

# Advancing patient safety through the use of cognitive aids

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The WHO Surgical Safety Checklist (the WHO SSC)<sup>1</sup> has had a profound impact on thinking in respect to the safety and reliability of surgery, in particular, and healthcare, more generally. It is both a cognitive aid and a tool to improve communication and teamwork. The systematic use of cognitive aids has long been embedded in many other industries, notably high-reliability industries such as aviation and the nuclear industry, but has been largely neglected in healthcare until recently. Few (if any) airplane pilots would think of taking off without making a series of important checks, and few would attempt to do this without a cognitive aid (in the form of a checklist): not only would they have an appropriate checklist available, but they would use it, every time.

It is interesting that the same cannot be said with confidence of medical practitioners, including anaesthesiologists, despite the fact that anaesthesia renders patients highly vulnerable to risk and is still associated with occasional deaths or injuries, and despite mounting evidence for reduction of such events through the effective use of checklists.<sup>1–6</sup> The latter is hardly surprising since events leading to harm during anaesthesia often result from omission of key planning steps (such as failure to anticipate and plan for a difficult airway) or other forms of basic oversight (such as failure to note an important allergy).

Wetmore *et al* have described another strategy that seeks to change this problem.<sup>7</sup> The Anesthesia Patient Safety Foundation (APSF) has developed a Pre-anesthetic Induction Patient Safety (PIPS) checklist from information gained through surveying over 2000 anaesthesia providers. Wetmore *et al* embedded the PIPS checklist into the Anesthesia Information Management System (AIMS) used in their institution in a manner that obligated users to electronically indicate compliance with the checklist

in order to access the AIMS functionality. They randomly allocated anaesthesia residents to use the PIPS checklist (or not) during time-pressured preparation for a simulated anaesthetic induction and demonstrated greater reliability in completing the relevant checks when the PIPS was used—at least in the context of their simulated clinical setting.

This was an encouraging result. It was both interesting and important that subjects using the PIPS checklist did not appear to succumb to any temptation to tick the electronic boxes and move on without actually doing the checks even after repeated use over a 6-month period. Whether this would remain so if use became routine over a longer period or with a more senior (and self-confident) cohort of users remains to be seen. The obvious point here is that checklists do not work by themselves: they must be used, and used in an engaged fashion with the mind focused on the issues at hand.<sup>8–9</sup> This is certainly true of the WHO SSC, which actually goes beyond the strict confines of checklists in general.

Many checklists (including the PIPS checklist investigated by De Maria *et al*) are largely that—lists of items to check. The WHO SSC, on the other hand, includes prompts for certain activities to promote teamwork and communication that might not otherwise occur, notably introductions during the ‘Time Out’ pause immediately prior to the first surgical incision. These introductions, in effect, are an exercise in ‘speed dating’ that aims to activate everyone in the room and prime them to speak up if anything of concern is noticed. The belief is that if people have spoken once, they are more likely to speak again, particularly if an atmosphere of collegial supportiveness has been created.

The use of names is also important—because a name is better than a label



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(such as 'nursing', 'anaesthesia' or 'surgery') in promoting such an atmosphere and because it allows directed communication, notably in a crisis: instead of giving an instruction to 'the room' one can direct a request to an individual and thereby increase the chance that it will occur. For example, something like 'Get two units of blood' is likely to be less effective than something like 'Samantha—please get two units of blood now'. But the activation of staff in this way will only work if the WHO SSC is actually used, and used in a way that is affirming and appropriate.

The WHO SSC also promotes some important elements of forward-thinking or planning: for example, about blood loss and difficult airways and about any anticipated problems on the part of any of the professional sub-teams in the operating room (nursing, anaesthesia and surgery). It also contains elements of any standard checklist—things to check. But effective forward-planning and checking will only occur if the SSC is actually administered, and administered with people listening and with their minds engaged. Disconcertingly, there is considerable evidence to suggest that this is not always the case.<sup>3 4 10</sup>

Several things make the effective use of cognitive aids more likely to occur.

