

# Optimising Surgical Safety Checklist implementation:

Key lessons for practitioners and partners





Investigator



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Emma-Louise Aveling (University of Leicester) Mary Dixon-Woods (University of Leicester) Peter McCulloch (University of Oxford) Yvette Kayonga (Catholic University of Rwanda) Ansha Nega (Gondar University)

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### Background

Surgery can provide life-saving treatment or can greatly relieve symptoms of many conditions. Around 234 million operations are performed across the world each year. Many operations go well, but some result in avoidable death and complication. These harms occur for reasons that are known to be preventable, such as lapses in good anaesthetic practice, weak infection control, and poor communication between team members.

In 2007, the World Health Organization (WHO) introduced a Surgical Safety Checklist - a list of 19 checks to be performed in the operating theatre before, during and after each surgical procedure. The checklist includes *technical* items such as administering antibiotics and use of pulse oximeters (a device that is attached to the finger to measure blood oxygen levels) and *non-technical* items such as team introductions, designed to ensure better communication and reduce hierarchies between senior and junior staff.

Policy makers and the World Health Organization have supported the checklist since a 2009 study conducted in eight diverse

### What were the findings of the study?

Some of these findings were published in a paper called 'A qualitative study comparing experiences of the Surgical Safety Checklist in hospitals in high and low-income countries,' in the *BMJ Open* journal. It found many similarities between the hospitals – but also some important differences.

Much that was positive was identified: many staff were enthusiastic about the potential benefits of the checklist to catch errors before they happened, and most showed a good understanding of when and how it should be used. But a striking finding was that in hospitals without adequate resources and efficient systems, simply requiring the checklist to be used might not only fail to improve patient safety but might also introduce *new* risks for staff and patients. This is the exact opposite of what the checklist was designed to achieve. hospitals around the world reported that, following introduction of the checklist, complications from surgery decreased.<sup>1</sup> Since then, more than 4,000 hospitals worldwide have registered as users of the checklist. In several countries (including the UK, France and Canada), use of a surgical safety checklist is mandatory. In others, accreditation frameworks, such as the Council for Health Service Accreditation of Southern Africa's framework, require use of the checklist.

Yet so-called 'never events' - patient safety incidents that the checklist is designed to catch - have continued to occur in the UK and around the world. Between 2011 and 2013 Dr Emma- Louise Aveling and Professor Mary Dixon-Woods in the Department of Health Sciences at the University of Leicester, and Professor Peter McCulloch in the Nuffield Department of Surgical Science at the University of Oxford, conducted a study to compare how the checklist was used in operating theatres in two British hospitals and two sub-Saharan African hospitals. The study involved observing doctors and nurses in operating theatres and interviewing some of them, as well as managers.

For the checklist to work, it has to be used **consistently**, for all surgical procedures – not just some; it must be used in **completeness** (in full, without items being missed) and with **fidelity** (items are performed as intended, with items ticked as complete only when checks have genuinely been made, at the right time, and in communication with the whole team). This means that understanding what might interfere with the correct use of the checklist is essential.

This report looks how hospitals – in high or low-income countries – can best approach implementation of safe surgery checklists in order to maximise the benefit to patients. It lists seven key lessons about how checklists can be introduced, implemented and used optimally and gives practical examples of how these lessons might work in a real situation.

### What is the Surgical Safety Checklist?

The WHO Surgical Safety Checklist is shown below, and is available from

http://www.who.int/patientsafety/safesurgery/tools\_resources/SSSL\_Checklist\_finalJun08.pdf

