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Date of publication

This guide was published in April 2010 and will be reviewed in April 2012. The latest version will always be available online on the programme’s website: www.1000livesplus.wales.nhs.uk

The purpose of this guide

This guide has been produced to enable healthcare organisations and their teams to successfully implement a series of interventions to improve the safety and quality of care that their patients receive.

This ‘How to Guide’ must be read in conjunction with the following:

- Leading the Way to Safety and Quality Improvement
- How to Improve

Further guides are also available to support you in your improvement work:

- How to Use the Extranet
- A Guide to Measuring Mortality
- Improving Clinical Communication using SBAR
- Learning to use Patient Stories
- Using Trigger Tools
- Reducing Patient Identification Errors

These are available from the 1000 Lives Plus office, or online at www.1000livesplus.wales.nhs.uk

Where reference is made to 1000 Lives Plus, this includes the work undertaken as part of the 1000 Lives Campaign and the second phase of this improvement programme - 1000 Lives Plus.

The guide uses examples from the former NHS organisational structures, and where possible this has been acknowledged.

We are grateful to The Health Foundation for their support in the production of this guide.
Improving care, delivering quality

The 1000 Lives Campaign has shown what is possible when we are united in the pursuit of a single aim: the avoidance of unnecessary harm for the patients we serve. The enthusiasm, energy and commitment of teams to improve patient safety by following a systematic, evidence-based approach has resulted in many examples of demonstrable safety improvement.

However, as we move forward with 1000 Lives Plus, we know that harm and error continue to be a fact of life and that this applies to health systems across the world. We know that much of this harm is avoidable and that we can make changes that reduce the risk of harm occurring. Safety problems can’t be solved by using the same kind of thinking that created them in the first place. To make the changes we need, we must build on our learning and make the following commitments:

- Acknowledge the scope of the problem and make a clear commitment to change systems.
- Recognise that most harm is caused by bad systems and not bad people.
- Acknowledge that improving patient safety requires everyone on the care team to work in partnership with one another and with patients and families.

The national vision for NHS Wales is to create a world class health service by 2015: one which minimises avoidable, death, pain, delays, helplessness and waste. This guide will help you to take a systematic approach and implement practical interventions that can bring that about. The guide is grounded in practical experience and builds on learning from organisations across Wales during the 1000 Lives Campaign and also on the experience of other campaigns and improvement work supported by the Institute for Healthcare Improvement (IHI).
Introduction

Surgery generally is very safe. However, there is the opportunity to improve further the system of care for surgical patients and experts have identified:

a) four interventions to reduce the number of infections after surgery,

b) two key interventions to further improve team work

This guide introduces these interventions, which, it is proposed, will prevent surgical complications. These interventions and measures should be considered for adult patients undergoing surgical procedures in the hospital setting.

This therefore does not include outpatient surgical interventions or GP minor surgery.

The importance of preventing surgical site infections

Surgical site infections still occur and cause significant mortality and morbidity despite many advances in the surgical environment and techniques.¹

- Infection rates of between 15-30% have been identified.²
- During 2008, 251 hospitals collected data on 94,750 surgical procedures. A total of 1,191 SSIs were detected, with readmission SSIs comprising 30% of this total.³
- Prevalence in Wales; SSIs accounted for 19% of the healthcare associated infections.⁴
- Patients with an SSI on average have an additional hospital stay of 6.5 days and that hospital costs are doubled. Extrapolating this to all acute hospitals in England gives an estimated additional annual cost of approximately £1 billion.⁵
- NICE (2008) identified that an infection increases the cost by two to five times when compared to patients who suffer no infection, equating to between £1618 and £2398 per patient.⁶
- Coello (2005) identified the extra LOS (length of stay) due to infections ranged from 3.3 days for abdominal hysterectomy to 21 days for limb amputation, and was at least nine days for other categories.⁷
- The additional cost attributable to SSI ranged from £959 for abdominal hysterectomy to £6103 for limb amputation. A recent exploration of post discharge SSI rates and costs⁸, identified an infection rate of 27% in colorectal patients and this was associated with a treatment cost of £10,500 per patient.
- The Centres for Disease Control and Prevention (CDC) have estimated that 40 to 60 percent of infections in clean elective surgery are preventable.
- There were 457,000 surgical procedures performed in Wales in 2007-2008. Using a conservative overall surgical site infection rate of 3% this represents over 22,800 infections. A less conservative estimate of a 15% infection rate represents nearly 68,550 infections.⁹
References

   www.cdc.gov/ncidod/dhsp/gl_surgicalsite.html


The revision of this guide has resulted in two changes to the previous content area:

- Continue beta blockers for patients admitted on beta blockers.
- This intervention area has been removed from the content area as the evidence to support this intervention is weak.
- Identify patients at risk, and provide appropriate DVT prophylaxis.
- The launch of the new content area of Hospital Acquired Thrombosis (HAT) incorporates this intervention.
Reducing Surgical Complications
Driver Diagram

**Content area**

**Drivers**
- Administer prophylactic antimicrobials appropriately
- Use of recommended hair removal methods
- Maintain glycaemic control for known diabetics
- Maintain peri-operative normothermia
- Use team briefings at the beginning of the list
- Use WHO surgical safety checklist for each patient

**Interventions**

**Preventing surgical site infections**
- Creating a team culture attuned to detecting and rectifying intra-operative errors

**Patient involvement**
- Patient education
- Patient awareness of risks
- Patient involvement in care

Reducing surgical complications
Getting Started

Have you set up your team?
You need to consider three different dimensions:

- Organisational level leadership
- Clinical or technical expertise
- Frontline leadership and team membership

See the ‘Leading the Way to Safety and Quality Improvement’ How to Guide; and Appendix B for further information.

Do you know how you will measure outcomes?
For this content area, you should use the following outcome measure:

- % of surgical patients with surgical site infections

See Appendix A for further information.

Do you and your team understand how to apply the Model for Improvement?
The Model for Improvement is a fundamental building block for change and you need to understand how to use it to test, implement and spread the interventions in this guide.

See the ‘How to Improve’ guide and Appendix C for further information.

How are you going to measure process reliability?
In order to improve outcomes for your patients you need to demonstrate you are using these interventions reliably. This means that all the elements of the interventions are performed correctly on 95% or more of the occasions when they are appropriate. You need to do this by using the process measures in this guide.

See the ‘How to Improve’ guide and Appendix C for a summary of all process measures.

How will you share your learning?
Contact 1000 Lives Plus for details of mini-collaboratives and other ways to share your learning and to learn about the progress of other teams.
Drivers and Interventions

This section details the interventions highlighted in the driver diagram which evidence has shown to be effective in this content area. You should use the Model for Improvement to test, implement and spread each intervention, using the listed process to monitor progress.

Please note that tools suggested for use will, where possible, be linked directly from this document using hyperlinks.

