

'How to Guide'

Five Steps to Safer Surgery

Step one: Briefing

Step two: *Sign in*

Step three: *Time out*

Step four: *Sign out*

Step five: Debriefing

December 2010

‘How to Guide’: Five Steps to Safer Surgery

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Using this How to Guide

The guide is designed for use by team members involved in implementing the Surgical Safety Checklist, including briefing and debriefing.

The guide is also a useful overview for:

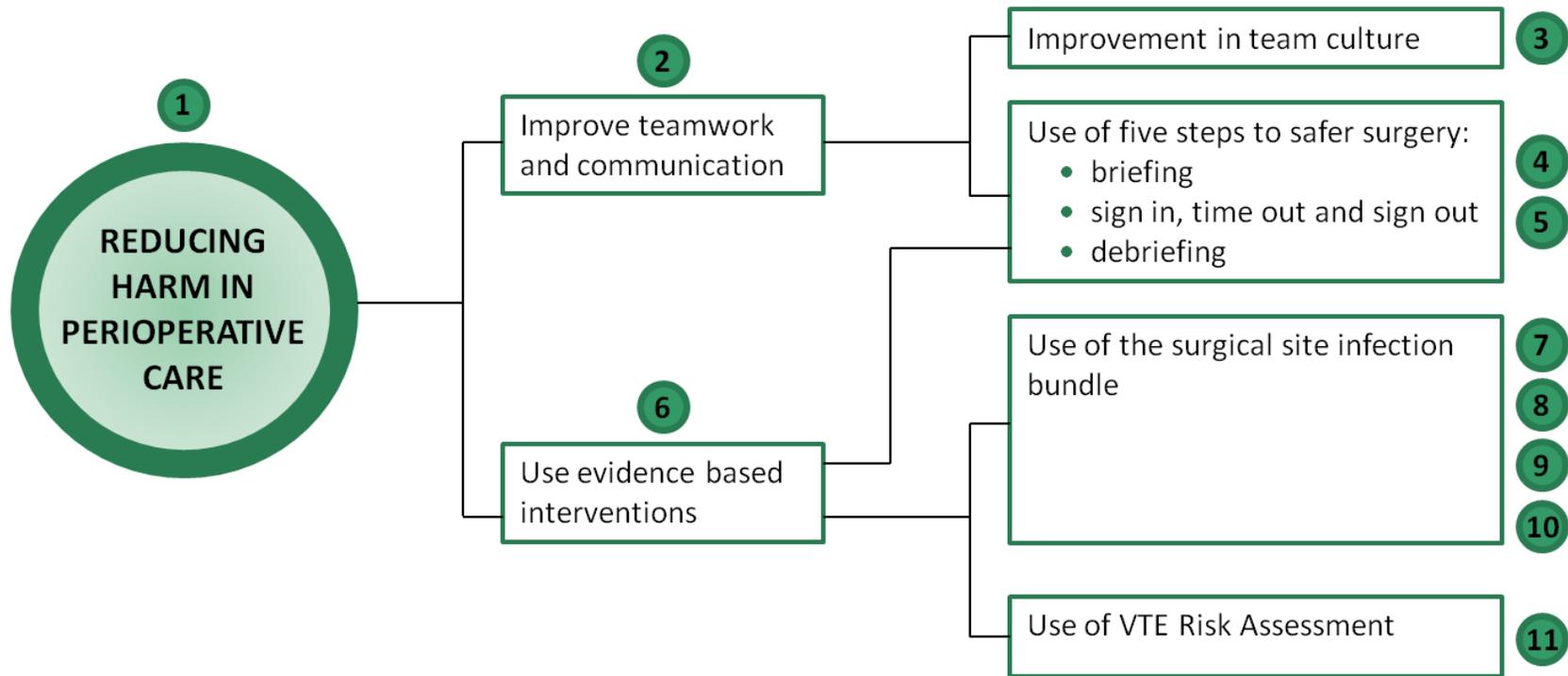
- perioperative teams
- governance teams
- relevant service managers
- senior managers and/or executive leads supporting the work and monitoring its progress
- service improvement staff who are required to provide improvement or change management expertise in relation to surgery.

For maximum impact from the How to Guide for Five Steps to Safer Surgery we recommend you have a full understanding of the following guidance:

- NPSA Patient Safety Alert: WHO Surgical Safety Checklist (adapted for England and Wales) and Supporting Information (www.nrls.npsa.nhs.uk/alerts)
- Patient Safety First: *The quick guide to implementing improvement* (www.patientsafetyfirst.nhs.uk)
- Patient Safety First: *The how-to guide for measurement for improvement* (www.patientsafetyfirst.nhs.uk)
- Patient Safety First: *The 'how to guide' for leadership for safety* (www.patientsafetyfirst.nhs.uk)

NB: You can use the numbers listed in the driver diagram ( ,  ,  etc) to identify the relevant measures in the How to Guide.

Driver diagram



- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Use of surgical trigger tools, case note reviews and number of Never Events 2. Team Culture Assessment Tools 3. Team stability and turnover 4. % of lists in the month when team briefing and debriefing was used 5. % of patients where the WHO Surgical Safety Checklist was used | <ol style="list-style-type: none"> 6. Number of patient incident reports relating to perioperative care 7. % of patients receiving on time antibiotics and % of prophylactic antibiotics discontinued on time 8. % of patients with normothermia 9. % of known diabetic surgical patients with controlled glucose 10. % of patients with appropriate surgical site hair removal 11. % of patients assessed for the risk of VTE |
|--|--|

Use the numbers listed in the driver diagram (**1** , **2** , **3** etc) to identify the relevant measures in the How to Guide.

