Rapid Response to Acute Illness (RRAI)
Acknowledgements

This guide has been produced by Dr Dave Hope, Dr Mark Smithies, Dr Alan Willson and Chris Hancock.

We would particularly like to thank healthcare organisations in Wales and their teams for their work in implementing these interventions and also feeding back lessons and experiences gained as a result.

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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 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

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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 the 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).

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.
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Introduction

The purpose of the Rapid Response to Acute Illness (RRAI) content area of 1000 Lives Plus is to support clinical teams in the reduction of harm and mortality associated with the acutely deteriorating patient.

What is the problem?

In the 2007 publication Safer Care for the Acutely Ill Patient, the National Patient Safety Agency found that, of 576 hospital deaths analysed, 11% were as a result of unrecognized or untreated deterioration. Several national enquiries have identified that, in the UK, the care prior to cardiac arrest or critical care admission is frequently sub optimal.2,3,4

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) identified that 21% of ICU admissions were avoidable and, based upon this estimate, the 1000 Lives Campaign faculty has calculated that there may be as many as 640 avoidable deaths in Intensive Care Units (ICUs) in Wales each year. Of course this does not include those patients who deteriorate and die in acute hospital areas without ICU admission so the actual avoidable mortality is probably much larger.

What is perhaps most alarming is that a large proportion of those patients whose condition deteriorates are known to have had recognisable symptoms for many hours prior to an event and one study found that 60% of cardiac arrests, deaths or unplanned admissions to ICU were preceded by documented physiological changes.5,6

The experience of clinicians as part of the Welsh Critical Care Improvement Programme (WCCIP), the Safer Patients Initiative (SPI) and the 1000 Lives Campaign is that a large proportion of this acute deterioration is due to unrecognised and untreated severe sepsis, a term which covers a number of infectious diseases that result in a common picture of multiple organ failure.

Severe sepsis is a condition with high prevalence - about 2.3% of hospital patients and about 27% of intensive care patients. Mortality rates are very high - around 30 - 50% and it is claimed that globally severe sepsis kills about half a million people a year: as many as myocardial infarction.7,8

A recent large scale US study has estimated that in cases associated with invasive surgery, attributable mean length of stay due to sepsis was 10.9 days, costs were $32 900, and mortality was 19.5% whereas in cases not associated with invasive surgery, attributable mean length of stay, costs, and mortality due to sepsis were estimated to be 1.9 to 6.0 days, $5800 to $12 700, and 11.7% to 16.0%.12

Until recently severe sepsis has had a low public profile. Reporting of cause of death on death certificates often omits the term severe sepsis so its prevalence has been under-reported. Times are changing and there is a growing international consensus both on the scale of the challenge and the practical ways to bring down mortality rates.9 The early detection and treatment of severe sepsis is therefore included as one of the interventions in the RRAI content area and this guide.
This potentially avoidable mortality from unrecognised acute illness is therefore due, partly, to lack of awareness of the extent and nature of the problem but, in the main it is attributable to systemic failures in all hospital areas coupled with a chronic inability to communicate across departmental and disciplinary boundaries.

**What is the solution?**

With the publication in 2007 of Acutely Ill Patients in Hospital: recognition of and response to acute illness in adults in hospital. Also known as Clinical Guidance (CG) 50, the National Institute for Clinical Excellence (NICE) has established a blueprint for organisations to deal with the problem of acutely deteriorating patients.

However adoption of this blueprint will only take place when acceptance of the problem and co-ordination of the response occurs at an organisational board level and similarly, the response will only be effective when acute and critical care areas collaborate in improving systems of care.

An effective system must

- Operate hospital-wide
- Work 24 hours a day
- Facilitate rapid treatment
- Enable escalation of care
- Feedback to referring teams on process and outcome

The good news is that the most effective treatments for the acutely ill with or without the complications of severe sepsis are simple interventions such as giving oxygen and intravenous fluids. The main challenge is that these treatments must be given early in the disease process to be effective.