Driver: Preventing Surgical Site Infections

To assist with the understanding of the impact of surgical site infection (SSI) in your clinical areas, the overarching measure SSI should be reported monthly and be the main measure for the organisation’s board internally. It should also be reported externally to the extranet reporting tool. To aid the collection of data without increasing the burden on organisations the Welsh Healthcare Associated Infection Programme (WHAIP) team will supply a national rate for SSI in orthopaedic and caesarean section surgery.

WHAIP and the informatics team of Public Health Wales have developed a tool to aid the collection of data outside of the mandated areas. The tool requires minimal information to be collated e.g. patients name and hospital number and notification of when an infection is identified. This simple reporting tool will enable organisations to identify the denominator (the number of patients in the sample sub group) and the number of infections identified, giving an overall rate of infection for that sub group. Health Boards should move towards collating and reporting SSI rates outside of the mandated reporting specialists, starting with those specialties testing and spreading the SSI bundle e.g. patients having colorectal surgery.

Identification of infections

This is not without its challenge as many patients will not present to the Health Board/organisation in which the surgery took place, when they develop a SSI. For hospital clinical teams post-discharge surveillance is recognised to be difficult. Much work has been done to improve this with the mandatory surveillance of post hip and knee replacement and caesarean section infections. With the advent of the new reconfigured NHS in Wales there is an opportunity for closer working between primary and secondary in this area.

There are a number of other opportunities which can be used to identify patients who develop an infection post operatively. None are going to provide a comprehensive figure of what the true SSI rate is for the Health Board but it will give and idea of whether there is a general reduction in infection rates over time when using the Campaign interventions. This data therefore cannot be used for comparative purposes between organisations or even between teams in the same Health Board. The data can only be used as a feedback mechanism to the Health
Board to identify where their issues are and whether or not the interventions implemented are making a difference.

Should Health Boards develop other mechanisms to collect this data, this should not interfere with the mandatory reporting process and should be collated separately.

A separate guide giving examples of how post discharge infections can be identified and feedback to the health board is available from the 1000 Lives Plus internet and extranet site (see resources).

**Intervention 1: Appropriate Use of Prophylactic Antimicrobials**

There is extensive evidence\(^1\) that the use of prophylactic antimicrobials is appropriate for:

- clean surgery involving the placement of a prosthesis or implant
- clean-contaminated surgery
- contaminated surgery

It is recommended that prophylactic antimicrobials are not routinely used for clean non-prosthetic uncomplicated surgery. Also consideration should be given to a repeat dose of antimicrobial prophylaxis when the operation is longer than the half-life of the antimicrobial given. It has also been suggested that this should apply to patients classified as obese as well.

Whilst a majority of the evidence suggested prophylactic antimicrobials should be given within the 60 minutes prior to the surgical incision there are some emerging studies which suggest a narrower time frame of 59-30 minutes prior to the incision.\(^2\) Any prophylaxis, should consider the timing and pharmacokinetics (for example, the serum half-life) and necessary infusion time of the antimicrobial. By giving the antimicrobials at the start of the induction of anaesthesia this should provide the optimal conditions for the patient.

For the purposes of this work, the prophylactic interventions are:

1. Antimicrobials within 1 hour before surgical incision*
2. Prophylactic antimicrobial agent consistent with locally determined guidelines
3. Discontinuation of prophylactic antimicrobials within 24 hours of surgery

*Due to the longer infusion time required for vancomycin, it is acceptable to start this antimicrobial (e.g. when indicated because of beta-lactam allergy or high prevalence of MRSA) within 2 hours prior to incision.

Whilst it is currently suggested that prophylactic antimicrobials should be administered after the cord has been clamped in women undergoing a caesarean section, at the time of writing this guide NICE are reviewing this guidance. Recent papers have suggested that SSI rates post caesarean section can be improved by administering prophylactic antimicrobials in the 60 minutes prior to incision with no harmful outcome for the neonate.\(^3\) An update will be provided once a consensus view is obtained from the Royal Colleges.
Measures:
For this intervention, use the following process measures:

I. Percentage antimicrobials administered on time.
II. Percentage antimicrobials discontinued early.

Applying the Model for Improvement

**Plan** - Identify one nurse, junior doctor or clinical pharmacist willing to test a method of ensuring antimicrobials are discontinued within 24 hours of surgery.

**Do** - Undertake the review on one morning after a usual operating session the previous day.

**Study** - At an appropriate point in the day talk to nurse / doctor / pharmacist involved about how ‘user friendly’ the process was.

- Did it fit into the normal pattern of patient follow up or review?
- Was there anything they would like to see added? How long did it take? Did it pick up any ‘glitches’?
- Was it too dependent on someone remembering to do it? How could we make the process better next time?

**Act** - Make refinements based on the discussion. If the refinements may take time to implement such as creating a new form, arrange to do this but agree how you could carry on the testing by making refinements as you go along, testing again each time until you can do this successfully for the whole day.

Now test with another nurse / junior doctor/ pharmacist. It may help if the first testers identifies and discusses the process with a willing colleague.

Example of how to improve compliance
Powys Teaching Health Board found that when they introduced the WHO Surgical Safety Checklist their compliance for on time antimicrobials soon reached 100% and this has been maintained for several months.

Betsi Cadwaladr University Health Board (Eastern Division) have also used various prompts to remind the surgical team that antimicrobials are needed. One which appeared to push their compliance over 95% was the need for antimicrobials included on the operating list.
Top Tips

- Use pre-printed or computerised standing orders specifying antimicrobial agent, timing, dose, and discontinuation.
- Using electronic prescribing / pathways to direct to the appropriate antimicrobials and timely discontinuation.4
- Change operating room drug stocks to include only standard doses and standard drugs, reflecting national guidelines.
- Use visible reminders/checklists/stickers.
- Involve pharmacy, infection control, and infectious disease staff to ensure appropriate timing, selection, and duration.
- Verify administration time during “time-out” so action can be taken if not administered. Compliance has been improved from 55% to 99% using this method.5
- Use multidisciplinary ward rounds including pharmacists to ensure antimicrobials do not continue in the post operative period.

**Key area for action: much progress is being made on the timing of antimicrobials; the emphasis now needs to move to the appropriate discontinuation of antimicrobials**

**How to engage the patient in this intervention**

Patients should be informed they are receiving prophylactic antimicrobials and that these are for a limited period. The patient can be given advice about questioning the appropriateness of the medication they are given if it continues after the recommended doses.

**References**

Intervention 2: Use Recommended Hair Removal Methods

Evidence suggests that the rate of surgical site infection is not influenced by whether hair removal is undertaken or not. If hair is to be removed the method of doing so can affect the surgical site infection rate. The limited evidence from a systematic review suggests that the use of electric shavers (clippers) compared to shaving with a razor, reduces the incidents of SSI.¹

For the purposes of this work, the appropriate hair removal method is:

Only electric shavers/clippers to be used to remove hair at the site of incision.

