Preventable medical errors account for more deaths each year than breast cancer, automobile accidents, or drownings.\(^1\) Poor communication among health care workers is the most common cause of these medical errors.\(^2\) Nearly 70% of sentinel events have communication cited as a root cause.\(^3\) Closed malpractice claims from various clinical settings showed that ineffective communication and teamwork contributed to medical errors and patient harm in 43%\(^4\) to 70%\(^5\) of cases. Another study cited communication breakdowns as the primary contributing factor in approximately 75% of root cause analyses of adverse events (AE) and close calls.\(^6\) Despite efforts to change these statistics, for more than a decade, communication failure has been cited as the primary contributing factor in reported sentinel events.\(^7\)

Surgery is not immune to teamwork and communication errors. Critical information in the surgical environment is often transferred in a reactive, ad hoc manner and causes frequent anxiety and stress between clinicians.\(^8\) Assessments of surgical teams in the operating room by trained observers revealed a 30% communication failure rate.\(^9\) Not surprisingly, failures in communication were implicated in 43% of surgical AE. Additionally, the failure of the team to be vigilant and cross-check one another played a role in more than half of AE in the operating room (OR).\(^10\) Resident physicians from surgery, internal medicine, and obstetrics/gynecology training programs at a university teaching hospital reported communication failures as a factor in 91% of AE and near misses.\(^11\)

The US commercial airline industry was once plagued with similar errors and, as a result, experienced an unacceptably high rate of accidents and passenger deaths. Both NASA and the Military Inspector General calculated that 70% to 80% of aircraft-related fatalities were a result of human error and poor teamwork.\(^12\) The industry’s response was to design a program for teamwork training and checklist usage called Crew Resource Management (CRM). The resultant decrease in accidents prompted the Federal Aviation Administration to make CRM programs mandatory for all major US airlines. The aviation industry’s success in reducing critical errors has spared many lives and saved a great deal of money.\(^13\) The widespread use of CRM has contributed to reducing the risk of death on a US
major jet air carrier flight to 19 per billion, an 86% drop from the 1990s.\textsuperscript{14}

Although it is important to note that surgical patients and OR environments are more complex than airliners and airports, more than 20 years of teamwork research and experience in high-risk industries such as aviation, nuclear power, and military operations have clearly demonstrated that team training can overcome the primary communication and collaboration causes of AE.\textsuperscript{15-17} There is also a growing body of evidence that CRM-based patient safety programs have the same error-reducing effect in health care settings as in other industries.

Below are 6 things every physician needs to know about CRM-based programs in the OR. Two additional lists—"Thirteen Things You Must Assess in Your Organization to Create and Sustain a Culture of Safety" and "Seven Tips to Turbo Charge Your Surgical Safety Checklists"—are provided in an online-only appendix, available at www.aestheticsurgeryjournal.com.

1. Teamwork training programs and checklists are evidenced-based methods to improve patient care.

Multiple studies have documented that teamwork training and checklists reduce preventable errors and medical malpractice lawsuits and increase the safety and quality of patient care. The link between effective teamwork and improved patient outcomes was demonstrated by a recent RAND report that reviewed 16 studies and found empirical support for the relationship between teamwork behaviors and clinical patient outcomes (eg, risk-adjusted mortality, cardiac arrests, nosocomial infections, AE, adverse drug events, complications).\textsuperscript{18} Peer-reviewed literature in health care settings indicates that medical teamwork training improves the quality, safety, and cost-effectiveness of health care delivery. Specifically, the impact of teamwork on clinical outcomes has been studied in ORs\textsuperscript{19-22} inpatient medical and surgical wards,\textsuperscript{23-25} and intensive care units.\textsuperscript{26-27} This research has documented the relationship between teamwork, improved clinical processes, patient outcomes such as reduced medical errors,\textsuperscript{20,28} improved surgical team performance,\textsuperscript{19,20,22} better provider adherence to clinical guidelines,\textsuperscript{24,25,29} lower hospital lengths of stay,\textsuperscript{23,27,30} greater gains in patient functional status,\textsuperscript{31,32} and reduced patient mortality.\textsuperscript{26,27}