First, they must be well designed, and this generally implies being simple to use. Much effort was put into the design of the WHO SSC. As another example, The Difficult Airways Society (DAS) has just released a new algorithm for the management of an unanticipated difficult airway in adult patients.<sup>11</sup> This algorithm is much simpler than its various predecessors and is a model of good design and ease of use. Simplicity also appears to be a positive characteristic of the PIPs checklist studied by De Maria *et al.*<sup>7</sup>

Second, they should address issues of importance and should add value to the management of such issues. These points certainly apply to the WHO SSC, the DAS algorithm and the PIPS checklist. Patients are harmed or die because of oversights in surgery and anaesthesia, and all three interventions have carefully considered designs grounded in a combination of evidence and expert consensus to assist in avoiding such harm.

Third, the implementation strategy must be optimised. Cognitive aids should be collaboratively introduced into practice, not imposed. Practitioners should be educated about the evidence base for their value and formally trained to apply a carefully considered method for their use. There is evidence suggesting that the method of both implementation and application can be critically important to optimising compliance and quality in use of the SSC.<sup>12 13</sup> Nonetheless, implementation has not always been done well.

Is the value of cognitive aids confined to anaesthesia and surgery? No. Rather, these specialties have taken the lead in introducing some simple tools for promoting process reliability into their practice. They have

been somewhat late, and at times somewhat reluctant to do so—but now they have, and the challenge is for other disciplines to follow. There are numerous opportunities to transform routine and emergency encounters between practitioners and patients from hit-and-miss affairs into interactions in which key questions and processes are reliably asked and carried out. For example, no patient should be given a drug by an internist without a check on allergies and no patient seeing a primary healthcare physician with pyrexia of unknown origin should fail to have a history of recent travel taken. There should be no need to teach practitioners this sort of thing, but there may well be a need to ensure they do not simply forget key elements of routine interactions with patients.

Cognitive aids, therefore, can assist practitioners in many fields to achieve safe outcomes reliably, but they are not a substitute for expertise and ability. They must be well designed, and they must be familiar, particularly if they are to be of value in a crisis. Their use must be embraced intelligently and with engagement and should be integrated into the training of practitioners. For some purposes, the aids should be a routine part of daily work. For others, such as crisis management, practice in their use needs to be provided in other ways, through simulation-based training, for example. This training should be focused on the skills and knowledge needed to manage the crisis, and the cognitive aids should be integrated into the training as tools to supplement and ensure the effectiveness of that skill and knowledge.

Algorithms, such as that of the DAS, may serve as standing operating orders that define standards of care. By contrast, many checklists may be nothing more than useful aide memoirs. In either case, practitioners need to exercise judgement and tailor their actions to each individual patient and each particular context that presents itself. It is the practitioner and not the cognitive aid that is treating the patient. It follows that we are not advocating the slavish adherence to rigid protocols. Rather, we believe practitioners should make and implement decisions tailored to the needs of each individual patient—but without forgetting essential considerations or steps simply because they are human and subject to distraction and imperfections of memory.

Forgetfulness is as much a feature of routine practice as it is of crisis management. Together, the APSF and Wetmore *et al* have made an important contribution to patient safety. They have emphasised the need for cognitive aids in ensuring that the appropriate checks are done, every time, before patients are rendered seriously vulnerable by the induction of anaesthesia. These are the checks needed to ensure that all necessary equipment and support is available to cope with the routine and with the unexpected. The APSF has developed an appropriate cognitive aid—a checklist

grounded in the expertise of anaesthesia providers. DeMaria and colleagues have integrated this checklist into their institution's AIMS, thereby potentially ensuring that it is actually used, every time. They have provided evidence of the value of this strategy. Further refinement and widespread adoption of this particular cognitive aid would advance the mission of the APSF—'that no patient be harmed by anaesthesia.'

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