#### World Health Organization SURGICAL SAFETY CHECKLIST (FIRST EDITION) Before induction of anaesthesia **DEFERENCE** Before skin incision **DEFERENCE** Before patient leaves operating room SIGN OUT SIGN IN TIME OUT PATIENT HAS CONFIRMED CONFIRM ALL TEAM MEMBERS HAVE NURSE VERBALLY CONFIRMS WITH THE IDENTITY INTRODUCED THEMSELVES BY NAME AND TFAM: • SITE ROLE PROCEDURE THE NAME OF THE PROCEDURE RECORDED • CONSENT SURGEON, ANAESTHESIA PROFESSIONAL THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT AND NURSE VERBALLY CONFIRM SITE MARKED/NOT APPLICABLE • PATIENT • SITE APPLICABLE) ANAESTHESIA SAFETY CHECK COMPLETED PROCEDURE HOW THE SPECIMEN IS LABELLED PULSE OXIMETER ON PATIENT AND FUNCTIONING ANTICIPATED CRITICAL EVENTS (INCLUDING PATIENT NAME) SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED DOES PATIENT HAVE A KNOWN ALLERGY? SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT NO YES **BLOOD LOSS?** ANAESTHESIA TEAM REVIEWS: ARE THERE DIFFICULT AIRWAY/ASPIRATION RISK? ANY PATIENT-SPECIFIC CONCERNS? NO YES, AND EQUIPMENT/ASSISTANCE AVAILABLE NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS? RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)? NO YES, AND ADEQUATE INTRAVENOUS ACCESS HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES? AND FLUIDS PLANNED YES NOT APPLICABLE IS ESSENTIAL IMAGING DISPLAYED? NOT APPLICABLE

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

Box 1: WHO Surgical Safety Checklist.



## Key lessons

The checklist is most likely to work over the long term when introduced as part of a broader programme of improvement. The programme should take into account the many issues that can affect patient safety, including: how strong the leadership is, how well multidisciplinary teams work together, how reliably hospital systems function, how safety is monitored, and who will be held responsible if the steps on the checklist are not followed properly and mistakes are made. We identify seven key lessons that will support this kind of multi-faceted approach to checklist implementation.

- 1. Ensure the systems, processes and equipment that are necessary to support proper use of the checklist are in place
- 2. Use a multi-disciplinary, team-based approach to introducing the checklist
- 3. Identify strong local leaders to act as checklist 'champions'
- 4. Customise implementation of the checklist to suit the local context
- 5. Ensure there is support for implementing the checklist from every level of the organisation
- 6. Collect and use data to inform and sustain implementation efforts
- 7. Coordinate and make use of existing resources to support implementation through local and international networks.

### 1. Ensure the systems and processes to support the checklist are in place

The checklist is **not** a 'quick fix': successful implementation takes time and effort, in any setting. Certain things need to be in place or introduced first - systems for counting equipment and materials, for administering prophylactic antibiotics and for ensuring that anaesthesia equipment is complete, ready and functioning – for the checklist to work. So it may be that widerranging changes need to happen before or at the same time the checklist is introduced for it to be effective.

Some research from settings where resources are scarce shows that deficiencies in systems may not only limit the impact of checklist use, but can also introduce new risks for staff or patients. Staff may be tempted to share and record inaccurate information to ensure completeness; for example, equipment counts may be recorded as complete even if the systems, tools and support for reliable equipment counting are not in place. This not only leaves the patient vulnerable to harm, it also places staff at risk for having provided potentially 'false' information. Here are some actions for ensuring systems and processes are in place:

- Look carefully at how the organisation is set up in terms of resources, clinical systems, team work, behaviour and customs in order to support the proper use of the checklist. Ask questions such as:
  - Are there sufficient pulse oximeters to enable anaesthetists to use one for every single procedure?
  - Do nurses have the skills and tools to perform equipment counts properly at the beginning and end of procedures?
  - Do anaesthetists have the training and guidelines to perform consistent, 'best practice' checks of the anaesthesia machine?
  - If expected blood loss is high, are there systems in place that support reliable, timely access to additional fluids and/ or blood when needed?
- Strengthen systems before the checklist is introduced. For example, the development of a policy to standardise use of prophylactic antibiotics would need to involve pharmacists and microbiologists as well as operating theatre teams. This could also mean training nurses, agreeing (new) procedures such as when and where antibiotics should be given, by whom, and how or where this is documented, or providing training and supporting materials such as whiteboards and markers to establish reliable equipment counting practices and procedures.
- Remove mundane or ordinary obstacles, such as not having copies of the checklist available to hand, which can prevent safety procedures being carried out properly in any context.
- Make sure that where possible the right materials (fully functional anaesthetic equipment, an adequate supply of antibiotics, even marker pens) are available locally before the checklist is introduced; if not, patients will suffer poorer outcomes and staff will think that checks are not worth carrying out and will be even more resistant to use of the checklist.