Introduction

In June 2008, the World Health Organization (WHO) launched a second Global Patient Safety Challenge, 'Safe Surgery Saves Lives', to reduce the number of surgical deaths across the world. The initiative was designed to strengthen the commitment of clinical staff to address safety issues within the surgical setting. This included improving anaesthetic safety practices, ensuring correct site surgery, avoiding surgical site infections and improving communication and teamwork within the team.

In one year, from 1 January 2009 to 31 December 2009, the National Patient Safety Agency's (NPSA) National Reporting and Learning System (NRLS) received just over 155,000 reports of patient safety incidents from surgical specialties in England and Wales. The nature of the reports varied greatly, with the vast number reported as leading to no harm, however over 1000 were reported to have led to severe harm or even death.

The table below shows the breakdown of these reports by degree of harm.

Degree of harm	Surgical incidents
No Harm	111,548
Low	34,194
Moderate	8,344
Severe	905
Death	267
Total	155,258

The WHO Surgical Safety Checklist is a core set of safety checks, identified for improving performance at safety critical time points within the patient's intraoperative care pathway. It is for use in any operating theatre environment, including interventional radiology with the expectation that it can be adapted to fit local practice. The three steps in the checklist (sign in, time out, sign out) are not intended as a tick box exercise, but as a tool to initiate meaningful and purposeful conversation between relevant members of the clinical team to improve the safety of surgery.

In January 2009, the NPSA adapted the WHO Surgical Safety Checklist and issued a Patient Safety Alert to NHS organisations in England and Wales¹. By 1 February 2010 all NHS organisations in England and Wales were required to:

- ensure an executive and a clinical lead are identified in order to implement the surgical safety checklist within the organisation;
- ensure the checklist is completed for every patient undergoing a surgical procedure (including local anaesthesia);
- ensure that the use of the checklist is entered in the clinical notes or electronic record by a registered member of the team.

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Following the launch of 'Safe Surgery Saves Lives', Patient Safety First, a campaign for England, included the WHO Surgical Safety Checklist in their Perioperative Care Intervention¹. This focused on the 'model of improvement'² to bring about planned, sustained and reliable change. In Wales, the 1000 Lives campaign incorporated the requirements of the Alert into the 'Reducing Surgical Complications' intervention and provided significant support.

Patient Safety First encouraged small tests of change to adapt the checklist for local use. Early learning identified that the safety checks could be more reliably undertaken when they were delivered through a five-step process, adding in briefings and debriefings to the existing sign in, time out and sign out steps of the checklist. Following the release of the NPSA Patient Safety Alert, Patient Safety First supported NHS organisations in implementing the recommendations in England.

Specific checklists have been developed in some surgical specialties to address particular risk factors, for example ophthalmology, radiology and maternity (see appendices 1 and 3).

¹ <http://www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/Perioperativecare/>

Background

This 'How to Guide' replaces the Patient Safety First *How to guide for reducing harm in perioperative care* and builds on existing knowledge of team working and non-technical skills.

It is clear that the addition of a briefing at the beginning of a list and a debriefing before members of the team depart the theatre or department are key in delivering the cultural change required. The NPSA is committed to supporting sustained change and is now advocating learning from and reducing harm through the use of a five-step process:

Step one: Briefing

Step two: Sign in

Step three: Time out

Step four: Sign out

Step five: Debriefing

This 'How to Guide' builds on the existing knowledge, using additional tools and measures to support the implementation of the five-step process. The guide includes all previous elements and measures associated with the perioperative care environment, as well as additional support for the successful implementation of briefing and debriefing.

The proposed elements, suggested changes and associated measures discussed in this document are not exhaustive. They are, however, a basis on which to start making a difference in the given area. The 'How to Guide' also provides a sound methodical approach that you can apply repeatedly in other improvement efforts you initiate.

NB: Not all measures included in this 'How to Guide' are applicable across all specialties (for example, ophthalmology and radiology.) These specialties can develop additional measures as required.

Implementing the Five Steps to Safer Surgery

Before using this guide we recommend you read the Patient Safety First document *The quick guide to implementing improvement* as it contains background information on:

- 'The Model for Improvement': a suggested approach to undertaking any improvement activity
- 'Getting Started': a series of actions to consider working on prior to attempting to implement changes, including:
 1. Engage senior leadership support
 2. Form a team
 3. Establish quantitative and qualitative feedback mechanisms
 4. Provide education and training
 5. Reporting and learning.

These documents are both available from the Patient Safety First website www.patientsafetyfirst.nhs.uk. There is also a quick guide to implementing improvement in Appendix 2 of this document.

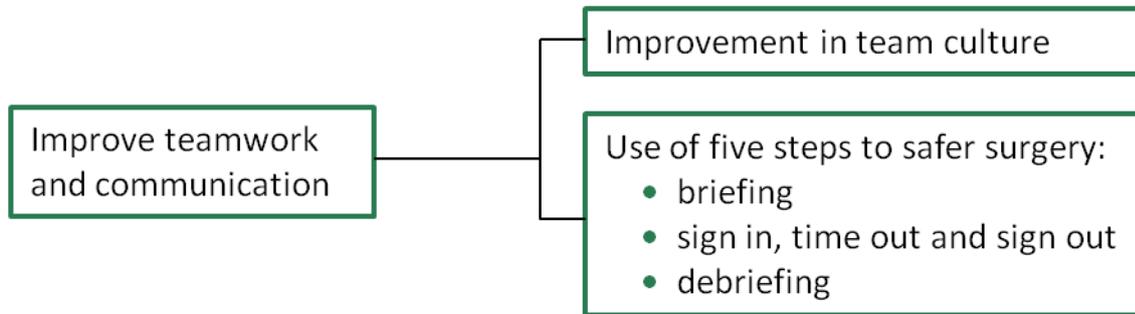
Surgical trigger tools and case note review 1

The use of triggers to identify perioperative adverse events is an effective method for measuring the overall level of harm within a healthcare organisation.