**Measure:**

For this intervention, use the following process measure:

Percentage surgery patients with appropriate hair removal

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Applying the Model for Improvement

**Plan** - Identify one nurse, junior doctor or ECG technician willing to test this intervention outside of the operating department e.g. in A&E for 12-lead ECGs, to ensure any patients requiring cardiac surgery have not had their chest hair shaved

**Do** - Try it for one shift

- At an appropriate point in the day talk to nurse / doctor / ECG technician how ‘user friendly’ the process was.
  
  ■ Did it fit into the normal pattern work?
  
  ■ How much longer did it take? How could we make the process better next time?

**Act** - Make refinements based on the discussion. Was it difficult to find clippers, were they charged etc. Arrange to do this but agree how you could carry on the testing by making refinements as you go along, testing again each time until you can do this successfully for the whole day.

Now test with another ECG technician. It may help if the first testers identifies and discusses the process with a willing colleague.
**Example of how the need to improve was identified**

Some departments found that when they discussed this intervention area with midwives they weren’t aware of the up to date evidence and had been advising women to shave during the later stages of their pregnancy in case they needed surgery. Educational and promotional events have ensured that appropriate advice is now given.

Betsi Cadwaladr University Health Board (Eastern Division) undertook an audit of pregnant women and found that a significant number of them would have shaved themselves in case they needed surgery.

**Top Tips**

- Ensure adequate supply of electric shavers and train staff in proper use.
- Use reminders (signs, posters).
- Using pre assessment clinics to educate patients not to self-shave preoperatively.
- Use of educational, patient information leaflets to reinforce.
- Remove all razors from the entire hospital except for men who wish to shave their faces.
- Work with the purchasing department so that razors are supplied only to those appropriate areas.
- Engagement with clinical directors and business managers to ensure a switch back to razors is not considered on a cost improvement basis.
- Consider exception reporting when over 12 month data show ongoing compliance.

**How to engage the patient in this intervention**

Patients are now the key to the continuing success in this intervention area. During their pre-assessment clinics, patients should be educated in the importance of not shaving themselves at the site of surgery.

**Reference**

7 Tanner J; Woodings D; Moncaster K. Preoperative hair removal to reduce surgical site infection. Cochrane Database of Systematic Reviews 2006, Issue 3
Intervention 3:
Maintenance of Peri-operative Glycaemic Control

Review of medical literature shows that the degree of hyperglycaemia in the peri-operative period is correlated with the rate of surgical site infection in patients undergoing major cardiac surgery.\textsuperscript{1,2,3,4} There are only two Randomised Controlled Trials (RCT) reported in this area but there are also a number of other case controlled studies as well as retrospective records reviews and analysis of national databases.

Collating all this information suggests that a wider group of surgical patients could benefit from tight glycaemic control in the peri-operative period.

*Please note: For 1000 Lives Plus, the desired range is being defined as a serum glucose level between 5-10 mmol/L, throughout peri-operative period.

Maintenance of peri-operative glycaemic control is;

1. All diabetic patients (whether insulin or tablet controlled) should have capillary glucose monitoring instituted at a minimum frequency of 4 hourly prior to transfer to the operating theatre, immediately pre-operatively, hourly during surgery and until discharge from recovery and / or infused regime is stable; and then 2-4 hourly until normal feeding is resumed.

2. All patients should be treated, according to local protocols, to maintain a blood glucose level between 5-10 mmol/L.

Although there is some evidence that even tighter levels of glycaemic control can influence SSI, this must be balanced against the risk of inducing hypoglycaemia. As most diabetic surgical patients will be nursed outside of a critical care setting, a range of 5-10 mmol/L reduces the risk of hypoglycaemia.

\begin{center}
\textbf{Measure:}
\end{center}

For this intervention, use the following process measure:

Percentage of diabetic patients with good glucose control (within range).

\begin{center}
\textbf{Applying the Model for Improvement}
\end{center}

\begin{itemize}
  \item [Plan] Identify one anaesthetist willing to test a regime chart in the operating department
  \item [Do] Try it for one patient
  \item [Study] At an appropriate point in the day talk to the anaesthetist about how ‘user friendly’ and clear the regime is.
    \begin{itemize}
      \item How much longer did it take? How could we make the process better next time?
      \item Did the patient have the desired outcome of blood sugars within range?
    \end{itemize}
  \item [Act] Make refinements based on the discussion. Arrange to do this but agree how you could carry on the testing by making refinements as you go along,
\end{itemize}
testing again each time until you can do this successfully for the whole day.
Now test with another anaesthetists or the recovery nurse. It may help if the
first testers identifies and discusses the regime with a willing colleague.

Top Tips

- Have a reliable system to identify all diabetic patients in pre-assessment
  and ensure that their surgery is scheduled for as early in the day as
  possible, e.g. first on the list.
- Have a policy guiding the allocation of diabetic patients to early morning
  surgery, including the early feeding and commencement of normal insulin
  therapy if not remaining Nil By Mouth after surgery.
- Have patients manage their own insulin as soon as they are capable.
- All diabetic patients should have their diabetes management reviewed to
  ensure desired glycaemic control is attained (see above).
- Regularly check preoperative blood glucose levels on all diabetic patients
  to identify hyperglycaemia and hypoglycaemia; this is best done early
  enough that assessment of risk can be completed and treatment initiated
  if appropriate.
- Develop and implement one glucose control protocol to be used for all
  surgical patients which identifies and manages all patients with diabetes,
  including triggers to instigate IV protocols in starved patients and step
  down to subcutaneous (SC) regimes.
- Eliminate the use of SC sliding insulin dosage scales; if a sliding scale
  is used, standardize it through the use of a protocol and pre-printed or
  computer generated prescription chart, which clearly designates the
  specific increments of insulin coverage.
- Require an independent double-check of the drug, concentration, dose,
  pump settings, route of administration, and patient identity before
  administering all IV insulin.
- Use pre-typed diabetic and insulin infusion orders with “units” written
  in full.
- Use a diabetic management flow sheet.
- Separate look-alikes and sound-alike products by labelling, by time, and
  by distance, unless standardising to a single preparation / product.

How to engage the patient in this intervention
A majority of diabetic patients can successfully manage their condition and
should be encouraged to do so as soon as possible after surgery.
References


The recent guidelines produced by The All Wales Consensus Group to support the NSF for Diabetes in Wales has suggested regimens.