The focus then has to be on the early identification of acutely ill patients and in delivery of a bundle of treatment within a few hours of the onset of deterioration. These simple targets are hard to achieve and require us to redesign how patients are monitored and treated throughout the hospital.

This system enabling a rapid response must also be achieved without adding a significant burden of work on the clinical team and in a way that is entirely owned by those implementing it.

The Surviving Sepsis Campaign (SSC) is an International campaign to reduce mortality and morbidity from sepsis by 25% partly through the introduction of Sepsis Care Bundles. These bundles consist of interventions that have solid evidence in improving mortality.

They consist of 3 elements; the first ‘sepsis six’ details the actions to be taken within 1 hour of diagnosis, the second 6 hours from the diagnosis of Severe Sepsis or Septic Shock (time zero) known as the Resuscitation Bundle and the first 24 hours from diagnosis known as the Management Bundle. The SSC care bundles have, in some areas, been operationalised as a care pathway.

Evaluation of the Surviving Sepsis Campaign has concluded that this multifaceted performance improvement initiative has been successful in changing sepsis treatment behaviours and that this has been associated with a significant reduction in mortality from Severe Sepsis.
Rapid Response to Acute Illness Learning Set (RRAILS)

In order to support Welsh clinicians in reducing mortality and harm from acute deterioration, the Rapid Response to Acute Illness Learning Set (RRAILS) was established in June 2009 with the following aims:

- Support the introduction of care bundles based upon the guidance from NICE CG50 and the Surviving Sepsis Campaign.
- Enable measurement of compliance with these bundles and use of feedback and the model for improvement (MFI) to improve reliability in the process of recognising and responding to the acutely ill.
- Facilitate the identification and quick remedying of training needs amongst the multidisciplinary team.
- Demonstrate how incorporating measurement of compliance with these bundles and the SBAR tool improves the speed and effectiveness of handovers both within the team and between clinical disciplines.
- Improve patient outcomes by reducing the number of cardiac arrests, admissions to ICU and the incidence of severe sepsis.

The four care bundles, based upon NICE CG50, which you are asked to introduce as drivers for change are listed below and you may want to take a moment to consider the attached questions:

- **Admissions bundle** - what proportion of the patients admitted to your clinical area have a full set of observations on admission and have a plan for the frequency of observations which has been communicated to all clinical staff?
- **Recognition bundle** - what proportion of your patients are regularly risk assessed using a track and trigger system and are routinely screened for severe sepsis if found to be at risk?
- **Response bundle** - What proportion of your patients are treated appropriately and in a timely manner if their condition deteriorates?
- **Sepsis Six** - What proportion of your patients are given Oxygen, fluids and antibiotics within 1 hour of being diagnosed with severe sepsis?

**Why use care bundles?**

Care bundles, in general, are groupings of best practices with respect to a disease process that individually improve care, but when applied together may result in substantially greater improvement. The science supporting each bundle component is sufficiently established to be considered the standard of care.

Clinical teams who participated in the Welsh Critical Care Improvement Programme (WCCIP), Safer Patients Initiative (SPI) and 1000 Lives Campaign have implemented care bundles on such interventions as central lines and ventilators and have measured compliance with them at the very high level of greater than 95%. There appears to be an association with this high compliance and improvements in patient outcomes such as a reduction in the rates of central line
and ventilator related infections.

The care bundle is not intended as a comprehensive list of all actions within a process, nor is it a care pathway. What it does do is reduce the opportunity for omission of those elements of a process that are thought to be essential. By using care bundles to implement systems for the detection and early treatment of the acutely deteriorating patient it is possible for clinical teams to demonstrate improvements in one area of the patient pathway without having to change everything at once.