The surgical trigger tool developed by the NHS Institute for Improvement and Innovation contains information about how to undertake retrospective case note reviews in order to review the rate of harm within the organisation and track improvements over time.

www.institute.nhs.uk/safer_care/safer_care/trigger_tool_portal.html

Improve teamwork and communication 2



Improvement in team culture

Virtually all aspects of healthcare rely on people working together safely and effectively. Good teamwork is perhaps the most vital defence available for a safer healthcare system. Good teamwork refers to the way people work together in both traditional and non-traditional teams. For example:

- staff who work side by side on a daily basis in an established team
- virtual teams across departments who rarely meet
- face-to-face teams who may meet regularly, rarely, or may have never met before (for example in surgery).

Teamwork in surgery

Recent research allows us to understand more about how errors happen in the operating theatre. We know that the way teams work together, in terms of leadership, communication, shared situational understanding and the opportunity to speak up, contributes significantly to the risk of errors³.

Attention to detail is vital as small problems can lead to bigger problems^{4, 5, 6}.

. Poor communication is frequently cited when errors occur^{7, 8, 9}.

A recent study in the US reported an association between a team training programme for operating theatre staff and outcomes for surgical patients. Clinicians were trained to work as a team and to conduct checklist guided preoperative briefings and postoperative debriefings. An increase in compliance with the use of briefing and debriefing was also found to be associated with improved patient outcomes¹⁰.

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What is team culture?

The way a team works together is referred to as ‘team working’ or ‘team skills’. The culture or climate of a team refers to the ‘shared values and beliefs’ of the team. Team culture is a multi-dimensional and complex concept, but it can be simplified by thinking about the following aspects of how the team works together:

- Team stability and turnover
- Leadership and coaching
- Amount of formal and informal contact
- If the team has skills to do the job
- Opportunity to reflect on team objectives or effectiveness
- How an individual’s skills are valued, including junior staff
- How mistakes are treated
- The opportunity to speak up
- Trust and cooperation
- Helpfulness or empathy
- Support and empathy
- Opportunity for individual development
- Opportunity to review work processes as a team
- Conflict, collaboration and learning across disciplines

Whilst healthcare professionals are exceptionally experienced at working collaboratively, they are rarely given the time or tools that enable them to develop as a team. Team members may change frequently so using the five-step process reinforces team work by acknowledging the role of each team member and creating a common purpose.

Teamwork does not emerge naturally. It is necessary to provide time, facilities and support to help individual staff to become a good team. A few simple team building opportunities included in daily work can reduce cost and improve the quality of care. This will encourage support from the highest levels of management and the most senior practitioners.

A range of tools and techniques are available to measure and enhance teamwork and team culture on the NPSA website at: www.nrls.npsa.nhs.uk/resources/patient-safety-topics/human-factors-patient-safety-culture

The table below outlines some of these tools.

Team culture assessment tools

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Name	Description	Good for:
<p>Team Climate Assessment Measure (TCAM)</p>	<p>TCAM is a questionnaire that measures 11 dimensions of team climate. From the results of the questionnaire a team is able to understand aspects of their teamwork that can be improved.</p> <p>If a team chooses, they can also work through the development programme offered by TCAM consisting of six sessions. If a team completes the development programme they are then able to measure changes by completing the questionnaire again.</p> <p>http://tinyurl.com/TeamClimateAssessment</p>	<ul style="list-style-type: none"> • Identifying areas of team climate for development. • Team development programme. • Measuring improvements.
<p>Team Self Review (TSR)</p>	<p>TSR is aimed specifically at theatre teams and helps teams review and understand all aspects of their team performance. It is based on briefings and debriefings that allow all practitioners in a team to contribute to the development of the team goals and processes.</p> <p>http://tinyurl.com/TeamSelfReview</p>	<ul style="list-style-type: none"> • Fitting team skills into briefing and debriefings.
<p>Manchester Patient Safety Assessment Framework (MaPSAF)</p>	<p>This framework allows reflection within a multidisciplinary team on 10 dimensions of patient safety culture and gives examples of a positive culture.</p> <p>http://tinyurl.com/ManchesterPSAF</p>	<ul style="list-style-type: none"> • A quicker review of patient safety culture within the team.

There are also tools to measure team safety culture, which can be used to track changes in team attitude. The Safety Attitude Questionnaire (SAQ), developed in the USA, has a version for operating theatre teams¹¹. See:

http://www.uth.tmc.edu/schools/med/imed/patient_safety/questionnaires/SAQBibliography.html

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Case study

A 78 year old retired lawyer underwent a lengthy revision hip procedure with multiple trays, significant blood loss requiring on table transfusion and several packs of swabs used. At the sign-out a missing swab was identified. After a cursory inspection of an extensive operative site the surgeon declared that he was confident the swab was not inside the patient and continued to close. Despite several requests building to protestations he continued to close and refused to allow an image intensifier into theatre to check the wound for fear of increasing the risk of infection. Whilst still under anaesthesia the patient was wheeled, with a closed wound, into the anaesthetic room where imaging revealed the swab resting behind the proximal femur. The patient was returned to theatre, the wound re-opened and the swab removed. The failure of the process to change behaviour despite performing the checklists to apparently adequate standard demonstrates the risk of this becoming a tick box exercise rather than an effective tool to improve behaviours of all team members and communication.