#### 2. Use a team-based approach

The design of the checklist was influenced by prior research demonstrating a link between effective team communication and desired clinical outcomes. So organisations need to look at the way that team members work together and communicate with each other to ensure information provided by different team members is equally valued or shared across the whole team.

Introduction of the checklist will work best if it is done in a teambased way. Research shows that implementation will be difficult if staff are not well-informed or engaged; practitioners reported that when people did not use the checklist properly, it was partly because they didn't understand *why* it was being used or *how* to use it properly.



Nurses, surgeons and anaesthetists, as well as healthcare professionals from outside the surgery department (such as pharmacists, senior managers, quality assurance staff, or staff with expertise in quality improvement techniques) should work together to plan their implementation strategy, to identify any local adaptations that may need to be made, to identify resource needs, to run training and to support, monitor and review its use over time.

It is especially important that people continue to use the checklist during busy periods (due to high workloads and/or staff shortages) or emergency procedures, especially during night shifts; this is when staff in all settings have reported that they were least likely to use the checklist, or more likely to see people refusing to use it. Yet staff recognised it was also at its most useful when they were exhausted or overloaded and more likely to make mistakes.

Here are some ways to get the most out of team working:

- Train the team together on checklist use rather than have separate training for different disciplines. In certain situations some (additional) training may be useful for specific disciplines; for example, allowing nurses to first work together (without doctors) can help them to feel confident in presenting their views as a group when it comes to contributing to multidisciplinary group training.
- Provide regular refresher training for new staff where staff turnover is high, or where there are frequent rotations of junior staff (such as medical trainees). An appropriate member of staff (an infection control lead or a surgical checklist 'champion') could be given time, resources and authority to provide this.
- Use techniques such as 'Plan, Do, Study, Act' (PDSA) cycles to 'troubleshoot' (identify and resolve) problems such as confusion over who should ask and answer the questions on

the checklist, or the checklist not fitting with existing work patterns (e.g. the senior surgeon not typically being present before incision to do the 'time out').

One team we studied used *role plays* to demonstrate how long it actually takes to use the checklist in practice. During initial discussion and training sessions on the checklist, *before* it was implemented, teams acted out the performance of the checklist and measured the time it took to go through all the items. This served to counteract the view that the checklist takes a long time to go through and that there is not time to use it.

In one hospital where equipment counts worked well, nurses had had rigorous training and used a 'challenge and response' approach, whereby one individual gave the count out loud and another verified (also out loud) that count was correct. The introduction of white boards and markers where nurses could list the equipment used, in particular swabs and gauzes, had two advantages: all instruments could be listed, and all team members were given a chance to see, and verify, the count, encouraging more cooperation between surgeons and nurses in the counting of equipment.

#### 3. Identify strong local leaders as 'champions'

Studies from both the UK and Africa have found that there is often some resistance to use of the checklist or particular elements such as team introductions, checking the identity of the patient or marking the site. In our study, surgeons in particular complained that the checklist wasted time or caused delays, or that the problems the checklist was designed to prevent did not happen at their hospital.

This is a challenge to securing compliance where nurses and/or operating department practitioners have been given responsibility for initiating checklist use and completing answers to the checks on the form: surgeons and other senior consultants enjoy a higher status in operating theatres and this means they are less likely to listen to instructions from other staff such as nurses.

It is essential to identify champions from all relevant disciplines (nurses, surgeons, anaesthetists, infection control) as the influence of professional peers in the same discipline (surgeon to surgeon, anaesthetist to anaesthetist) is much more persuasive than suggestions from others in a different discipline. Local surgery leaders can help to organise training for staff and encourage checklist use in operating theatres during routine working days and nights. Senior departmental or hospital leaders can help to make sure there are enough resources (medicines, equipment) and that everyone has access to what they need. They can coordinate efforts between different teams (nurses and surgeons) and across different departments (surgery and pharmacy) to secure compliance. They can empower nurses and non-medical staff by being available for lesser status staff to call on when they encounter resistance from other staff.