Intervention 4: Maintenance of Intra Operative Normothermia

The 2008 NICE guidance reinforces the evidence that maintaining normothermia for surgical patients is imperative. It is not unusual for a patient’s core temperature to drop below 36.0 °C following induction of general or regional anaesthesia. If the perioperative team do not manage this risk throughout the perioperative patient pathway, as many as 70% of patients undergoing routine surgery may be hypothermic on admission to the recovery room. In Wales this could mean nearly 290,000 patients per year.¹

The main reasons for hypothermia include the loss, under general or regional anaesthesia, of the behavioural response to cold and the impairment of thermoregulatory heat-preserving mechanisms and anaesthetic-induced peripheral vasodilation (with associated heat loss). Additional factors that increase the risk of hypothermia include the use of un-warmed blood and intravenous or irrigation solutions, and environmental factors such as a lower theatre temperature.

It is also sensible to prevent patients getting cold while waiting or being transported for surgery, exposing the body during surgery and, avoiding fluid deprivation before anaesthesia.

If hypothermia does develop then patients can experience increased perioperative blood loss, longer post-anaesthetic recovery, postoperative shivering and thermal discomfort. There is also an increased risk of morbid cardiac events including arrhythmia, altered drug metabolism, increased risk of wound infection, reduced patient satisfaction with the surgical experience and a longer stay in hospital.

There are several systematic reviews of the literature concerning the effects and prevention of hypothermia.²³ The medical literature indicates that patients undergoing elective hernia repair, varicose vein surgery, breast surgery or colorectal surgery have a decreased risk of SSI if they are warmed during the perioperative period.⁴⁻⁵ Whilst some experts believe that initial efforts should be directed at colorectal surgery patients due to their increased risk of SSI, until additional clinical studies are performed, there is evidence to show that preventing hypothermia in all patients considered at risk is beneficial in reducing other complications.

*Please note: This component of care does not pertain to those patients for whom therapeutic hypothermia is being used (e.g., hypothermic cardioplegia).
**Normothermia interventions:**

Patients are risk assessed for the potential to develop inadvertent hypothermia during surgery and their risk of cardiovascular complications (documented).

1. Patients with a **core** temperature of less than 36.0°C pre operatively do not commence their anaesthesia and surgery until they have been warmed to at least 36.0°C using forced warm air. Active warming should then continue throughout the procedure.

2. All patients at higher risk and / or with surgery anticipated to last or more than 30 minutes, are warmed intra operatively using forced warm air.

3. All patients routinely have their temperature monitored; 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.

4. Healthcare professionals should ensure that intravenous fluids (500 ml or more) and blood products are warmed to 37°C using an appropriate fluid warming device.

5. Patients who arrive in recovery with a temperature less than 36.0°C should be warmed using forced warm air and transfer to the ward should not be arranged until their core temperature is 36.0°C or above.

*If this is not a practical intervention e.g. exposed surface area too extensive to allow forced warm air, then an alternative form of warming needs to be considered. There is an extensive range of products on the market which could be used for most surgery.

| Measure: |
| For this intervention, use the following process measure: |
| Percentage patients with perioperative normothermia. |

**Applying the Model for Improvement**

**Plan** - Identify one anaesthetist willing to test if warming fluids helps to maintain normothermia in his or her patients for non major type surgery lasting over 30 minutes.

**Do** - Try it for one patient

**Study** - After the case talk to the anaesthetist and check the recorded temperature of the patient. How ‘user friendly’ the process was, did it fit into the normal pattern work? How much longer did it take?

**Act** - Make refinements based on the discussion. Was it difficult to find the equipment? Arrange to do this but agree how you could carry on the testing by making refinements as you go along, testing again each time until you can do this successfully for the whole day.

Now test with another case or the whole list.
Example of improving practice and saving money

Powys Teaching Health Board undertook an initial audit and established that 60-70% of their patients were suffering from hypothermia. They reviewed their processes and found that the transfer from the ward to the surgical unit was having a detrimental affect on the patients’ temperature and this was being exacerbated during the peri-operative period. Their solution was to use a forced warm air gown to warm vulnerable patients pre operatively and use the gown throughout their surgical stay. Not only did they improve the outcomes for patients by reducing their incidence of hypothermia but they also saved money by not having to launder cotton gowns.

Top Tips

To reduce the amount of heat lost during their hospital stay patients should:

- Ideally walk to theatre covered with a dressing gown and wearing slippers. Where patients are transferred on trolleys, then they should be covered with one cotton sheet and two blankets, or alternatively a duvet.

- In addition to the interventions above, to ensure other environmental factors are not detrimental to the maintenance of normothermia, the theatre temperature should be set at 21 °C whilst the patient is exposed, and the patient should be covered for as long as possible. This temperature setting could be turned down as soon as forced air warming is established. If however the team members are uncomfortably warm then active cooling clothing is available to purchase.

- It is also important to ensure that healthcare professionals are trained in the use any temperature recording or warming device. They should also be aware of, and carry out, any adjustments that need to be made in order to obtain an estimate of core temperature from that recorded at the site of measurement. They should also be aware of any such adjustments that are made automatically by the device used.

- Temperature monitoring devices should be calibrated regularly to ensure they are accurately recording the temperature of the patient.

- Supplies of forced warm air machines need to be sufficient to meet the demands of the service.

- The efficacy of fluid warmers are being tested by Surgical Materials Testing Laboratory (SMTL) and the Campaign will review the report once available.

- It may be useful to provide daily feedback, e.g. the number of cases between each hypothermic patient.

Key area for action: much progress is being made on the use of forced warm air intra operatively. The emphasis now needs to move to the appropriate use of warmed fluids.
How to engage the patient in this intervention

At pre assessment, they should be told their risks of becoming hypothermic during their surgery so they can bring along warm clothing to the hospital. In order to ensure patients do not lose heat prior to or during the transfer to the theatre department, they should be encouraged to wear their own warm normal day clothing, bed clothing, dressing gowns and slippers for as long as possible, prior to surgery.

References

1 Health Solutions Wales Data Extract (10326) Total number of surgical operations, for Welsh residents 2006. Received 27-02-08


**Driver: Creating a Team Culture**

**Intervention 5:**
**Use team briefing at beginning of each operating list**

Team briefings are a simple way for the operating team to share information about potential safety problems and concerns about patients on that operating list. The briefing should foster an environment in which the team can share information without fear of reprisal and integrate the reporting of safety issues into everyday work.\(^1\) They also allow the whole theatre team to anticipate potential problems or challenges. The idea is that the briefing is just that brief, and should only take about five minutes occurring at the beginning of the operating list.

Observational studies have identified that using a structured team brief reduced the number of communication failures and promoted proactive and collaborative team communication\(^1\) and even though there is scepticism from some surgeons, those who did participate felt that it had a positive impact.\(^2\)

**Measure:**
For this intervention, use the following process measure:

Percentage daily team briefings.