Never Events

Never Events are serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented. Primary care trusts are required to monitor the occurrence of Never Events within the services they commission and publicly report them on an annual basis.



The Never Events Framework is available at: www.nrls.npsa.nhs.uk/neverevents

Examples of Never Events

Surgical Never Events include wrong site surgery and retained instruments/swabs post operation:

Wrong site surgery: a surgical intervention performed on the wrong site (for example wrong knee, wrong eye, wrong patient, wrong limb, or wrong organ); the incident is detected at any time after the start of the operation and the patient requires further surgery, on the correct site, and/or may have complications following the wrong surgery.

Retained instruments/swabs post operation: one or more instruments or swabs, or a throat pack, are unintentionally retained following an operative procedure, and an operation or other invasive procedure is needed to remove this, and/or there are complications to the patient arising from its continued presence.

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NB: This Never Event does not include interventional radiology or cardiology procedures, and the definition of instrument does not include guide wires, screws, or other similar material. It does not include retained swabs after non-operative vaginal delivery.

What are we trying to achieve?

An example of an aim statement could be:

“We will experience no Never Events by DATE.”

How can we measure progress?

Example measure:

Measure	How to calculate	Guidance
Days between surgical Never Events.	Count the days between surgical Never Events.	A surgical Never Event is considered to have occurred in any circumstance of a wrong site operation or retained instrument, swab or throat pack.

Use of Five Steps to Safer Surgery

We know that the introduction of briefings and checklists in surgery improves information exchange and identification of problems, resulting in smoother running theatres^{12, 13}. In addition, staff have greater job satisfaction in an environment with a shared focus on quality and safety¹⁴.

The five-step process for improving the way theatre teams communicate with each other and behave as a team is:

Step one: Briefing

Step two: Sign in

Step three: Time out

Step four: Sign out

Step five: Debriefing

Recognising the impact of non-clinical skills on surgical safety provides surgical and interventional teams with an opportunity to deliver the many improvements that other high risk industries have enjoyed.

The introduction of briefings promotes approaches to improving care for patients undergoing surgical procedures in both the elective and emergency situations in acute or primary care settings. It details components of care which improves communication and the smooth running of theatre and reduces the incidence of avoidable error and omission.

The use of team briefings

The NHS Institute for Innovation and Improvement has designed a package of support to enable organisations in the NHS to improve the patient experience. In field tests for ‘The Productive Operating Theatre’ programme, results showed that when briefing and debriefing (steps 1 and 5 of the five-step process) are used alongside the checklist, there is a greater impact on team performance and safety, with the additional benefits of reductions in delays, smoother running lists and an improved safety climate¹⁵.

Briefings are a simple way for the operating/interventional team to share vital information about patients for surgery and discuss potential and actual safety issues before and after the list/procedure takes place. Briefings should encourage an environment where the team can share this information without fear of reprisal, integrating the reporting of patient

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safety incidents into everyday routine. *The quick guide to briefing and debriefing* can be found on the Patient Safety First website www.patientsafetyfirst.nhs.uk which includes advice on:

- When the briefing or debriefing can take place
- Why they are helpful
- Who should attend
- What points should be discussed

What are we trying to achieve?

An example of an aim statement could be:

“By DATE will not be experiencing equipment problems that could have been anticipated in advance.”

What changes can we make that will result in improvement?

Briefing: existing knowledge tells us briefing works well in improving the running of the list. Allocating five minutes before the start of the list will enable the core team to meet to discuss the requirements of that list, including safety concerns, equipment and staffing.

Debriefing: existing learning tells us that this does not occur as often as briefing, but that it can be a valuable method of improving practice. Allocating time at the end of the list will enable the core team to review any issues that occurred, answer concerns the team has, discuss specific incidents or identify how to prevent them happening again for the next list.

How can we measure progress?



Example measure:

Measure	How to calculate	Guidance
The percentage of operating days in the month in which team debriefings were used per operating list.	<p>Determine the numerator: the total number of lists in the month at which debriefing occurred.</p> <p>Determine the denominator: the total number of lists in the sample during the month.</p> <p>Calculate the percentage by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Sampling is appropriate for this measure.</p> <p>The numerator is a YES/NO outcome. Only lists where the debriefings were used are recorded as compliant.</p>

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Case Study

A 56 year old man was admitted for resection of a retro-orbital tumour. This required a lengthy intracranial exposure by a neurosurgeon followed by resection of the tumour by an ophthalmic surgeon. After some forceful insistence that a briefing take place by the consultant anaesthetist for the list, it became clear that the ophthalmic surgeon was not available due to an administrative error in timetabling. This would not otherwise have been discovered until after the anaesthesia or possibly even after exposure of the tumour.

Implementation of the WHO Surgical Safety Checklist

The WHO Surgical Safety Checklist forms steps two, three and four of the five-step process.

A version adapted for use in England and Wales issued by the NPSA in January 2009 contains the minimum requirement and can be adapted locally to accommodate additional requirements to bring about best practice relating to safety checks in theatre.

