Practical challenges of introducing WHO surgical checklist: UK pilot experience

The WHO checklist has the potential to reduce preventable adverse events in surgery. But **A Vats and colleagues**' experience suggests that a careful and rigorous implementation plan is required to ensure that the checklist is used routinely and correctly

As part of an initiative to improve patient safety the World Health Organization has developed a surgical checklist to ensure basic minimum safety standards.[1] The National Patient Safety Agency has made it mandatory for all NHS trusts in England and Wales to implement an adapted version of the checklist by February.[2] Use of the checklist will require a change in culture for operating theatre teams, and the benefits will be realised only if everyone is supportive of the change and implementation is robust. Our experience in piloting the NHS checklist highlights some of the potential challenges and barriers.

Implementation process

Two operating theatres at our hospital were selected to pilot the new checklist (figure). The theatres were selected to represent the bulk of surgery done in the NHS, one being used for trauma and orthopaedic surgery and the other for gastrointestinal surgery and gynaecological procedures. After collecting data on current practice, we devised a comprehensive implementation strategy. The research team met operating theatre staff individually, in small groups, and through a wider hospital forum. We proposed that the checklist process should be led by nurses to flatten hierarchy and support shared teamwork. In the first two weeks of the implementation, a member of the research team was present in the theatres to train operating teams in use of the checklist, encourage use, and answer any queries.

Initial reactions

On the whole, anaesthetists and nurses were largely supportive of the checklist. Some consultant surgeons were not very enthusiastic, but by using local surgical champions to expound the benefits we achieved almost complete adoption. Completion of the checklist was initially slow because the teams were not familiar with the checks and each item was read out in its entirety. However, with time, the teams became quicker and used single word cues (such as "antibiotics"). One team became so familiar with the checklist that they could perform the checks verbally, relying solely on their memory. Although this reflected a high level of coordination, items were sometimes omitted and we urged the team to use the paper checklist.

We found considerable variability in the way the checklist was implemented and saw many examples of poor use (box 1). Although some teams used it as a tool to ensure completion of safety processes and a platform to transfer patient critical information, others saw the checklist merely as a "tick box" exercise. We also found that the sign-in and time-out sections were completed more consistently than the sign-out section. This was largely because it was unclear when this section should be completed. Moreover, in the busy period towards the end of an operation, nobody assumed responsibility for the sign-out checks. Some nurses were reluctant to remind the surgeon and anaesthetist to do the checklist; in these instances the anaesthetists occasionally took over the role of initiating the time-out checks.

Box 1 | Characteristics of a badly used checklist

Incomplete—Although the sign-in and time-out were usually completed, sign-out was rarely done

Hurried—Surgeons, and occasionally anaesthetists, can give the impression that the checklist is delaying the workflow, putting pressure on nurses to ensure that items are covered quickly

Dismissive replies (affirmative and inaccurate)—Dismissive answers often go unchallenged without a request for confirmation or clarification by other professionals

Done when some key people are absent—For example, surgeons and anaesthetists completing the time-out section when the scrub team are preparing equipment in the scrub area

The checklist was piloted from March 2008 for six months. Compliance with the checklist was variable over the pilot period (table). We estimated the compliance by calculating the fraction of the total number of procedures in the operating theatre each month in which the checklist was used and submitted to the research team. After the research team stopped attending all operations to encourage use of the checklist at the end of April, the rate of compliance fell, and the team therefore had to resume attendance to further promote use of the checklist. This variation in compliance reflects the fact that the use of the checklist has to be actively driven by the research team.[3] Within a month after the study finished, use of the checklist fell in both operating theatres, requiring a further period of encouragement of adoption. As the pilot study was coming to an end, the hospital developed a modified version of the checklist and required that this was used in all operating theatres. Adoption was slow, but now nearly all operating theatres at our hospital use the checklist and the nursing team largely initiates the time-out section.