**Applying the Model for Improvement**

- **Plan** - Identify one surgeon willing to test a structured briefing at the beginning of the list using a crib sheet.
- **Do** - Try it for one list
- **Study** - After the list talk to the team. How ‘user friendly’ was the process?
  - Did it fit into the normal pattern work?
  - Did the crib sheet have the right questions / prompts on it?
  - How much longer did it take?
- **Act** - Make refinements based on the discussion. Arrange to do this but agree how you could carry on the testing by making refinements as you go along, testing again each time until you can do this successfully for the whole day.

Now test with another list or another team. It may help if the first testers identifies and discusses the crib sheet with a willing colleague.

**Example of how to embed into practice**

Powys Teaching Health Board have developed a process of linking the team briefing and the WHO checklist which encourages all the team to take time before the beginning of the list to discuss the days work and provides a template for discussion.
Top Tips

- Allocating five minutes before the start of the operating list where the core members of the team e.g. surgeon, scrub nurse, circulating nurse, ODP and anaesthetist can meet to discuss the requirements of that operating list and any safety concerns.
- Identify in advance a list of safety issues for discussion e.g. patient allergies, anticipated complications etc., potentially using a structured checklist.
- Using a de-briefing session at the end of the operating list to review any issues raised, answer concerns or discuss incidents.

References


Intervention 6: Implementation of the WHO Safer Surgery Checklist

1000 Lives Plus included a requirement to have team briefings at the beginning of the operating list as a simple way for the operating team to share information about potential safety problems and concerns about patients on that operating list. These briefings should foster an environment in which the team can share information without fear of reprisal and integrate the reporting of safety issues into everyday work. They also allow the whole theatre team to the opportunity to anticipate potential problems or challenges.

The ‘Safer Surgery Checklist’, including the Time Out, integral to the checklist, provides opportunity for the whole theatre team to share information about potential safety problems and concerns about specific patients on the operating list. It facilitates the integration of essential reporting on safety issues into everyday work. This proactive information exchange also enables the whole theatre team to anticipate potential problems or challenges.

Measure:

For this intervention, use the following process measure:

Percentage completing the ‘time out’ section using Safer Surgery Checklist with the core team.

Applying the Model for Improvement

Plan - Identify one clinician willing to test the checklist outside of the operating department e.g. outpatients procedure.

Do - Try it for one list.

Study - After the list talk to the team. How ‘user friendly’ the process was.

- Did it fit into the normal pattern work?
- Did the checklist have the right questions / prompts on it?
- How much longer did it take?

Act - Make refinements based on the discussion. Arrange to do this but agree how you could carry on the testing by making refinements as you go along, testing again each time until you can do this successfully for the whole day.

Now test with another list or another team. It may help if the first testers identifies and discusses the checklist with a willing colleague.
Example of how to get started

Aneurin Bevan Health Board were early adopters of the checklist and used the challenge of a 90 day sprint to aid the implementation of the checklist across all sites. The identified a clear starting point and through rapid PDSA cycles rolled out the checklist quickly. They found that once a few people started to use it, other teams would ask if they could start as well.

Top Tips

- Use in conjunction with team briefing so avoid parts of the checklist for each patient i.e. team introduction.
- Build it into the normal flow of work e.g. prior to giving the surgeon the knife for the first incision.
- Allow local additions to the checklist.
- Identify and share where the checklist has made a difference.

How to engage the patient in this intervention

The ‘Sign in’ should take place in the anaesthetic room and / or prior to anaesthetising the patient and there are frequent occasions where under regional or local anaesthetic patients will be awake during their procedure. The patient should be made aware of the use of the checklist as a safety check prior to surgery and it should be identified that some of the questions may worry patients and should be adapted as appropriate.

Reference

Helpful Resources

1000 Lives Plus
www.1000livesplus.wales.nhs.uk

Resources

- A print quality version of the WHO checklist and an implementation manual can be downloaded from www.npsa.nhs.uk/nrls/alerts-and-directives/alerts/safer-surgery-alert/

- A Starter Kit has also been developed by WHO to assist pilot sites in implementing the checklist. This can be found at www.patientsafetyfirst.nhs.uk A UK version will be available soon.

- There is also an opportunity to hear the author, Dr Atul Gawande, speak about the tools development and use in practice on the IHI web site (www.ihi.org/IHI/Programs/Campaign/Campaign.htm?TabId=7).

- If you would like to view a short film about the checklist please go to www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid45=59860
## Reducing Surgical Complications

### Appendices

<table>
<thead>
<tr>
<th>Measure name</th>
<th>% of surgical patients with SSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure type</td>
<td>Outcome</td>
</tr>
<tr>
<td>Related content area / driver</td>
<td>Reducing Surgical Complications</td>
</tr>
<tr>
<td>Description</td>
<td>The percentage of surgical patients developing a Surgical Site Infection (SSI). Even though one patient could experience more than one SSI during the same admission or surgical procedure, this measure is a percentage not a rate. The numerator, therefore, is based on a simple question: Did the patient develop a SSI? Yes or No? The measure is not concerned with how many the patient developed.</td>
</tr>
<tr>
<td>Rationale</td>
<td>This is a measure of one aspect of the quality of care for patients undergoing surgery.</td>
</tr>
<tr>
<td>Numerator</td>
<td>The total number of elective surgical patients in the sample who developed a SSI.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Denominator</td>
<td>The total number of surgical cases (patients) in the sample.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Method of calculation</td>
<td>Calculate the actual percent of patients developing a SSI by dividing the numerator by the denominator and then multiplying the resulting proportion by 100.</td>
</tr>
<tr>
<td>Collection guidance</td>
<td>Even though one patient could experience more than one SSI during the same admission or surgical procedure, this measure is a percentage not a rate. The numerator, therefore, is based on a simple question: Did the patient develop a SSI (Yes or No)? The measure is not concerned with how many infections the patient developed. The decisions on sample size should be driven by surgical volumes. In order to have a viable percentage you want the denominator (number of surgical patients) to be at least 15-20 each month. If you fall short of this minimum, then you need to regroup and figure out what combination of areas and procedures you need in order to get this minimum denominator size. Data on post-hospital-discharge infections are critical to accurate SSI data relating to the surgery we do hence the community has a crucial role in collecting SSI data for feeding back to the surgical teams in the hospital.</td>
</tr>
<tr>
<td>Measure name</td>
<td>% antimicrobials administered on time</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Measure type</td>
<td>Process</td>
</tr>
<tr>
<td>Related content area / driver</td>
<td>Prevent SSI in Elective Surgery</td>
</tr>
<tr>
<td>Description</td>
<td>The percentage of elective patients receiving on-time prophylactic antimicrobials administration.</td>
</tr>
<tr>
<td>Rationale</td>
<td>This measure assesses whether units are complying with evidence-based practice. The implication is high compliance should reduce risk of infection.</td>
</tr>
<tr>
<td>Numerator</td>
<td>The number of elective surgical patients with prophylactic antimicrobials completely infused within 0-60 minutes prior to surgical incision (see exceptions listed) in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local audit (Data collection tools or patients notes)</td>
</tr>
<tr>
<td>Denominator</td>
<td>The total number of elective surgical patients in your pilot population during the month who should have received antimicrobial prophylaxis.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local audit (Data collection tools or patients notes)</td>
</tr>
<tr>
<td>Method of calculation</td>
<td>Calculate the actual percent of eligible patients receiving antimicrobial prophylaxis by dividing the numerator by the denominator and then multiplying by 100 resulting in a proportion.</td>
</tr>
<tr>
<td>Collection guidance</td>
<td>This is a Yes/No question. Did the patient receive prophylactic antimicrobials 0-60 minutes prior to surgical incision (see exceptions listed in the ‘How to Guide’). Create a system to track this measure prospectively in 100% of relevant pilot population. If antimicrobial administered or time of recording is not documented, count this case as one in which the patient was not given the antimicrobial on-time (i.e. count as error.) If you start measuring this in a pilot population, you will have to create a new data series in the Extranet every time you add another area to your surgical population. Note: Organisations are likely to adapt antimicrobial prophylaxis protocol(s) as part of their participation in 1000 Lives Plus.</td>
</tr>
</tbody>
</table>

