

Measuring Variation in Use of the WHO Surgical Safety Checklist in the Operating Room: A Multicenter Prospective Cross-Sectional Study

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- BACKGROUND:** Full implementation of safety checklists in surgery has been linked to improved outcomes and team effectiveness; however, reliable and standardized tools for assessing the quality of their use, which is likely to moderate their impact, are required.
- STUDY DESIGN:** This was a multicenter prospective study. A standardized observational instrument, the “Checklist Usability Tool” (CUT), was developed to record precise characteristics relating to the use of the WHO’s surgical safety checklist (SSC) at “time-out” and “sign-out” in a representative sample of 5 English hospitals. The CUT was used in real-time by trained assessors across general surgery, urology, and orthopaedic cases, including elective and emergency procedures.
- RESULTS:** We conducted 565 and 309 observations of the time-out and sign-out, respectively. On average, two-thirds of the items were checked, team members were absent in more than 40% of cases, and they failed to pause or focus on the checks in more than 70% of cases. Information sharing could be improved across the entire operating room (OR) team. Sign-out was not completed in 39% of cases, largely due to uncertainty about when to conduct it. Large variation in checklist use existed between hospitals, but not between surgical specialties or between elective and emergency procedures. Surgical safety checklist performance was better when surgeons led and when all team members were present and paused.
- CONCLUSIONS:** We found large variation in WHO checklist use in a representative sample of English ORs. Measures sensitive to checklist practice quality, like CUT, will help identify areas for improvement in implementation and enable provision of comprehensive feedback to OR teams. (J Am Coll Surg 2015;220:1–11. © 2015 by the American College of Surgeons)
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Use of the WHO surgical safety checklist (SSC) and others like it has been linked to improvements in patient outcomes, compliance with standard processes of care, and the quality of teamwork in the operating room (OR).¹⁻⁹ However, although using safety checklists in

the OR has, on the whole, been shown to be beneficial in comparison with not using them, there has been little investigation to date aimed at assessing how much variation there is in their use in the real world, how best to capture this variation, and the implications this has for patient care. Surgical checklists like the WHO SSC are, in effect, “behavioral” interventions: their effective implementation requires OR personnel to make consistent amendments to their behavior. As such, as has been repeatedly argued in the literature, their success as a reliable quality improvement initiative is heavily dependent not only on their binary adoption, but on attitude change, positive safety culture, OR team buy-in, and faithfulness to the procedure (among additional organization-wide strategies to remove barriers to their use).¹⁰⁻¹⁴

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Abbreviations and Acronyms

CUT = Checklist Usability Tool
 OR = operating room
 SSC = surgical safety checklist

Emerging evidence suggests that the use of safety checklists in practice is not reliable and that OR teams display large variations in how they use these tools. Observational studies of surgical time-outs and sign-outs (as part of the WHO SSC) in a number of countries, including the US, UK, and Australia, have concluded that the checks are often only partially completed (or completed in an abbreviated manner), team members are frequently absent during the checks, or they often fail to actively participate. At times, the checks occur retrospectively (ie, time-out checks completed after commencement of the procedure) or are skipped entirely (despite being mandatory in some places, as they are in the UK).¹⁵⁻¹⁸ This is important because inappropriate use of safety checklists might have a paradoxically negative impact on patient safety: when checklists are used as a “check-box” exercise, the OR team may be led to complacency.¹⁹⁻²⁰ More generally, poor or incomplete use of checklists might simply mean that their potential benefits for patient care and safety are not achieved.

Although there is guidance available to advise OR teams on how to conduct safety checklists (eg, from the original WHO publications or from patient safety organizations),²¹⁻²² often teams are not provided with this information and do not have their performance evaluated against it, meaning that they are largely left to decide for themselves how to conduct the checks, who leads them, when to initiate them, etc, with little facilitation.²⁰ This is one likely driver of large variation in checklist use. Additionally, current approaches to audit often take a rather simplistic, binary approach to measuring the use of checklists (ie, asking, “Was the checklist completed

or not?”). Such evaluations are inadequate for detecting variation in their use, and they cannot be used to provide detailed feedback to OR teams so they can improve their checklist implementation.¹² So, standardized and reliable tools for picking up how well teams are using safety checklists in practice are needed.

To address the current shortcomings in evaluating the use of checklists, we developed a novel bespoke “Checklist Usability Tool” to capture, in a standardized and reliable manner, precise characteristics of how the time-out and sign-out parts of the WHO SSC are conducted by OR teams. Using this tool, the aim of this study was to descriptively assess how well the checklist is being used in English ORs, and where (if anywhere) most variation in the quality of checklist use lies. Specifically, we looked at variation between hospitals, between surgical specialties, and between elective and emergency procedures. Having a better understanding of such variation might help to better direct and inform training and education efforts focused on WHO SSC use. Related to this, we also sought to draw conclusions about what characteristics of checklist use appear to be most effective and what might constitute best practice.

METHODS**Sample**

This was a multicenter, prospective observational study. The study was part of a national evaluation of the implementation of the WHO SSC across surgical services of the National Health Service (NHS) in England (the Surgical Checklist Implementation Project). Real-time observations of the time-out and sign-out portion of the WHO SSC were conducted across 5 hospitals in England over a period of 13 months, between May 2010 and June 2011. To ensure the selected hospitals were representative, they spanned a wide geographic spread (each coming from an administratively different health region of England), and varied according to size (larger/teaching vs

Table 1. Checklist Usability Tool (CUT): Variables of Checklist Use Assessed

Categorical variables	
Was the checklist used at time-out/sign-out? (yes/no)	
When during the perioperative pathway were the checks initiated? (selected from a list, eg, before prepping, before incision [after prepping], after incision)	
Which team member led the checks? (team member selected from list; scrub nurse/practitioner, circulating nurse, attending surgeon, etc).	
Were all team members present for the checks? (yes/no + list who was absent)	
Did all present team members pause and focus on the checks? (yes/no)	
Ordinal/continuous variables	
Percentage of items checked (+list which items not checked)	
How long did the checking procedure take? (in seconds)	
How much information was shared verbally by each of the sub-teams in the OR (surgeons, nurses, and anesthesiologists) on a 1 to 4 Likert scale (1, no information shared; 4, all relevant information shared)*	

*Variable assessed at time-out only due to limited information sharing at sign-out.

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