Benefits of checklist

Properly used, the checklist ensures that critical tasks are carried out and that the team is adequately prepared for the operation. The team prioritises tasks as either standard or non-standard procedure, considers whether the procedure presents any particular threats (long operation, hypothermia, potential problems), and looks ahead to the possible need for other services or inputs. The checklist briefing allows each member of the team to review information given by the others and embeds the idea of open communication from the beginning of the operation, whether or not the team has worked together before. The process implies that everyone in the team has a right, in fact a responsibility, to communicate and to speak up if they foresee or notice any errors or problems.

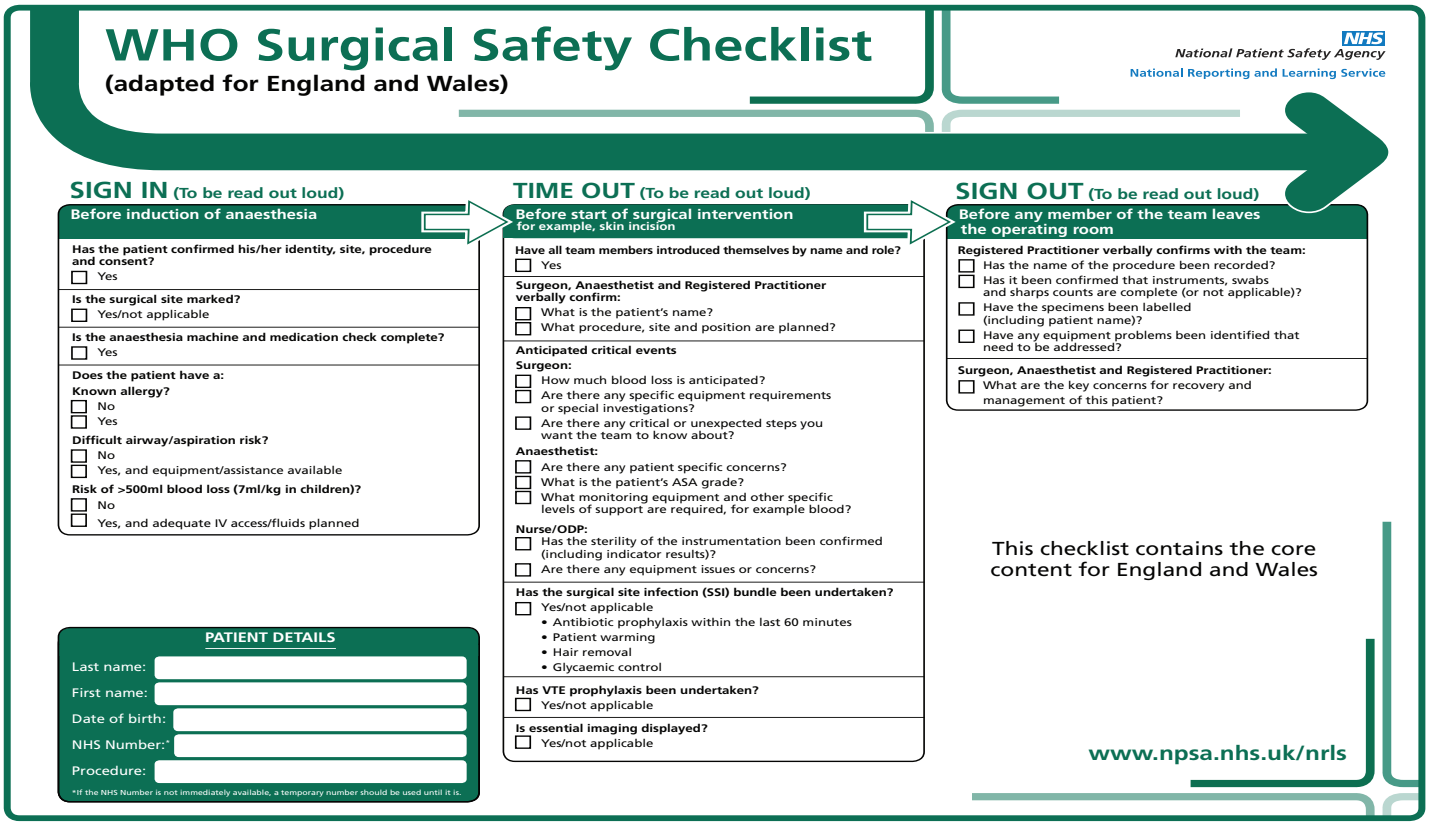
The WHO checklist study showed a significant reduction in postoperative mortality (from 1.5% to 0.8%) and morbidity (11% to 7%).[4] At our hospital, we found no significant change in overall morbidity or mortality, which were already very low, after the introduction of the checklist. However, there was a noticeable improvement in safety processes such as timely use of prophylactic antibiotics, which rose from 57% to 77% of operations after the checklist was introduced.