Champions must be credible – highly respected for their work, authoritative and in a position of responsibility - to be persuasive. They also need to be seen around, and be present in theatres during operations, to lead by example, to challenge resistance to using the checklist and prevent any temptation not to carry out each item properly.

Here are some ways to help ensure that local leaders can 'champion' the checklist:

- Identify and discuss serious 'adverse events': Incidents such as operating on the wrong site or wrong patient should be discussed by surgeons, nurses and anaesthetists, and used to reflect on how the checklist could help to prevent such incidents and how it might need to be adapted to the local context. Led by senior team members, this approach can emphasise learning not blame.
- Allow space for debate and challenge: This involves creating an environment where all staff feel they can openly talk about their objections to using the checklist, the problems they see in using it and how to solve them. Where differences in status are significant, this may mean holding discussion sessions for separate disciplines (e.g. nurses or surgeons) before meeting together as a multidisciplinary group.
- Put the patient in the room: Using patients' accounts of their experiences can be an effective way of persuading staff that things need to change or that there is room for improvement. The WHO Patients for Patient Safety programme has a global network of patient 'champions' who may be able to provide in-country support to practitioners wanting to make use of patient stories. The programme has also made available various resources, including videos of patient stories (http://www.who. int/patientsafety/patients\_for\_patient/en/)



In one hospital a senior physician collected examples of serious incidents in their own hospital (such as a caesarean section being performed on the wrong mother), made a Powerpoint presentation of these events (anonymising them so that the patient and staff involved were not identified) and discussed them with a multi-disciplinary team of operating theatre staff as part of the training process. During checklist training in another hospital, a senior, respected surgeon shared his own experience of operating on the wrong site and explained how the checklist would have ensured that he did not make this mistake.

### 4. Customise implementation to suit the local context

The World Health Organization (WHO) encourages additions and modifications to the checklist to suit local practices, routines and systems. This can help to make sure that introduction of the checklist improves and simplifies working lives rather than complicating them, and that it fits in with practices and systems that are already working well to ensure the safety of patients. It can also help to develop a sense of local ownership of the checklist.

The feeling amongst staff that this is 'their' checklist and not something which has been imposed by outsiders and perhaps does not meet their needs. It is important that any changes are identified and agreed with the whole team, and are not made by individuals or single groups.

Examples of local customisation include:

- Adding the hospital's name and logo to the checklist form
- Improving the wording of checklist items where staff feel that the wording is confusing or not clear enough
- Incorporating the checklist into existing documentation for surgical or obstetric patients
- Adding other checks which are already routinely made (e.g. precautions against deep vein thrombosis (DVT))
- Adding a space for team members to 'sign off' completion of each section to make sure that someone takes responsibility for seeing that each section is fully completed.

While customising the checklist is often helpful, there is a danger of changes to the checklist being made that simply remove elements that staff feel cannot be achieved or are a waste of time (e.g. making sure a pulse oximeter is used for every patient or getting team members to introduce themselves to each other), instead of making changes so that those things *can* be done (getting more equipment, introducing new systems or providing training). This kind of 'customisation to existing practice' is unlikely to lead to benefits for staff or patients, as it will simply reinforce existing ways of doing things. What you can do:

- Ensure that changes are made based on discussion with staff of all disciplines, not just a few individuals.
- Be prepared to trial and adapt the checklist more than once, using techniques such as 'Plan, Do, Study, Act' (PDSA) cycles, to get the format right.
- Take care not to stop efforts or forget to source any missing items. Weigh up the risks of waiting until these can be supplied versus going ahead with using the checklist (in the short term) in the absence of a certain item(s), and taking additional precautions to minimise predictable risks due to its absence. However, this must be seen as a temporary measure.

### 5. Ensure institutional support from top to bottom

Leadership from the highest levels of the institution (department heads, senior doctors and nurses, medical directors and hospital CEOs or boards) is important: it shows that everyone is committed to patient safety. Leaders in these positions also have an important role to play in giving practitioners access to the equipment, drugs and materials needed to make use of the checklist meaningful.