References

2. NCEPOD, (2005) National Confidential Enquiry into Patient Outcome and Death
Rapid Response to Acute Illness

Driver Diagram

**Content Area**

- Reduce mortality and harm by improving the recognition of and response to the acutely deteriorating patient

**Drivers**

- **Admission Bundle** - Observation baseline and plan within 2 hours of admission communicated to the clinical team

- **Recognition Bundle** - Early identification and risk stratification of the deteriorating patient

- **Response Bundles** - Appropriate and timely treatment of acute illness

- **Sepsis Six Bundle** - Appropriate and timely treatment for severe sepsis within 1 hour of diagnosis

**Interventions**

- Full set of observations on admission
- Clear monitoring plan specifying the physiological observations to be recorded and how often.
- Communicate this information to the clinical team

- Monitor physiological observations at least every 12 hours according to plan
- Record track and trigger system score.
- Perform Risk Assessment
- Consider severe sepsis if patient is ‘at risk’
- Communicate this information to the clinical team

- Inform appropriate staff using SBAR tool
- Change frequency of observations
- Additional monitoring if appropriate
- Timely assessment and initiation of response
- Initiate Sepsis Six bundle if appropriate

- Oxygen
- Blood Culture
- IV antibiotics
- Fluid Resuscitation
- Serum Lactate and Hb
- Hourly Urine Output Monitoring

- Regular and frequent multidisciplinary reviews of circumstances surrounding patient deterioration
- Multidisciplinary training in recognition and response to acute illness

Ensure competence in - monitoring, measurement, interpretation and prompt response
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’ 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 measures:

■ Cardiac Arrest Call Rate
■ Number of calls for response to patients at medium and high risk
■ Number of DNAR orders
■ % severe sepsis patients escalated to level 2, 3 or 3T care
■ % severe sepsis mortality

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 B 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 A 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

Driver: Admission Bundle

The admissions bundle consists of the following elements:

- Full set of observations within 2 hours of admission
- Plan for frequency of observations within 2 hours of admission
- Communicate this information to the clinical team

Interventions

1. Full set of observations

NICE Clinical Guidance (50) recommends that adult patients in acute hospital settings, including patients in the emergency department for whom a clinical decision to admit has been made, should have physiological observations recorded at the time of their admission or initial assessment and a clear written monitoring plan that specifies which physiological observations should be recorded and how often.

The full set of observations should include:

- Heart rate
- Respiratory rate
- Systolic blood pressure
- Level of consciousness
- Oxygen saturation
- Temperature

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) Report: Adding Insult to Injury\(^1\) reviewed the care of patients who died in hospital with a primary diagnosis of acute kidney injury (acute renal failure).

The report noted systematic failings in the management of acute kidney injury (AKI) including the finding that a fifth of post-admission AKI was both predictable and avoidable.

As a way of supporting Health Boards in delivering the recommendations of this report the North Wales Critical Care Network are developing renal care bundles which are intended to impact at the admissions stage of the patient’s journey.

1000 Lives Plus supports the incorporation of elements of the renal bundles, such as urinalysis and blood tests on all emergency admissions, with the RRAILS admissions bundle at a local level and will work with teams to support implementation and measurement.
2. Clear monitoring plan

The clear monitoring plan should specify the physiological observations to be recorded and how often, taking into account:

- Diagnosis
- Comorbidities
- The agreed treatment plan

3. Communicate this information to the clinical team

As with the other bundles in this content area, the information in the other two elements of the bundle is only useful when communicated to the rest of the team. Errors of omission occur most frequently at times when information should be transferred but isn’t. Inclusion of the communication element in this bundle is to ensure that making the process of admitting patients run correctly every time does not depend upon who happens to be on duty at the time.

**Measures:**

For this intervention, use the following process measures:

RR01 % compliance with ‘Acutely Ill’ admission bundle

Applying The Model For Improvement

**What are we trying to achieve?**

The admissions bundle is regarded by many as the entry point to RRAILS and when starting improvement work it is important that all members of the team know what it is they are trying to achieve. The change is more likely to ‘stick’ if everyone feels that they own it and to do this involvement is the key.