**Exceptions**

- Within two hours if patient receiving vancomycin,
- If surgery is being carried out with tourniquet control, all antibiotic administration must be completed before the tourniquet is inflated and within one hour prior to surgical incision.
- Women undergoing caesarean section should receive the antibiotic as soon as the umbilical cord is clamped (this is under review).
<table>
<thead>
<tr>
<th><strong>Measure name</strong></th>
<th>% antimicrobials discontinued early</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure type</strong></td>
<td>Process</td>
</tr>
<tr>
<td><strong>Related content area / driver</strong></td>
<td>Prevent SSI in Elective Surgery</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Percentage of elective patients whose prophylactic antimicrobials were discontinued 24 hours (48 hours for CABG or other cardiac surgery) after the end of surgery.</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>This measure assesses whether units are complying with evidence-based practice. The implication is high compliance should reduce risk of infection and reduce the risk of antimicrobial resistance.</td>
</tr>
<tr>
<td><strong>Numerator</strong></td>
<td>The total number of elective surgical patients whose prophylactic antimicrobials were discontinued within 24 hours of the end of surgery (48 hours for CABG or other cardiac surgery) in your pilot population.</td>
</tr>
<tr>
<td><strong>Data Source</strong></td>
<td>Local audit (Data collection tools or patients notes)</td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
<td>The total number of elective surgical patients with no evidence of existing pre-operative infection in your pilot population during the month.</td>
</tr>
<tr>
<td><strong>Data Source</strong></td>
<td>Local audit (Data collection tools or patients notes)</td>
</tr>
<tr>
<td><strong>Method of calculation</strong></td>
<td>Calculate the actual percent of patients whose antimicrobials were discontinued by dividing the numerator by the denominator and then multiplying the resulting proportion by 100.</td>
</tr>
<tr>
<td><strong>Collection guidance</strong></td>
<td>This is a Yes/No question. Were the antimicrobials discontinued within 24 hours of the end of surgery? NB Patients in whom antimicrobials is continued as treatment should be excluded from this measure. Create a system to track this measure prospectively in 100% of relevant pilot population. Summarise and report every month on the Extranet. If you start measuring this in a pilot population, you will have to create a new data series in the Extranet every time you add another area to your surgical population.</td>
</tr>
<tr>
<td>Measure name</td>
<td>% with perioperative normothermia</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Measure type</td>
<td>Process</td>
</tr>
<tr>
<td>Related content area / driver</td>
<td>Prevent SSI in Elective Surgery</td>
</tr>
<tr>
<td>Description</td>
<td>The percentage of appropriate elective surgical patients core body temperature of greater than 36.0°C immediately following surgery.</td>
</tr>
<tr>
<td>Rationale</td>
<td>This measure assesses whether units are complying with agreed guidance. The implication is that high compliance should reduce the risk of developing a Surgical Site Infection</td>
</tr>
<tr>
<td>Numerator</td>
<td>The number of appropriate elective surgical patients with a body temperature of greater than 36.0°C immediately following surgery.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Denominator</td>
<td>The total number of surgical patients not excluded from normothermic maintenance in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Method of calculation</td>
<td>Calculate the actual percent of eligible surgical patients with perioperative normothermia by dividing the numerator by the denominator and then multiplying the resulting proportion by 100</td>
</tr>
<tr>
<td>Collection guidance</td>
<td>Create a system to track this measure prospectively in 100% of the surgical patients in the pilot population. Temperature readings should be record immediately upon leaving the operating theatre. Normothermia = temperature of greater than 36.0°C. Exclusion criteria: Patients for whom hypothermia is deliberately sought for therapeutic reasons (e.g. hypothermic total circulatory arrest). If you start measuring this in a pilot population, you will have to create a new data series in the Extranet every time you add another area to your surgical population.</td>
</tr>
</tbody>
</table>

Local feedback is important to identify areas of weakness and success. This intervention lends itself to a particular type of measure - “the number of patients between incidents of hypothermia (i.e. patients who arrive at recovery with a temperature less than 36.0°C)”. This can be displayed locally and collated over time to identify an increase in the amount of time lapsed between events.
<table>
<thead>
<tr>
<th>Measure name</th>
<th>% surgery with appropriate hair removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure type</td>
<td>Process</td>
</tr>
<tr>
<td>Related content area / driver</td>
<td>Prevent SSI in Elective Surgery</td>
</tr>
<tr>
<td>Description</td>
<td>The percentage of inpatient elective surgical patients with hair removal by an approved method.</td>
</tr>
<tr>
<td>Rationale</td>
<td>This measure assesses whether units are complying with evidence based practice. The implication is that high compliance should reduce the risk of developing a surgical site infection.</td>
</tr>
<tr>
<td>Numerator</td>
<td>The total number of elective surgical patients with surgical site hair removal by an approved method in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local audit</td>
</tr>
<tr>
<td>Denominator</td>
<td>The total number of elective surgical patients in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local audit</td>
</tr>
<tr>
<td>Method of calculation</td>
<td>Calculate the actual percent elective surgical patients with appropriate hair removal by dividing the numerator by the denominator and then multiplying the resulting proportion by 100.</td>
</tr>
<tr>
<td>Collection guidance</td>
<td>Consult the How To Guide for advice on what constitutes appropriate hair removal. Depending on the volume of elective surgical patients seen each week, this measure may be based on a total enumeration of surgical patients or sample. Each month 15-20 surgical cases should be reviewed. If there is a large volume of surgical cases each week (e.g., over 50) stratification could be considered.</td>
</tr>
<tr>
<td><strong>Measure name</strong></td>
<td>% diabetic patients with good glucose control</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Measure type</strong></td>
<td>Process</td>
</tr>
<tr>
<td><strong>Related content area / driver</strong></td>
<td>Prevent SSI in Elective Surgery</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The percentage of known diabetic elective surgical patients with controlled serum glucose (5-10 mmol/L) immediately post operatively.</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>This measure assesses whether units are complying with a small evidence-base. The implication is that high compliance should reduce risk of infection</td>
</tr>
<tr>
<td><strong>Numerator</strong></td>
<td>The number of elective diabetic surgical patients with controlled serum glucose (5-10 mmol/L) in the immediate post-operative period i.e. in recovery room.</td>
</tr>
<tr>
<td><strong>Data Source</strong></td>
<td>Local Audit</td>
</tr>
<tr>
<td><strong>Denominator</strong></td>
<td>The total number of diabetic elective surgical patients in your pilot population.</td>
</tr>
<tr>
<td><strong>Data Source</strong></td>
<td>Local Audit</td>
</tr>
<tr>
<td><strong>Method of calculation</strong></td>
<td>Calculate the actual percent of diabetic surgical patients with postoperative glucose control by dividing the numerator by the denominator and then multiplying the resulting proportion by 100</td>
</tr>
<tr>
<td><strong>Collection guidance</strong></td>
<td>Create a system to track this measure prospectively in 100% of the surgical patients in the relevant pilot population. If you start measuring this in a pilot population, you will have to create a new data series in the Extranet every time you add another area to your surgical population.</td>
</tr>
</tbody>
</table>