Accountability is unlikely to be achieved without institutional support beyond the operating theatres - for example, having senior managers who are willing and able to take action against staff who persistently refuse to comply with patient safety measures. In some places, managers themselves may need support to enable them to fulfil this role.

Support for use of the checklist at the national level (Ministries of Health or national professional councils or organisations) can increase the incentive to use the checklist. Use of the checklist in NHS hospitals is mandated by the UK government. Accreditation is increasingly being adopted in low- and middle-income countries as a strategy for improving the quality and safety of care. Many of the accreditation frameworks used (such as the COHSASA accreditation scheme adopted for some hospitals in Malawi and Rwanda, or Ethiopia's national health reform guidelines) include the requirement that hospitals implement and monitor use of the checklist.

Here are some actions that management teams could take:

- Develop the leadership confidence and skills of local leaders or 'champions' by ensuring that staff are allocated protected time to make the necessary changes - building a regular half-day into personal job plans for safety and quality improvement work and requiring accountability on it.
- Put appropriate monitoring and reporting systems in place by authorising practitioners to spend time and resources on ensuring successful implementation Practitioners should be expected to implement patient safety measures as part of their routine duties.
- Identify national-level 'incentives' and raise awareness about their existence to support local efforts to encourage use of the checklist.

### 6. Collect and use data to inform and sustain implementation efforts

Evidence from different countries suggests that audit, research and surveillance needs to be a priority: measurement shows where improvements are needed and, just as importantly, where they are working. But although collecting and using data for improvement is a challenge in any setting, it is especially so for hospitals that lack systems to support the collection and use of data. There may also be significant 'cultural' barriers to routine collection and use of data (such as fear of being (unfairly) blamed or punished).

There are three types of data to consider:

- Base-line data is collected before an intervention starts.
  For example, the number of surgical errors or surgical site infections can be used to 'prove' there is a problem that needs to be addressed. Staff often do not know how many avoidable deaths or complications there are to begin with, leaving the 'need' for the checklist open to challenge.
- Process data showing checklist use (in how many procedures is the checklist used?), completeness (how many/which checks were completed?), and quality of checks (how well were they carried out, e.g. did people actually introduce themselves?) allow staff to refine implementation strategies in a timely manner. Monitoring checklist use can also enhance accountability.
- Outcome data –such as results of surgery or surgical site infection rates - can demonstrate whether the intervention is having the desired effect or not, and if continued efforts in the face of obstacles and resistance are worth it.
- Teams must decide what is feasible in terms of what data to collect and how often to collect it. This monitoring might be more frequent in early stages (such as weekly) and become less frequent as its use is established. Indicators to assess impact must be practical and manageable in the local context (e.g. not choosing to use measures requiring sophisticated laboratory facilities to measure surgical site infection rates if these are not present).

Feedback to all team members encourages a sense of collective responsibility as well as joint pride in their achievements. Encouraging a bit of competition – say, by comparing compliance data in different operating theatres – can also be a good way of motivating checklist use.

Here are some tips for data collection and use in resourceconstrained settings:

- Sourcing easy-to-use data collection tools from international organisations and local institutions such as APPS, or those supported by THET (Tropical Health & Education Trust), is a way of supporting the development of skills, tools and systems for data collection and monitoring.
- Include time for data collection in the job description of certain staff (such as nurses in charge of operating theatres) or into the requirements of medical trainees. This will be seen as recognition by the hospital's managers and senior staff that data collection is a legitimate use of staff time

- Make it compulsory that a representative from each team (nurse, anaesthetist and surgeon) sign off on the checklist and conducts regular audits of whether this is being done.
- Staff should know and understand in advance the consequences of non- compliance, and these should apply to all staff regardless of status.



One East African hospital, through their APPS partnership, supported an audit clerk to receive training in the UK; the audit clerk then supported and trained other members of clinical staff to carry out audits in their own department, including audits of checklist use.

### 7. Coordinate and make use of existing resources

Within a hospital, co-ordination and alignment among various patient safety programmes or internationally supported healthcare programmes that often co-exist is important. Unfortunately, this does not always happen. For example, where more than one programme is working in the surgical department, it is important that approaches are aligned to avoid conflicting information being circulated, or to avoid perceptions that there are personal benefits from involvement in improvement initiatives for some but not others (such as getting paid for taking part in training). These kinds of issues can reinforce existing divisions and tensions, even though they don't mean to, and undermine the goals of the programme.