Many hospitals have launched their improvement work with a series of publicity and education events whilst Velindre Cancer Centre held an entire week of events to raise awareness of severe sepsis.

It is important to remember to start the measurement and data collection at the same time as the intervention is launched both because it is integral to the change process itself and also to capture any changes to the data caused by events surrounding the launch.

**How will we know that a change has been an improvement?**

You will only know that change is an improvement if you measure. The measures detailed below (see Reporting section) for this intervention are of both processes and outcomes but, rather than the traditional setting of outcome targets, the methodology of 1000 Lives Plus is to support teams in improving and making more reliable processes which will inevitably result in improved outcomes.
The most common process measure used in RRAI is compliance with the care bundles and it can be seen that by achieving a high compliance with the bundle the team is demonstrating that it is performing the elements of the bundle reliably.

The percentage compliance is best represented on a run chart which is automatically generated by the 1000 Lives Plus Extranet from the uploaded data. Run charts are a very good way visual way of communicating progress back to the team and should be displayed somewhere prominent where everyone can see it (see How to Improve Guide).

The secret to data collection is to try and make it as easy as possible and this is generally best done by integrating data collection into the normal practice in the clinical area. The bundle compliance sheets in the resources section of this guide are intended to be used during shift handover or safety briefing and require that only two numbers are recorded on each day. For this intervention those two numbers would be -

- The number of admissions in that day
- The number fully compliant with the admissions care bundle

(see Resources section)

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

Involving the whole team in your improvement work and you may be surprised by how easily a problem can be solved by the application of a different perspective. Rather than nurses taking on this extra role, in some of the RRAILS teams it is the ward clerk who has assumed the responsibility for collecting the admissions bundle data.

Try laminating the Admissions Safety Board (see resources section) and using it as a highly visible means of ensuring that everyone knows who has been admitted, how ill they are and when their observations are due.

**Does this mean that we have to retrospectively audit all the charts?**

Absolutely not; the purpose of this work is to make existing systems more efficient and effective, not to add extra work in checking up on others. Improving communication is the key to this and as errors of omission in existing systems occur most commonly at times when information is transferred the obvious time to collect this data is as a part of the shift handover process.

**Reference**

Driver: Recognition Bundle

The Recognition bundle consists of the following interventions:

- Monitor physiological observations at least every 12 hours in accordance with the patient’s observation plan.
- Record track and trigger score
- Perform risk assessment based upon track and trigger score
- If patient is ‘at risk’ consider whether sepsis may be the cause
- Communicate this information to the clinical team

Interventions

1. **Monitor physiological observations**

NICE CG50 recommends monitoring physiological observations at least every 12 hours unless decided at a senior level to increase or decrease the frequency for an individual patient.

You should monitor:

- Heart rate
- Respiratory rate
- Systolic blood pressure
- Level of consciousness
- Oxygen saturation
- Temperature

2. **Record track and trigger score**

NICE CG 50 recommends using multiple-parameter or aggregate weighted scoring systems such as MEWS or PAR, which allow a graded response.

The systems should:

- Define the parameters to be measured and the frequency of observations
- State the parameters, cut-off points or scores that should trigger a response

The implementation of an aggregate weighted Track and Trigger score into all areas of hospital care will continue to be a priority for 1000 Lives Plus. Given that Track and Trigger scores are a part of all patient safety systems, it has long been realised that training and education of staff could be greatly simplified by promoting the same score in all hospitals in Wales.