A global study established that adherence to safety measures during surgery increased significantly following the introduction of the WHO Surgical Safety Checklist, and that there was a significant reduction in surgical morbidity and mortality¹⁶. These findings have been reinforced by a multi-centre study in the Netherlands, which reported a reduction of nearly one third in patients with complications, and a halving of the percentage of patients who died, following the implementation of a checklist for the surgical pathway¹⁷.

The use of the WHO Surgical Safety Checklist was found to be feasible in circumstances requiring rapid surgical intervention¹⁸. Experience suggests that sharing of information and checking crucial steps is even more important in emergencies when staff are likely to be under increased pressure. The WHO and NPSA Surgical Safety Checklists are in Appendix 3.

What are we trying to achieve?

An example of an aim statement could be:

“By DATE all team members will introduce themselves before the start of every list.”

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What changes can we make that will result in improvement?

The WHO Surgical Safety Checklist improves communication and teamwork in the operating/interventional room.

Whilst compliance may be measured by sourcing evidence that the checklist was used, organisations will need to assure themselves that all team members are present and contribute to essential communications at each step.

How can we measure progress?



Example measure:

Measure	How to calculate	Guidance
The percentage of lists using the WHO Surgical Safety Checklist.	<p>Determine the numerator: the total number of lists in the month on which the checklist was used.</p> <p>Determine the denominator: the total number of lists in the sample during the month.</p> <p>Calculate the percentage by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Sampling is appropriate for this measure.</p> <p>The numerator is a YES/NO outcome. Only lists where the checklist was used for all patients are recorded as compliant.</p>

The measure outlined above is useful for seeing the overall organisation progress in implementing the checklist but may show progress to be slow. It may also be useful and easier to audit a sample of 10 individual cases more frequently, getting a sense of how well the checklist is being implemented in specific areas. This works well in areas still testing and adapting the checklist, or those who have recently started using the checklist.

Organisations may also wish to measure the impact of using the checklist by monitoring the incidence of surgical Never Events and improvements in team working and communication in the operating room.

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Case Study

A 24 year old healthy women, a keen triathlete, was admitted for arthroscopy of her left knee. She was listed for a right knee arthroscopy and on arrival into the anaesthetic room the sign-in took place. The discussion at sign-in between the patient, ODP and anaesthetist revealed that although listed consented and marked for a right knee arthroscopy, it was in fact her left knee that was symptomatic and for which she had an MRI scan showing a significant meniscal tear. Following discussions between the surgical team and the patient a new consent form was signed, the list corrected and a successful left knee arthroscopy performed.

Use evidence based interventions

Include incident reporting heading etc

Patient safety incidents **6**

The number of patient safety incidents relating to peri operative care can be an indication of reducing patient harm by using evidence based interventions. All patient safety incidents should be reported, monitored and reviewed, see www.nrls.npsa.nhs.uk/report-a-patient-safety-incident

Use of the Surgical Site Infection (SSI) bundle

This has four components:

- Component one:** Appropriate use of prophylactic antibiotics
- Component two:** Maintenance of normothermia
- Component three:** Maintenance of glycaemic control for known diabetic patients
- Component four:** Use of recommended hair removal methods

Component one: Appropriate use of prophylactic antibiotics

What are we trying to achieve?

Find out if you already have a protocol in place. If you do, perform an audit to find out your current level of compliance.

An example of an aim statement could be:

“Within one year 80 per cent of clinically appropriate surgical patients will receive on time appropriate antibiotics. We will increase this to more than 90 per cent within two years.”

How will we know a change has been an improvement?

Create your operational definition. In the example above this means establishing the criteria for ‘appropriate surgical patients’, ‘on time’ and ‘appropriate antibiotics’. For example:

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Statement	Criteria
Appropriate surgical patients	As judged by clinical teams.
On time	Patients should receive antibiotics within 60 minutes before surgical incision. Due to the longer infusion time required for vancomycin, it is acceptable to start this antibiotic (for example when indicated because of beta-lactam allergy or high prevalence of MRSA) within two hours prior to incision.
Prophylactic antibiotics	Should be discontinued within 24 hours of surgery.

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How can we measure progress?

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Example measurements:

Measure	How to calculate	Guidance
Percentage of patients receiving on time antibiotics.	<p>Determine the numerator: the number of eligible patients in the sample receiving on time antibiotics.</p> <p>Determine the denominator: the total number of patients reviewed.</p> <p>Calculate the percent by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Use a pilot population of adult, elective surgical patients and track 100 per cent.</p> <p>Remember this is a YES/NO outcome – only patients receiving the antibiotics within the 60 minutes prior to surgical incision are ticked as compliant. Give credit where a reason for exclusion is documented.</p> <p>Report data monthly – report the four figures for the month as an aggregated numerator and denominator each month.</p>
Percentage of prophylactic antibiotics discontinued on time.	<p>Determine the numerator: the number of patients in the sample whose prophylactic antibiotics were discontinued on time.</p> <p>Determine the denominator: the total number of patients reviewed.</p> <p>Calculate the percent by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Use a pilot population of adult, elective surgical patients and track 100 per cent.</p> <p>Remember this is a YES/NO outcome – only patients whose prophylactic antibiotics were discontinued within 24 hours of end of surgery are ticked as compliant.</p> <p>Exclude patients whose antibiotics are purposely continued as part of their treatment and this is documented.</p> <p>Report data monthly – report the four figures for the month as an aggregated numerator and denominator each month.</p>

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What changes can we make that will result in an improvement?

