

# The WHO Surgery Safety Checklist

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## INTRODUCTION

Mortality and complications are undesirable but occur occasionally following any surgical procedure. Traditionally, many complications are considered unavoidable and result from uncontrollable factors related to the nature of the disease and general health condition of the patient (for example, the existence of diabetes or obesity).<sup>2</sup> Efforts have been made to reduce morbidity and mortality through preoperative risk assessment, identifying risk factors, and preparing patients accordingly.<sup>3</sup> Preoperative assessment of patients with heart diseases, for example, has proved to be beneficial.<sup>4</sup> Despite careful evaluation, complications still occur. In a prospective study of colon cancer operations, the mortality rate for elective cases was 3.5% and the complication rate 24% compared with 10% mortality and a 38% complication rate in emergency procedures.<sup>1</sup> In the developing world, postoperative complications may be even higher. An audit of anesthesia-associated mortality in Zimbabwean teaching hospitals demonstrated that poor preoperative and postoperative management was a factor contributing to 51% of the avoidable deaths.<sup>5</sup>

Although Hieronymus has already declared that “errare humanum est,” preventable complications are inexcusable. Despite the best of clinical intentions, preventable complications resulting from human factors are frequent and pervasive. Examples include improper procedures for identifying patients, inadequate preoperative evaluation, ignorance of important clinical history (like allergies), and the failure to confirm that adequate equipment and blood products are available when needed. Essential imaging, appropriate and timely

administration of antibiotics, and venous thromboembolism prophylaxis, preparation for blood loss, confirmation of equipment sterility, surgical counts, and appropriate labelling of specimens are of utmost importance but are frequently neglected. In addition, clear plans for postoperative management are infrequently communicated but should be defined at the end of the operation, taking into account the condition of the patient and the procedure he or she underwent.

Despite over 100 years of modern surgical experience and many avoidable complications being reported in the media and professional literature, errors still do occur. Although the experience of the surgeon plays a vital role, communication between surgeons, anesthesiologists, and nurses is critical for success in avoiding preventable human error.<sup>6,7</sup> Checklists have proved useful to ensure safety in many industries that require complex human interaction. In aviation, checklists for flight safety are routine. The aviation safety authorities demand that pilots should use predesigned checklists before take off or landing, leaving nothing to the pilot's memory. The items checked anticipate most seen or unforeseen occurrences. This approach is beginning to infiltrate the medical world, and checklists are already being used in anesthesia practice.<sup>8</sup> Although safety measures have been taken for quality surgical improvement, such as the American College of Surgeon's National Surgical Quality Improvement Program (NSQIP),<sup>9</sup> a general strategy has not been introduced.



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One of the results of this work was the creation of a surgical safety checklist, introduced to a wide clinical audience after a year of intensive consultative work with surgeons, anesthesiologists, nurses, and patient safety experts. The project was lead by Atul Gawande from the Department of Health Policy and

Management at the Harvard School of Public Health, who is a surgeon at Brigham and Women's Hospital in Boston. The WHO Surgical Safety Checklist identifies crucial safety steps divided into 3 phases, each corresponding to a specific period during normal operative workflow: before the induction of anesthesia ("sign in"), before skin incision ("time out"), and before the patient leaves the operating room ("sign out"). In each phase, the checklist helps confirm that the surgical team has completed its critical safety tasks before proceeding. This checklist is clear and concise, user friendly, and promotes an ongoing dialogue among surgeons, anesthesiologists, and surgical nurses (**Figure 1**).

The WHO Surgical Safety Checklist identifying crucial safety steps corresponding to the following three stages:

- before the induction of anesthesia (“sign in”);
- before skin incision (“time out”);
- and before the patient leaves the operating room (“sign out”).

**...PATIENTS ...  
TRUST CLINICIANS  
TO MINIMIZE THE  
RISKS OF INJURY  
AND DEATH.**

**FIGURE 1**

During the sign in, patient identity and consent for surgery are confirmed; the operative site is marked; and the risk of blood loss, airway difficulty, and allergic reaction is reviewed. For the time out, team members introduce themselves, confirm out loud that they are performing the correct operation on the correct patient and site, and then verbally review any critical elements of the operation. Antibiotic administration and imaging availability are also confirmed as appropriate. The sign out guides a review of the operation performed, completion of sponge and instrument counts, labelling of any surgical specimens, equipment malfunctions or issue, and the key plans and concerns for postoperative management and recovery.

This checklist was designed to be suitable for any operation in any surgical discipline and can be used in developed countries as well as in countries with limited resources. It is accompanied by a WHO Guideline book that outlines the 10 essential objectives of safe surgery, explaining the importance of each one and reviewing the relevant literature.<sup>10</sup>

### INTRODUCTION OF THE CHECKLIST

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The New European Surgical Academy (NESA) was a consultant in this project and decided to initiate use of the checklist. The checklist was introduced and accepted for use by the HELIOS Hospitals Group, one of the biggest of its kind in Europe. The departments of obstetrics and gynecology were the first to adopt the checklist into daily clinical practice.

The checklist was introduced to all the heads of Ob/Gyn departments on March 20, 2008, and the concept was unanimously accepted. Between April 15, 2008 and July 15, 2008, clinicians used the checklist during the performance of 1340 major operations. Using the checklist has not caused undue delays, and with practice it has been easily incorporated into the normal operating room routine. The staff were enthusiastic, and its use seems to have improved communication between all clinical disciplines involved in surgical care.

### DISCUSSION

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All patients undergoing surgery expect the best possible care and trust clinicians to minimize the risks of injury and death. There are always unavoidable risks related to the underlying condition and comprise an important part of the informed consent.<sup>11,12</sup> Risks resulting from lack of communication between staff members or from failure to follow basic standards of safe care can cause severe harm and violate the dictate of “primum non nocere.” Our goal as surgeons is to reduce this risk. In addition to the clear benefits to the patient and clinicians, the financial savings associated with reduced complication rates cannot be ignored.<sup>13,14</sup>

### CONCLUSION

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The experience with the checklist demonstrates that introducing a checklist designed to improve safe practices has been uneventful, has promoted interdisciplinary dialogue, and has been enthusiastically accepted. Following this initial pilot study, the checklist will be introduced to all the surgical departments of the HELIOS Hospitals Group and is expected to contribute to the safety and well being of patients. We recommend any surgical department to start using this simple, efficient checklist as a tool to reduce the likelihood that proven standards of care have been omitted or overlooked and to improve the safety of surgery everywhere.

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Michael Stark, MD, the president of the New European Surgical Academy, created the first European based working group on Natural Orifice Surgery. He is the chairman of the ob/gyn departments of the HELIOS group and developed modified surgical procedures like the Misgav-Ladach CS and the Ten-Step Vaginal Hysterectomy.

Henning Baberg MD, is a graduate of the Bochum Medical School (Germany) and also studied at San Diego University. He is a cardiologist and associate professor for internal medicine. Since 2005 he is the head of organization and process development of the HELIOS group which manages 60 hospitals with 30,000 employees.

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