A single Welsh score would be used by all nurses, doctors, and other health care staff, including agency and locums working across the principality, thus facilitating training and reducing potentially fatal errors produced by using
different scores in parallel in different departments in the same hospital or neighboring hospitals. Despite extensive testing, including a number of studies from Wales, multiple scores have been evaluated with none being clearly superior to the others. However, very recent research submitted for publication in an international journal might change this. Analysis of data from a large data-base containing nearly 200,000 sets of observations from over 35,000 patients has reportedly served to create a scoring model with a markedly superior performance in predicting deterioration and death within 24 hours. Professor G. Smith’s group from Portsmouth has kindly offered to support 1000 Lives Plus by offering this scoring model for use in Wales. The Track and Trigger scoring tool will be made available for use by Welsh Healthcare Organisations from May 2010. 1000 Lives Plus will also support the development of an All-Wales TPR chart incorporating the scoring model.

3. Perform risk assessment
NICE CG 50 recommends that you set thresholds locally, and review regularly to optimise sensitivity and specificity.

4. Consider sepsis
Mortality from severe sepsis is hugely reduced if it is detected and treated early. Awareness of potential sepsis can be raised by asking the simple question ‘could this be sepsis?’ when a patient is identified as being ‘at risk’.

Several hospitals have developed simple diagnostic tools (see resources section) which act also as guidelines, teaching aid and means of audit.

5. Communicate with the clinical team
An observation chart is only useful when the information on it is communicated to others. Make sure that the rest of the clinical team are aware of which patients are at risk, what their level of risk is and what actions are being taken as a result.

Use shift handover, safety briefings, Patient Status at a Glance (PSAG) boards or handover sheets to ensure that this information is passed on.

Measure:
For this intervention, use the following process measures:
RR02 % compliance with ‘Acutely Ill’ recognition bundle
Applying the Model For Improvement

What are we trying to achieve?

Although it has been commented that ‘outcomes are all that patients care about’ experience with the 1000 Lives Campaign suggest that it takes longer to change outcomes than it does to demonstrate improvements in processes. Moreover outcomes will not change until the processes that lead to that outcome are improved. It therefore makes sense to set out to improve the process of recognising the deteriorating patient as evidenced by improvements in the compliance with the care bundle.

How will we know that a change has been an improvement?

The only sure way of knowing that a change has been an improvement is through measurement. It is not a good idea to invest a huge amount of time, effort and money into making changes before starting measurement as you will then have no idea as to whether your intervention has improved things or not.

The extensive reorganisation of healthcare in Wales has, in some cases, led to prioritisation of efforts to achieve standardisation of observation charts and Track and Trigger tools rather than the improvement of processes for the recognition of deteriorating patients.

Whilst standardization is desirable it may necessitate the postponement of action for a long time until agreement is reached on formatting. Try measuring bundle compliance whilst you make changes to the documentation as this should give a good indication of what changes work and what don’t.

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

Try using Patient Status at a Glance Boards (PSAG) or laminate the safety board template in the resources section of this guide and use it as part of your handover. Visual aids such as these act as reminders of the need to update and share information. On ward 20 at the Royal Glamorgan Hospital MEWS score and observation frequency are recorded on a PSAG board that is updated every shift.

Try holding a safety briefing at the start of handover in which ‘at risk’ patients are identified, frequency of observations and other interventions is shared and the goal for that patient is agreed. This briefing should take no longer than 5 minutes, should be multidisciplinary and all participants should remain standing to promote brevity. Other risks such as falls or pressure ulcers may be identified at the same time.

Frequently asked questions

Do we have to do observations every 12 hours even on patients who don’t need it?

No. The principle of improvement work is to prevent errors of omission, not to override clinical judgment. If there is agreement amongst the clinical team that observations are not required every 12 hours, for example if a patient has been
commenced on an end of life pathway, then the bundle has still been complied with.

The important point is that everyone knows that this decision has been made and that this fact is communicated to all the relevant team. Using Patient Status at a Glance boards (PSAG) safety briefings or SBAR will assist with this.

**How will we know how often to do the observations?**

Participation in RRAILS has revealed that there is frequently no guidance or protocol in existence in clinical areas to indicate how frequently observations should take place.

