> <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	<p>To Surgeon, Anaesthetist and Nurse:</p> <input type="checkbox"/> What are the key concerns for recovery and management of this patient?
<p>Is the anaesthesia machine and medication check complete?</p> <input type="checkbox"/> Yes		
<p>Is the pulse oximeter on the patient and functioning?</p> <input type="checkbox"/> Yes		
<p>Does the patient have a:</p> <p>Known allergy?</p> <input type="checkbox"/> No <input type="checkbox"/> Yes		
<p>Difficult airway or aspiration risk?</p> <input type="checkbox"/> No <input type="checkbox"/> Yes, and equipment/assistance available		
<p>Risk of >500ml blood loss (7ml/kg in children)?</p> <input type="checkbox"/> No <input type="checkbox"/> Yes, and two IVs/central access and fluids planned		

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

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Effective strategies for safety

- **Use operating room teamwork and communication techniques that reduce risks and errors:** The course 'Being an effective team player' provides a detailed analysis of how effective teams work together and the actions that team members can take to effectively contribute to improved performance and safety. In the surgical environment, particular attributes, actions and communication techniques exist that are known to improve teamwork.
- **Processes for reviewing mortality and morbidity:** Many hospitals will have surgical review meetings, (mortality and morbidity meetings). These are forums for discussing incidents and difficult cases and are the main peer-review method for improving future patient care. Such meetings provide a forum for auditing surgical complications or deaths and are necessary for improving practice in a surgical unit. Because patient safety is a relatively new discipline, many of these meetings have yet to adopt a blame-free systems approach to discussing errors.