Beyond individual hospitals, comparison of implementation experiences everywhere suggests that there are many common challenges to securing compliance. This shows that there is rich potential for hospitals in diverse settings to learn from one another and work together to achieve improvements in surgical safety. This may be through local healthcare networks (such as national professional organisations or regional health jurisdictions), or international networks. These might include international partnerships between hospitals in different countries, international organisations that work with many different hospitals (such as the Lifebox Foundation or the WHO's <u>African Partnerships for Patient Safety</u> (APPS)), or 'virtual networks' such as the <u>THET</u> online 'community of practice'. These networks offer resources (such as <u>videos</u> demonstrating checklist use) as well as the opportunity to connect with other healthcare professionals who have experience implementing the checklist in local contexts where problems such as those mentioned above have been encountered. Seeing what others have managed to achieve in similar situations can be motivating and help sustain implementation efforts in the face of challenges.

One hospital we studied lacked enough pulse oximeters to have one available in every operating room. The hospital was able to source more through the Lifebox Foundation (see <u>www.lifebox.org</u>). Eligible health facilities in lower- and middle-income countries can purchase a Lifebox® oximeter via their website at a discounted price, which includes the cost of shipping directly to the health facility.

### Conclusions

We hope that this report has provided some helpful and concrete examples of how to overcome these challenges and maximise the benefit of introducing the checklist for patients and staff. We have provided some further references and links which may help teams to succeed in effectively implementing the checklist.

### Acknowledgements

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### **Further reading**

#### The study:

Aveling, E.L., McCulloch, P. & Dixon-Woods, M. (2013) A qualitative study comparing experiences of the surgical safety checklist in hospitals in high- and low-income countries. *BMJ Open, 3:e003039.doi:10.1136/bmjopen-2013-003039* 

Wellcome Trust news summary of the study

### International organisations:

WHO APPS page:

http://www.who.int/patientsafety/implementation/apps/ resources/framework/en/#

Healthcare professionals working in partnership with other hospitals can access the tools and resources that have been developed by the APPS community by registering with African Partnerships for Patient Safety. Organizations not currently working in partnership but who are committed to patient safety improvement can also register. Use this link to find out more: <u>http://www.who.int/patientsafety/implementation/apps/</u> registration/en/

World Health Organization information on patient safety and surgical safety:

http://www.who.int/patientsafety/challenge/en/

Safesurg.org provides information on checklist implementation and an extensive range of tools to support the process:

#### http://www.safesurg.org/index.html

THET (Tropical Health & Education Trust) runs a virtual 'community of practice' for health professionals working in international healthcare partnerships. Information about this and how to sign up, as well as other THET activities and resources, can be found on the THET website at <u>www.thet.org</u>

The Lifebox Foundation – <u>www.lifebox.org</u> The Lifebox Foundation have produced a video illustrating use of the Surgical Safety Checklist: <u>http://www.youtube.com/</u> <u>watch?v=D7wceuPErJk</u>

#### **Quality improvement:**

More information on PDSA cycles ('Plan, Do, Study, Act') can be found at:

http://asq.org/learn-about-quality/project-planning-tools/ overview/pdca-cycle.html

http://www.ihi.org/resources/Pages/Tools/ PlanDoStudyActWorksheet.aspx

#### **Additional papers:**

Bosk CL, Dixon-Woods M, Goeschel CA, Pronovost PJ. The art of medicine. Reality check for checklists. *The Lancet* 2009;374(9688):444-5.

Dixon-Woods M, McNicol S, Martin G. Ten challenges in improving quality in healthcare: lessons from the Health Foundation's programme evaluations and relevant literature

#### BMJ Quality and Safety 2012;21: 876-884

Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AHS, Dellinger EP, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *New England Journal of Medicine* 2009;260:491-9.

#### For more information

SAPPHIRE GROUP University of Leicester, University Road, Leicester, LE1 7RH, UK

t: +44 (0) 116 252 5493 e: es213@le.ac.uk w: www.le.ac.uk



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