Although this measure only considers the immediate post-operative period, teams may wish to audit for the first three days post-operatively as a custom measure on the extranet (please refer to your local data collector).

Experience from the Safer Patient Initiative (SPI) sites has demonstrated that this intervention is difficult to achieve, especially in the short term. Therefore teams may want also to collect information on the range of blood sugar level as well as a simple “yes / no” response of ‘glucose control’ to establish just how far the processes are from being reliable e.g. did the patients having blood glucose level of 0.5 mmols/L above the range as opposed to 2 mmols/L above the range.
<table>
<thead>
<tr>
<th>Measure name</th>
<th>% daily team briefings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure type</td>
<td>Process</td>
</tr>
<tr>
<td>Related content area / driver</td>
<td>Create a team culture attuned to detecting and rectifying intra operative errors.</td>
</tr>
<tr>
<td>Description</td>
<td>The percentage of operating days in the month in which at least one team briefing, including the core team, was conducted per theatre list.</td>
</tr>
<tr>
<td>Rationale</td>
<td>The implication is that increased daily team briefings including the core team will create a team culture for detecting errors and rectifying data intra operative errors.</td>
</tr>
<tr>
<td>Numerator</td>
<td>The total number of number of days in the month in which at least one team briefing was conducted per theatre list in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Denominator</td>
<td>The total number of operating days in the month in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Method of calculation</td>
<td>Calculate the percent compliance with using team briefings by dividing the numerators by the denominator and then multiplying the resulting proportion by 100.</td>
</tr>
<tr>
<td>Collection guidance</td>
<td>Create a system to track this measure prospectively in 100% of relevant pilot population. If you start measuring this in a pilot population, you will have to create a new data series in the Extranet every time you add another area to your surgical population.</td>
</tr>
<tr>
<td>Measure name</td>
<td>% completing the ‘time out’ section using Safer Surgery Checklist with the core team</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Measure type</td>
<td>Process</td>
</tr>
<tr>
<td>Description</td>
<td>The percentage of elective surgical patients in the month which completed the ‘time out’ used the safer surgery checklist, including the core team.</td>
</tr>
<tr>
<td>Numerator</td>
<td>The total number of number of elective surgical patients in the month which completed the ‘time out’ the safer surgery checklist was used in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Denominator</td>
<td>The total number of elective surgical patients in the month in your pilot population.</td>
</tr>
<tr>
<td>Data Source</td>
<td>Local Audit</td>
</tr>
<tr>
<td>Method of calculation</td>
<td>Calculate the percent compliance completing the ‘time out’ using the checklist by dividing the numerators by the denominator and then multiplying the resulting proportion by 100.</td>
</tr>
</tbody>
</table>
| Collection guidance | Create a system to track this measure prospectively in 100% of relevant pilot population.  
This is a YES/NO outcome. Only patients where the ‘time out’ checklist was used for all appropriate cases are recorded as compliant. 
You can check compliance with list sign in / sign outs using the same method. 
If you start measuring this in a pilot population, you can create a new data series in the Extranet every time you add another area to your surgical population. |
Appendix B - Setting up your team

Achieving improvements that reduce harm, waste and variation at a whole-organisation level needs a team approach: one person working alone, or groups of individuals working in an unco-ordinated way will not achieve it and this applies equally at all organisational levels.

Whether your improvement priorities relate to 1000 Lives Plus content areas, national intelligent targets or other local priorities, you need to consider three different dimensions in putting your team together:

- Organisation level leadership.
- Clinical or technical expertise.
- Frontline leadership.

There may be one or more individuals on the team working in each dimension, and one individual may fill more than one role, but each component should be represented in order to achieve sustainable improvement.

**Organisation level leadership**

An Executive, or equivalent level Director, should always be given delegated accountability from the Chief Executive for a specific content area; and all staff working on the changes should know who this is. This individual needs sufficient influence and authority to allocate the time and resources necessary for the work to be undertaken. It is likely that accountability will be further delegated to Divisions, Clinical Programme Groups or Directorates and this can help to build ownership and engagement at a more local level. However, it is essential that the leader has full authority over the areas involved in achieving the improvement aim. As changes spread more widely, crossing organisational boundaries, appropriate levels of delegation will need to be reviewed.

When working with frontline teams, it is essential for organisational level leaders to have an understanding of the improvement methodology and to base conversations around the interpretation of improvement data. Reporting of progress to higher organisational levels should also use a consistent data format so that the Executive level leader can report to the Board on progress.

**Clinical/Technical Expertise**

A clinical or technical expert is someone who has a full professional understanding of the processes in the content area. It is critical to have at least one such champion on the team who is intimately familiar with the roles, functions, and operations of the content area. This person should have a good working relationship with colleagues and with the frontline leaders, and be interested in driving change in the system. It is important to look for clinicians or technical professionals who are opinion leaders in the organisation (individuals sought out for advice who are not afraid to try changes).
Patients can provide expert advice to the improvement team, based on their experience of the system and the needs and wishes of patients. A patient with an interest in the improvement of the system can be a useful member of the team.

Additional technical expertise may be provided by an expert on improvement methodology, who can help the team to determine what to measure, assist in the design of simple, effective measurement tools, and provide guidance on the design of tests.