In the OR, surgical teams with teamwork training demonstrate significant increases in the quality of preoperative procedural briefings and the use of effective teamwork behaviors to overcome communication errors during cases.\textsuperscript{33} Surgical teams using a scripted patient handoff checklist reduced technical and communication errors and provided improved patient information transfer.\textsuperscript{34} Teams using a preoperative checklist reduced the rate of deaths and complications by more than a third, reduced unplanned returns to the OR, and reduced surgical infections.\textsuperscript{35}

Plastic surgeons have an added teamwork advantage in that many procedures are performed with the patient under only local anesthesia. This allows the plastic surgeon to integrate the patient as an additional member of the team by including him or her in preoperative briefings and by encouraging the patient to speak up if he or she senses that something is not right. Plastic surgeons thus take advantage of the patient’s ability to cross-check and communicate and help ensure that the benefits of teamwork listed above are realized.

2. Not only are they the right thing for your patients, but teamwork training programs and checklists also create a better environment in which to practice medicine.

Improved teamwork and communication between clinicians has been linked to improved job satisfaction, lower job stress, and reduced turnover.\textsuperscript{36} In the OR, preoperative briefings have been shown to increase team satisfaction\textsuperscript{21,37,38} and improve the safety climate.\textsuperscript{21} With these changes, job satisfaction improves and stress decreases as staff turnover is reduced and the professional climate is enhanced. Better teamwork performance has also been linked to improved patient satisfaction.\textsuperscript{39}

Beyond improving the interpersonal work environment, if surgical teams—through effective teamwork training and use of safety tools like checklists—fix their communication and collaboration issues, they eliminate the main causes of procedural error, inefficiency, resource waste, “work-arounds,” patient inconvenience, and delays.\textsuperscript{9} As all physicians know, the surgical team cannot be as efficient or as safe if all members of the team are not present in the room. For example, the ability of the team to respond quickly to unforeseen circumstances is reduced if the circulating nurse (CN) is not present. Surgical teams using a preoperative briefing tool experience fewer incidents where the CN must make an unplanned trip to the core for missing supplies and equipment. If a trip to the core must be made, less time will be spent there. Team briefings, accomplished with a script, reduce total surgical flow disruptions per case.\textsuperscript{40}

3. While powerful, checklists are not “one size fits all” and must be customized to local practices, which is especially true in a plastic surgeon’s office.

One of the most important parts of the World Health Organization (WHO) Surgical Safety Checklist is a small sentence at the very bottom of the checklist form: “This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.”

No matter what type of checklist they are trying to create, surgical teams ignore this advice at their peril. In 11 years of work with hospitals, ambulatory surgical centers, and surgical offices, I have never seen an “off-the-shelf” checklist successfully adopted. Just because the checklist worked elsewhere, there is no guarantee it will work in your facility. Checklists must be created by the clinicians who will actually use them, not by administrators from the hospital across town. Effective checklists for a plastic surgeon’s office are modified to fit the culture, workflow, and practice patterns of the office setting where they will be implemented.
Attempting to impose a WHO checklist designed for a hospital setting in an office setting without customization will only cause resistance from the surgical team. The most successful checklists are site and surgery specific; these are developed in a collaborative manner responding to the needs and views of all members of the care team. For example, at Mayo Clinic, preoperative checklists were developed with input from 56 different members of the surgical team, including surgeons, certified surgical assistants, certified surgical technicians, registered nurses (including CN), perfusionists, and certified registered nurse anesthetists (CRNA). Since, as stated, successful surgical checklists are created by the staff that must actually use the finished product, feedback from the end users at all stages of the design and implementation process is critical. Figure 1 shows an example of a “Time Out” checklist for preoperative use.

4. Teamwork training and checklist usage have a financial return on investment.

Contrary to the belief that comprehensive safety efforts only reduce revenue, the financial rewards of an effective teamwork training and complete online courses. In my own work with hospitals, I have found that it is not uncommon for hospital insurers to extend 6-figure premium rebates (as much as US $270 000) to the institution in response to the improved claims experience. Because fewer errors are being made, institutions have experienced as much as a 50% decrease in open claims files for potentially compensable events and a 33% decrease in claims dollars per surgical discharge.