Barriers and challenges

At the conclusion of the study, we conducted semi-structured interviews and held informal conversations with staff who had used the checklist. These showed some remaining barriers and challenges to implementation.

Unfamiliarity and embarrassment

Nurses were largely supportive of the checklist and saw it as a platform to communicate better and clarify resources required for the procedure. They



WHO checklist for England and Wales[2]

were also largely supportive of the team introductions at the start of the time-out section. One nurse said, "I always wondered who these people were in the theatre that I was working with sometimes—but being busy you wouldn't approach them . . . now I understand their role better." However some staff felt awkward and embarrassed by the introductions. This is an entirely new concept in UK operating theatres, and it will be some time before theatre teams become accustomed to the routine.

Hierarchy in the operating theatre

The steep hierarchy prevalent in most UK operating theatres serves as a barrier to nurses leading the checklist. We observed that the checklist was more likely to be completed thoroughly when the surgeons and anaesthetists were supportive or the leading nurse was confident. However, since the checklist has been made compulsory, the nursing teams have taken on the responsibility of ensuring that the checklist is consistently used in their theatres.

Compliance with surgical safety checklist during pilot

Month	% Compliance (No of operations)
March	66 (101/152)
April	80 (86/107)
May	51 (61/120)
June	42 (59/141)
July	45 (62/139)
August	79 (55/70)

Timing of checks

Some anaesthetists thought that many of the items in the time-out section should be included in the sign-in section and that the surgeons should be present for this. This could be impractical as surgeons are often consenting patients between cases or writing the operative notes. Some staff also pointed out the futility of checking a patient's identity after he or she has been draped as the name bands cannot be accessed without compromising sterility. Since the study, some teams have tried to perform the time-out checks before the patient is draped. However, this may also be difficult because this period is usually the busiest with some staff doing tasks away from the patient.

Duplication

Some staff, especially operating department practitioners, thought that the checklist duplicated checks already undertaken. Anaesthesia and nursing teams have used pre-operative checklists for sometime. However, they do not involve the whole team. Duplication of the checks may be an irritant but, by creating redundancy in the process, it enhances safety,[5] Nevertheless, it may be possible to devise a process with less duplication in future.

Modification of checklist

During the interviews it emerged that several people thought that some of the checklist items were not relevant to UK operating theatres. A consultant anaesthetist commented, "It is a bit artificial sometimes. It's trying to be everything to every nation and to every standard of medicine." Pulse oximetry, for example, was considered to be a superfluous check in the UK as it is nearly always used. Orthopaedic surgeons were concerned that there was no check for prophylaxis against deep vein thrombosis. It is likely that specialties will want to modify the checklist to include items that are relevant to them. However, it is important to prevent the list from becoming too exhaustive. Experience in the nuclear industry shows that "as the list of items grows, there may be a higher probability of overlooking any given item."[6]

Box 2 | Factors for successful implementation

- Provide training and learning materials
- Organisational leadership—senior clinicians and managers should be seen to be enthusiastically backing the checklist. Make the checklist a clinical governance goal
- Cultivate local champions
- Clarify the role of each professional group—Decide who should initiate the checklist but maintain shared professional responsibility for completion
- Regular audits—Provide feedback to theatre teams on compliance with the checklist
- Encourage and support local measurement of effectiveness
- Support essential local adaptations but discourage oversimplification and modification for the sake of it

Box 3 | Areas for research

- Multicentre evaluation of barriers to and drivers of successful adoption
- Examination of correlation between effective use and intraoperative and postoperative outcomes
- Effect on teamwork
- Effect of team training on the effective use of the checklist
- Effect on operating theatre efficiency and economics

Misuse of the checklist

When poorly used, the checklist can potentially have a detrimental effect on safety and teamwork in the operating theatre. In aviation, it has been acknowledged that a badly performed checklist can provide a false sense of security.[5] A surgeon's dismissive affirmative reply to the equipment check can falsely reassure the scrub nurse that all the necessary equipment is present. This could be why some clinical staff members believe that the checklist has had no effect on equipment problems in the operating theatre.