- Involve your pharmacists and infection control team. They can help you with a variety of actions such as helping develop criteria for appropriate prophylactic antibiotics, patient inclusion/exclusion criteria and developing prompt methods if these are not administered or discontinued.
- The use of pre-printed or computerised standing orders specifying antibiotic agent, timing, dose, and discontinuation.
- Changing operating room drug stocks to include only standard doses and standard drugs, reflecting national guidelines.
- Using visible reminders/checklists/stickers.
- Verifying antibiotic administration time during the intra-operative ‘time-out’* so action can be taken if not administered.

NB: *More information about the appropriate use of prophylactic antibiotics can be found in the NICE Clinical Guideline 74, Surgical site infection: prevention and treatment of surgical site infection¹⁹.*

Component two: Maintenance of normothermia

What are we trying to achieve?

Find out if you already have a protocol for perioperative warming in place. If you do, perform an audit to find out your current level of compliance.

An example of an aim statement could be:

“Within one year 95 per cent of all surgical patients will be maintaining a body temperature within normal range during surgery and in the post-operative phase.”

How will we know a change has been an improvement?

Create your operational definition. In the example above this means establishing the definition of ‘normal range’ and ‘post-operative phase’. For example:

* For ‘time-out’ see earlier section relating to the implementation of the surgical checklist

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Statement	Criteria
Normal range	Temperature of 36.5°C to 37.5°C. Exclusion criteria: Patients for whom hypothermia is deliberately sought for therapeutic reasons (for example hypothermic total circulatory arrest for cardiac surgery).
Post-operative phase	Should be determined locally

NB: Some hospitals only undertake warming of patients for particular procedures, for example colorectal, open abdominal or longer procedures. Our recommendation is that this component should be aimed at all surgical patients unless they are in your locally determined exclusion criteria.

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How can we measure progress?

Example measure:

Measure	How to calculate	Guidance
Percentage of patients whose first temperature in post op care unit was >36°C.	Determine the numerator: the number of eligible patients in the sample whose first temperature in post op care unit was >36°C. Determine the denominator: the total number of patients reviewed. Calculate the percentage by dividing the numerator by the denominator and multiplying the result by 100.	Use a pilot population of adult, elective surgical patients and track 100 per cent. Use anaesthetic chart or post-operative unit chart as the primary data source. This is a YES/NO outcome. Only eligible patients with a temperature >36°C on arrival in post op care unit are recorded as compliant.

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What changes can we make that will result in an improvement?

- Monitor the temperature of all patients routinely: in the hour before surgery, before induction, every 30 minutes during surgery, on arrival in the recovery room and every 15 minutes during the recovery period. The method used for taking the temperature should be clearly identified and recorded.
- Initiate pre-operative, intraoperative and post-operative interventions of forced warm air fluid warming in response to the patient’s recorded core temperature.
- Assess patients for their potential to develop inadvertent hypothermia during surgery. Include identification of patients undergoing surgery anticipated to last >30 minutes, providing them with forced warm air intraoperatively. If this is not a practical intervention, for example because the exposed surface area is too extensive to allow forced warm air, then electric blankets underneath the patient will help maintain core temperature.
- Ensure that where patients are pre-operatively assessed as having a core temperature of less than 36°C, their anaesthesia and surgery is delayed until the patient has been warmed using forced warm air. Active warming should continue throughout the duration of surgery.
- Ensure that intravenous fluids (500 ml or more) and blood products are warmed to 37°C using an appropriate fluid warming device.
- Patients arriving in recovery with a temperature less than 36°C should be warmed using forced warm air.

NB: More information is available in the NICE guideline: *The management of inadvertent perioperative hypothermia in adults*²⁰.

Component three: Maintenance of glycaemic control for known diabetic patients

What are we trying to achieve?

Find out if you already have a protocol for known diabetics undergoing surgery in place. If you do, perform an audit to find out your current level of compliance.

An example of an aim statement could be:

“Within one year 95 per cent of all surgical patients will be maintaining a serum glucose level within normal range on the day of surgery.”

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How will we know a change has been an improvement?

Create your operational definition. In the example above, this means establishing the definition of 'normal range'.

Statement	Criteria
Normal range	Normal range for controlled serum glucose = 5.0 to 10.0 mmol/l.

How can we measure progress?

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Example measure:

Measure	How to calculate	Guidance
The percentage of known diabetic elective surgical patients with controlled serum glucose (5.0-10.0 mmol/l) on the day of surgery.	<p>Determine the numerator: the number of patients in the sample with controlled serum glucose on the day of surgery.</p> <p>Determine the denominator: the total number of patients reviewed.</p> <p>Calculate the percentage by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Use a pilot population of adult, elective, known diabetic surgical patients and track 100 per cent.</p> <p>This is a YES/NO outcome. Only eligible patients with controlled serum glucose on the day of surgery are recorded as compliant.</p>

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What changes can we make that will result in an improvement?

- Regularly check perioperative blood glucose levels on all diabetic patients to identify hyperglycaemia and hypoglycaemia.
- Eliminate the use of sliding insulin dosage scales; if a sliding scale is used, standardise it through the use of a protocol and pre-printed order form or computer order, that clearly designates the specific increments of insulin coverage. Further information is available on the Patient Safety First website at: www.patientsafetyfirst.nhs.uk.
- Standardise to a single concentration of IV infusion insulin.
- Assign responsibility and accountability for blood glucose monitoring and control.

Component four: Use of recommended hair removal methods

What are we trying to achieve?