In addition, physicians become more efficient when the institution at which they practice medicine reduces its surgical times and improves the number of “uneventful cases” (eg, cases that are booked correctly, start on time, have no unplanned delays, and finish on time). Additionally, when surgical teams conduct a preoperative briefing, use standard communications scripting, complete a checklist, and conduct a postoperative debriefing, they dramatically shorten their case length times, even when learning to perform a new type of surgical procedure.

5. To get the benefits of patient safety, efficiency, and financial return, physicians must lead the use of teamwork behaviors and checklists.
In aviation, the captain of the crew leads the use of any checklist. The captain “calls” for the checklist at the appropriate time and ensures that it is completed correctly. By determining when and how checklists are completed, the captain has a valuable tool to effectively and expertly lead the team. Likewise, the most successful checklist implementations in health care are those where physicians lead the checklist process. They “call” for the checklist at the appropriate time and give checklist usage their undivided attention. This doesn’t mean that the CN can’t actually “run” items on the checklist, but the surgeon should always lead the start of any checklist. It must always be clear to the entire surgical team that the surgeon is in charge of the checklist process.

An effective checklist is actually a standardized communication tool. It is not a “tick sheet”; instead, it is a script to promote information exchange and team cohesion. It should therefore include a scripted briefing. The briefing should cover the status and stability of the patient, and it should clearly delineate team members’ roles, discuss the team’s immediate plans, and cover any potential pitfalls to those plans.43

To increase engagement and promote open verbal communication, the format of the briefing must be participatory. It should be led by the surgeon, but each member of the team should be asked to report his or her plan for the case and raise any questions related to his or her area of focus.40 Because team members must be prepared for any potential threats to the checklist process, they must actively scan, cross-check, and assess the situation. This cross-check helps the team detect any deviations or threats to the patient’s safety. Assertively conveying to other team members these potential threats prevents small errors from becoming big errors. Therefore, every preprocedure briefing should include a statement by the surgeon encouraging “stop the line” communication, such as, “If you see, suspect, or feel that something is not right, I expect you to speak up.” A nurse simply can’t make this sort of statement with the same impact on the team as when it comes from the leader of the team.

Physician leadership in teamwork training and checklist use becomes even more important in the doctor’s office or surgery center. In these settings, the surgeon is more likely to be his or her own boss, with the ultimate responsibility for safety. There are often no professional safety managers or a risk management bureaucracy imposing safety measures or systems on the office. Where these safety structures are not in place, physician leadership in implementing and utilizing teamwork behaviors and safety tools is critical to both the organization and the patient being able to realize the benefits in safety, quality, and efficiency.

**6. Checklists may be used across the continuum of care and require only a small investment of your time.**

Once expertise is gained, the length of time required to accomplish an effective briefing and checklist in the OR prior to a procedure typically takes 1 minute or less,40 and there will be no delay in start time.40 Outside of the OR, checklists reduce errors and improve efficiency in preprocedure testing, the preoperative holding area, and during the transfer to the postoperative area. In the past 12 years, LifeWings safety coaches have created and implemented over 500 facility- and department-specific checklists for surgical, trauma, interventional radiology, oncology, obstetric, and catheterization teams. For teams that do not practice procedure-based care, LifeWings has created and implemented over 1000 checklists for labor/delivery, intensive care, emergency medicine, hospitalists, pharmacy, and laboratory testing.

**CONCLUSIONS**

For a small investment of time, effort, and leadership, surgeons who choose to implement team training and checklist usage in their OR will achieve a documented improvement in patient safety and quality care. A review of the published literature reveals that these improvements will include a reduction in medical errors, complications, and unplanned returns to the OR. Additionally, surgical teams will improve their adherence to clinical guidelines, leading to shorter lengths of stay, greater gains in patient functional status, and reduced infections and patient mortality. With these improvements, patient satisfaction improves as well.

**Disclosures**

The author is Chairman and CEO of LifeWings Partners, LLC, a company that offers services discussed in this article.

**Funding**

The author received no financial support for the research, authorship, or publication of this article.

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