Poor use of the checklist also has the potential to deepen existing cultural divisions and further fray inter-professional dynamics. Issues such as when to do the time-out checks, team introductions, and the availability of the senior surgeon for the checks have led to tensions between surgeons and anaesthetists. When dominant members have decided to do the checks among themselves, other members of the team have felt shut out.[3]

Successful implementation

In order to facilitate implementation and ensure its durability within the workflow of the operating theatre the checklist has to be used effectively (box 2). Our experience highlights three steps that are of particular importance:

Developing local champions

At the beginning of the process it is important to achieve a critical mass of "positive adopters" to drive further adoption rather than insisting that everyone is engaged from the outset. We found that people who were initially reluctant dropped their objections to the checklist over time. Forcing people to use the checklist at an early stage will only create a critical mass of influential "negative adopters," which may lead to the checklist falling out of use across the whole organisation.

Organisational leadership

Although the National Patient Safety Agency has made the checklist mandatory, it is unlikely to be implemented or maintained without the backing of senior leadership within each organisation.[5] Since, the trust made the checklist compulsory within our hospital, it is used in all the operating theatres for almost all surgical procedures.

Training

One of the problems we encountered was the limited time given to training and embedding the checklist. Practical issues such as confusion about who should lead each section of the checklist and when to do the checks can be minimised by training. These issues may seem trivial but in our experience can be important during the implementation stage. Training videos[7 8] and workshops led by local champions should ideally be supported through broader training in human factors and team building similar to the crew resource management training in aviation.[9]

Conclusion

The WHO checklist could herald a change in the work culture of operating theatres, making it more transparent, receptive to quality improvement, and driven by effective teamwork. The WHO checklist is not a final product but an intelligent tool that will adapt with time.[3] Further research, both nationally and internationally, is essential to ensure it becomes widely used and that use is sustained.

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Accepted: 22 November 2009
Contributors and sources: The article is based on the authors' experiences with the pilot study. KM was the local research lead for the project, AD was the project lead and also led one of the four working groups of the WHO Safe Surgery Saves Lives project. AV and KN were responsible for data collection and analysis. RWD was the project manager. KM is the guarantor. The views expressed here are those of the authors and not of WHO, Imperial College Healthcare or the Centre for Patient Safety and Service Quality.
Competing interests: AD, KM, and RWD were on the working group of the WHO Safe Surgery Saves Lives campaign.
Provenance and peer review: Not commissioned; externally peer reviewed.

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Cite this as: *BMJ* 2010;340:b5433

doc2doc

Four letter words in the *BMJ*

In response to Sharon Elizabeth Whitehorn's expletive laden personal view about formality when dealing with patients (*BMJ* 2009;339:b5357), doc2doc, BMJ Group's online global clinical community, is discussing whether the *BMJ* was right to spell out the word fuck.

imhotep: "Doctors are compulsive swearers. Surely if we're offended when we see swear words in print we should be equally as offended when they get yelled across the operating table?"

yoram chaiter: "I don't see a judge in court swearing. The same applies to doctors. What's next? Sharing a drink with the alcoholic? Smoking grass with a junkee?"

Martin Jones: "It should be printed as spoken, The Dr didn't say ****!"**

drsama: "Henry Higgins mentions something about 'the cold-blooded murder of the English tongue…"

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From *BMJ* blogs

Joe Collier believes that we are heading for "one almighty battle." A recent paper reported how exposure to the high frequency electromagnetic waves emitted by mobile phones can prevent or even reverse certain clinical features and underlying pathology of Alzheimer's disease in susceptible mice. If this were to hold true in humans then the pharma industry would lose millions of pounds that are spent each year on drugs to manage Alzheimer's disease.

http://blogs.bmj.com/bmj/