Find out if you already have a protocol for appropriate hair removal in place. If you do, perform an audit to find out your current level of compliance.

An example of an aim statement could be:

“Within one year 95 per cent of all elective surgical inpatients will be having hair removal for surgical procedures performed using the recommended method.”

How will we know a change has been an improvement?

Create your operational definition. In the example above, this means establishing the definition of a ‘recommended method’. For example:

Statement	Criteria
Recommended method	The recommended method for this intervention is that only electric shavers/clippers will be used to remove hair around the incision site.

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How can we measure progress? 10

Example measure:

Measure	How to calculate	Guidance
Percentage of patients with hair removal by the recommended method.	<p>Determine the numerator: the number of patients in the sample with hair removal by recommended method.</p> <p>Determine the denominator: the total number of patients reviewed.</p> <p>Calculate the percentage by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Use a pilot population of adult, elective, surgical inpatients and track 100 per cent.</p> <p>This is a YES/NO outcome. Only eligible patients with hair removed using the correct method are recorded as compliant.</p>

What changes can we make that will result in an improvement?

- Ensuring that there is adequate supply of electric clippers and that staff are trained in their proper use.
- Using reminders (for example signs, posters).
- Educating patients not to self-shave pre-operatively.
- Removing all razors from the entire hospital (except for men who wish to shave their faces).
- Working with the purchasing department so that razors are supplied only to appropriate areas.

Whilst it is recommended that individual process measures should be reported for each component, it is strongly recommended that a ‘bundle’ approach is taken to the actions relating to SSI; that is, tracking your compliance with all elements.

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Example measure:

Measure	How to calculate	Guidance
<p>Percentage compliance with the SSI ‘bundle’.</p>	<p>Determine the numerator: the number of surgical patients in the sample receiving all four components of the SSI ‘bundle’.</p> <p>Determine the denominator: the total number of patients reviewed.</p> <p>Calculate the percent compliance by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>In order to do this simply it is necessary to have easy access to documented evidence for all components.</p> <p>Decide locally where to collect data. For example, form completed by post op care staff as each patient discharged or retrospectively from surgical ward.</p> <p>Remember this is a YES/NO outcome – only patients receiving all four components are recorded as compliant. Remember to give credit where there is a clinical reason for exclusion providing it has been documented.</p> <p>Collect data weekly. Aggregate your four scores to get a monthly compliance rate.</p>

Use of VTE Risk Assessment

The annual cost of managing Venous Thromboembolism (VTE) is estimated to be approximately £640 million in the UK. Inpatient treatment costs account for almost 50 per cent of the total cost. Approximately 20 per cent of costs are attributable to the chronic care costs of post-thrombotic syndrome²¹.

What changes can we make that will result in improvement?

The recently published NICE guideline offers best practice advice on the prevention of VTE. Implementation of the recommendations is expected to lead to a reduction in the number of adverse events²².

What are we trying to achieve?

An example of an aim statement could be:

“All surgical patients will be assessed against the risk factors for VTE by DATE”

How do we measure progress?

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Example measure:

Measure	How to calculate	Guidance
Percentage of patients assessed for the risk of VTE.	<p>Determine the numerator: the total number of patients who were assessed for the risk of VTE.</p> <p>Determine the denominator: the total number of patients in the sample during the month.</p> <p>Calculate the percentage by dividing the numerator by the denominator and multiplying the result by 100.</p>	<p>Sampling is appropriate for this measure.</p> <p>This is a YES/NO outcome. Only patients that were risk assessed for the risk of VTE are recorded as compliant.</p>

Appendix 1: Useful resources

National Patient Safety Agency

The National Patient Safety Agency (NPSA) is an Arm’s Length Body of the Department of Health and through our three divisions cover the UK health service. We lead and contribute to improved, safe patient care by informing, supporting and influencing organisations and people working in the health sector. Following the publication of a review of arms-length bodies, the National Patient Safety Agency (NPSA) will be disbanded in 2011. However aspects of our work, including the National Reporting and Learning System, will continue within the new proposed structure of the NHS Commissioning Board. We would like to reinforce the importance of NHS organisations continuing to report patient safety incidents in the usual way through the National Reporting and Learning System. This is so that trends in safety incidents can be identified and acted upon as early as possible.

www.nrls.npsa.nhs.uk

A range of tools to measure and enhance teamwork is available on the NPSA website at: www.nrls.npsa.nhs.uk/resources/patient-safety-topics/human-factors-patient-safety-culture

Patient Safety First

Patient Safety First is a campaign to make the safety of patients everyone’s highest priority. The campaign provides:

- tools to support implementation;
- information on implementing human factors in healthcare;
- references for reducing harm in perioperative care.

www.patientsafetyfirst.nhs.uk

A video demonstrating the five steps to safer surgery is at:

www.patientsafetyfirst.nhs.uk/Content.aspx?path=/interventions/Perioperativecare/5steps/video/

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World Health Organization

The WHO website provides tools and resources to support implementation of the *Safe Surgery Saves Lives* programme.

www.who.int/patientsafety/safesurgery/en

The Institute for Healthcare Improvement

The Institute for Healthcare Improvement (IHI) has developed many of the tools used to measure improvement in healthcare. The IHI website gives access to these other resources.

www.ihl.org

The NHS Institute for Innovation and Improvement

The NHS Institute for Innovation and Improvement promotes new ways of working in the NHS.

www.institute.nhs.uk

The Health Foundation

The Health Foundation provides information and publications about improving healthcare in the UK.

www.health.org.uk

Appendix 2: Acknowledgements

This guide has been produced by the National Patient Safety Agency. We wish to thank and acknowledge the Patient Safety First campaign for the ‘How to Guide for Reducing Harm in Perioperative Care’ which this document replaces.