**Frontline leadership**

Frontline leaders will be the critical driving component of the team, assuring that changes are tested and overseeing data collection. It is important that this person understands not only the details of the system, but also the various effects of making changes in the system. They should have skills in improvement methods. This individual must also work effectively with the technical experts and system leader. They will be seen as a bridge between the organisation leadership and the day to day work.

Frontline leaders are likely to devote a significant amount of their time to the improvement work, ensuring accurate and timely data collection for process and outcome measures related to the frontline team.

**Characteristics of a good team member**

In selecting team members, you should always consider those who want to work on the project rather than trying to convince those that do not. Some useful questions to consider are the following:

- Is the person respected for their judgment by a range of staff?
- Do they enjoy a reputation as a team player?
- What is the person’s area of skill or technical proficiency?
- Are they an excellent listener?
- Is this person a good verbal communicator within and in front of groups?
- Is this person a problem-solver?
- Is this person disappointed with the current system and processes and passionately wants to improve things?
- Is this person creative, innovative, and enthusiastic?
- Are they excited about change and new technology?
Appendix C - The Model for Improvement

Successful improvement initiatives don’t just happen - they need careful planning and execution. There are many things to consider and techniques to employ, which are captured in the driver diagram on page 37. The rest of this section explains the primary drivers and where to get more help in using them.

In any improvement initiative you need to succeed in three areas. You need to generate the Will to pursue the changes, despite difficulties and competing demands on time and resources. You need the good Ideas that will transform your service. Finally you need to Execute those ideas effectively to get the change required.

Will

The interventions you need to build Will are explained in the ‘Leading the Way to Safety and Quality improvement’ and ‘How to Improve’ guides. They concentrate on raising the commitment levels for change and then providing the project structure to underpin improvement approaches. Spreading changes to achieve transformative change across the whole health system requires strong leadership. We need to create an environment where there is an unstoppable will for improvement and a commitment to challenge and support teams to remove any obstacles to progress.

Ideas

The interventions in this guide describe ideas which evidence shows to be effective for achieving changes that result in improvements. It gives examples from organisations that have achieved them and also advice based on their experience. Methods and techniques for generating new ideas or innovative ways to implement the evidence can be found in the ‘How to Improve’ guide and other improvement literature.

Execution

However, to bring these ideas into routine practice in your organisation, it is essential that you test the interventions and ensure that you have achieved a reliable change in your processes before attempting to spread the change more widely.

1000 Lives Plus uses the Model for Improvement (MFI) which is a proven methodology as the basis for all its improvement programmes. It requires you to address three key questions and then use Plan-Do-Study-Act (PDSA) cycles to test a change idea. By doing repeated small-scale tests, you will be able to adapt change ideas until they result in the reliable process improvement you require. Only then are you ready to implement and spread the change more widely.
Model for Improvement

**Driver Diagram**

- **Aim**
  - To deliver patient safety and quality initiatives for Health Boards and Trusts

- **Primary drivers**
  - Will

- **Secondary drivers**
  - Create an organisational culture and environment for improvement

- **Interventions**
  - Engage senior Leadership
  - Make links to organisation goals
  - Form teams
  - Build skills
  - Raise awareness
  - Appoint clinical champions

- **Ideas**
  - Evidence Base (The what to)

- **Execution**
  - Improvement Methodology (The how to)

- **The Model for Improvement**
  - What are you trying to accomplish?
  - How will you know that a change is an improvement?
  - What change can you make that will result in improvement?

- **Establish reliable process**
  - Use reliability model

- **PDSA cycles:**
  - Test - implement - spread - sustain

Set SMART aims
Communicate aims
Use project charter to provide structure
Understand what to measure
Use 7 step measurement process
Map the process
Use creative thinking
**Model for Improvement-PDSA Cycle**

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What change can we make that will result in improvement?

**Seven Steps to Measurement**

1. Decide aim
2. Choose measures
3. Define measures
4. Collect data
5. Analyse & present
6. Review measures
7. Repeat steps 4-6
One area that bears extra attention is measurement because we have found that this is often the Achilles heel of improvement projects. When measuring your progress, follow the Seven Steps to measurement shown on page 41 and covered in more detail in the ‘How to Improve’ Guide.

The key is to go round the Collect-Analyse-Review cycle frequently:

- **Collect** your data
- **Analyse** - turn it into something useful like a run chart
- **Review** - meet to decide what your data is telling you and then take action

Successful improvement projects all have clear aims, robust measurement and well tested ideas. Use the ‘How to Improve’ guide to ensure your projects have all three.

What are we trying to accomplish?

You will need to set an aim that is Specific, Measurable, Achievable, Realistic and Time-bound (SMART). Everyone involved in the change needs to understand what this is and be able to communicate it to others.

How will we know that change is an improvement?

It is essential to identify what data you need to answer this question and how to interpret what the data is telling you. The improvement methodology ‘How to Guide’ provides detailed information on the tools, tips and information you need to achieve this, and includes the following advice:

<table>
<thead>
<tr>
<th>Plot data over time</th>
<th>Tracking a few key measures over time is the single most powerful tool a team can use.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seek usefulness, not perfection.</strong> Remember, measurement is not the goal; improvement is the goal. In order to move forward to the next step, a team needs just enough data to know whether changes are leading to improvement.</td>
<td></td>
</tr>
<tr>
<td><strong>Use sampling.</strong> Sampling is a simple, efficient way to help a team understand how a system is performing.</td>
<td></td>
</tr>
<tr>
<td><strong>Integrate measurement into the daily routine.</strong> Useful data is often easy to obtain without relying on information systems.</td>
<td></td>
</tr>
<tr>
<td><strong>Use qualitative and quantitative data.</strong> In addition to collecting quantitative data, be sure to collect qualitative data, which is often easier to access and highly informative.</td>
<td></td>
</tr>
<tr>
<td><strong>Understand the variation that lives within your data.</strong> Don’t overreact to a special cause and don’t think that random movement of your data up and down is a signal of improvement.</td>
<td></td>
</tr>
</tbody>
</table>
What change can we make that will result in improvement?

The interventions in this guide describe a range of change ideas that are known to be effective. However, you need to think about your current local systems and processes and use the guide as a starting point to think creatively about ideas to test. The improvement methodology guide gives more advice to support you in generating ideas.

Spreading changes to achieve transformative change across the whole health system requires strong leadership. We need to create an environment where there is an unstoppable will for improvement and a commitment to challenge and support teams to remove any obstacles to progress. The guide on ‘Leading the Way to Safety and Quality Improvement’ gives detailed information on interventions that will support this. However, the Model for Improvement, PDSA cycles and process measurement lie at the heart of the transformative change we seek.
Improving care, delivering quality

If we can improve care for one person, then we can do it for ten.

If we can do it for ten, then we can do it for a 100.

If we can do it for a 100, we can do it for a 1000.

And if we can do it for a 1000, we can do it for everyone in Wales.

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