Thank you to the strategy group for the Five Steps to Safer Surgery at the NPSA who have contributed to the development of this how to guide and to Dr Ken Catchpole, University of Oxford The John Radcliffe Hospital for his contribution to the *Quick guide to briefings and debriefings*.

Appendix 3: Checklist links

1. NPSA WHO Surgical Safety Checklist adapted for England and Wales
<http://tinyurl.com/WHOSaferSurgeryChecklist>
2. WHO Surgical Safety Checklist: for cataract surgery only
<http://tinyurl.com/CataractChecklist>
3. WHO Surgical Safety Checklist: for radiological interventions only
<http://tinyurl.com/RadiologyChecklist>
4. WHO Surgical Safety Checklist for maternity cases only
<http://tinyurl.com/MaternityChecklist>
5. WHO Surgical Safety Checklist and implementation manual (World alliance for patient safety)
www.who.int/patientsafety/safesurgery/ss_checklist/en/index.html

Appendix 4: Implementing improvement: Quick Guide

If you have started working through the Patient Safety First document ‘Getting Started’ in *The quick guide to implementing improvement*, you should have a team in place that is committed to reducing harm in perioperative care.

Gather your team together and work through the remaining sections of this ‘How To Guide for Five Steps to Safer Surgery’ which uses the questions based approach outlined in the quick guide’s section, ‘The Model for Improvement’.

What are we trying to achieve?

In order to agree your aim you need to understand the current situation as this helps to set a realistic timeframe for your goal. You need to set your aim and monitor your progress towards it. Your initial focus should be increasing compliance with any of the components considered in this document.

An example aim statement could be:

“We will reduce perioperative harm by 30 per cent within 18 months. This will be achieved through implementation of the intervention which focuses on improving teamwork and communication and reducing patient harm using evidence based interventions.”

Measuring improvement

Measurement is the only way to know whether a change represents an improvement.

The most commonly reported benefits experienced by organisations using the Five Steps to Safer Surgery are:

- reducing harm (for example surgical site infection);
- more reliable care;
- capture of more near misses;
- improved teamwork with quicker, smoother procedures.

The observed positive impact for staff includes improved attendance, reduced staff turnover, less dependency on bank staff and more stable teams.

Create the operational definition of your aim

It is critical that teams determine some criteria to measure improvement.

For example:

"All surgical patients will be assessed against the risk for VTE within 12 months".

Decide what measures will inform you of your progress and how you are going to collect them

In terms of defining and measuring 'perioperative harm', this should be done through a review of reported incidents and the appropriate triggers on the UK Global Trigger²³. This could include random case note reviews using the Global Trigger Tool and reporting data on the number of harm events on a monthly basis.

Teams have used a sampling approach, spot checks or a weekly audit at designated times. Regardless of the chosen method, ensure you maintain a standard and consistent approach over time for accurate results.

Collection of HR data including staff surveys, sickness rates, turnover rates and the use of temporary staffing can be used to identify measurable improvements to support the use of the Five Steps to Safer Surgery. Tools to measure team culture are another useful source of data to demonstrate improvement (*discussed in the section 'Part A: Improve Teamwork and Communication'*).

Measures used to track progress to improve the smooth running of theatre include the number of times equipment has been found missing or faulty during procedures, recorded at debrief.

Post updates to results regularly and prominently

Enthusiasm for the project will decrease if clinical staff perceive that the leadership's enthusiasm is reducing. It is essential to regularly update all staff involved in the work on the monthly change in rates and levels of compliance. This ensures teams are engaged, sustains the momentum of improvement and demonstrates the impact of the Five Steps for Safer Surgery.

NB: *In some areas an obvious improvement may take some time. If staff are not aware they may feel their efforts are not producing the required benefits.*

Comparing rates between hospitals (benchmarking)

Benchmarking is the practice of comparing rates of disease entities or patterns of therapy across organisations. Benchmarking, while often used to track performance, may not be a valid method to compare performance between facilities because of differences in patient population, resource availability, severity of illness and measurement methodologies.

Fortunately, this intervention does not require a comparison of rates between hospitals. As long as you establish methods in your organisation to determine the patterns and methods of your regular data collection, your results will be consistent over time for your own

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performance and your own improvement, which is the primary interest.

Any benchmarking should be based on improvement, rather than comparing rates.

If you learn of a hospital that has significantly improved, based on data and using the same measure over time, then learn from their work. Even if they are using a different definition from your hospital or treat some different populations, there will still be value in finding out what practices and changes they used to achieve their results.

What changes can we make that will result in improvement?

Making Five Steps to Safer Surgery fit into the patterns and habits at your organisation is essential.

Teams are most effective when they engage doctors, nurses, anaesthetists, operating department practitioners and other relevant staff to work with them to develop key aspects of the implementation. Where possible, try to fit new actions alongside those already established. This increases the likelihood they will be remembered and therefore carried out.

Discourage the tendency to select and try out items that seem easy instead of more difficult components in the intervention.

There are many factors that contribute to perioperative harm. Improving the care associated with each component of Five Steps to Safer Surgery will lead to a larger improvement overall.

Only implementing one or two components reduces the overall impact of the intervention and it will be much more difficult to observe related changes in your outcome measure.

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