This means that the decision as to frequency of observations is often based upon the experience of the admitting nurse and therefore ‘it depends who is on duty’

Some teams are now developing ways of risk assessing patients depending upon a combination of presenting condition, track and trigger score and even critical illness level as defined in the Critical Care Quality Requirements (CCQR).¹

More detailed definitions of levels of care based upon the CCQR have been produced by the North Wales Critical Care Network and can be accessed at www.wales.nhs.uk/nwcriticalcare

**Do we need to audit the observation charts to make sure that the bundle has been completed?**

Absolutely not, the point of this work is to ensure that safer practice becomes ‘just the way that we do things’, not to make extra work in auditing each other.

Whilst a good observations chart and risk scoring systems are essential they only work if the information is widely communicated. Times when this is most easily done include shift handovers and ward rounds so it is recommended that a safety briefing be carried out at this time.

**Reference**

**Driver: Response Bundle**

The response bundle consists of the following elements/interventions:

- Inform appropriate staff using SBAR tool
- Change frequency of observations
- Additional monitoring if appropriate
- Timely assessment and initiation of response
- Initiate Sepsis Six bundle if appropriate

**Response to risk assessment**

NICE CG 50 recommends that a graded response strategy for patients identified as being at risk of clinical deterioration should be agreed and delivered locally. It should consist of the following three levels.

**Low-score group:**

- Increased frequency of observations and the nurse in charge alerted.

**Medium-score group:**

- Urgent call to team with primary medical responsibility for the patient.
- Simultaneous call to personnel with core competencies for acute illness. These competencies can be delivered by a variety of models at a local level, such as a critical care outreach team, a hospital-at-night team or a specialist trainee in an acute medical or surgical specialty.

**High-score group:**

- Emergency call to team with critical care competencies and diagnostic skills. The team should include a medical practitioner skilled in the assessment of the critically ill patient, who possesses advanced airway management and resuscitation skills. There should be an immediate response.
- If the team caring for the patient considers that admission to a critical care area is clinically indicated, then the decision to admit should involve both the consultant caring for the patient on the ward and the consultant in critical care.

**Measures:**

For this intervention, use the following process measures:

- RR03 % compliance with ‘Acutely Ill’ response bundle
- Score-2-Door Time
Applying the Model For Improvement

What are we trying to achieve?

The obvious answer to this question is a reduction in harm and mortality, but although this is, of course, the eventual desired outcome it is worth considering what may be achieved in the short term.

The experience of introducing Outreach and Acute Care Teams in some Welsh hospitals has been that the number of Cardiac arrests fall because of an increase in the number of patients who had received Do Not Attempt Resuscitation (DNAR) orders. Both Cardiac Arrest Call rate and Number of DNAR orders are included as measures with RRAI and can be used as goals by clinical teams.

Measurement of compliance with the response bundle has the potential to expose areas of the process that could be improved and lessons that could be learnt. With reference to the Competencies for Recognising and Responding to Acutely Ill Patients in Hospital it is possible to develop a training needs analysis that is based upon the multidisciplinary competency requirements for a clinical area. This analysis may well be specific to the needs of the clinical area and the patients that it serves rather than the needs of the individuals who work there.

How will we know that a change has been an improvement?

The only way to know whether a change is an improvement is to measure. Rapid feedback of simple measures on a run chart provides a strong incentive to further action.

The Acute care Team at Glan Clwyd Hospital was formed when the Outreach team merged with Nurse Practitioners and the Hospital at Night team to provide a 24/7 service. They were able to demonstrate using run charts that the number of calls for ‘at risk’ patients had more than doubled.

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

Organise a regular multidisciplinary meeting at which all stakeholders in your clinical area are represented. Use this meeting to reach agreement on how you will approach this intervention.

Decide what score on the track and trigger represents which level of risk and what response is appropriate to each level of risk. Rather than set unrealistic expectations (eg the doctor will attend the patient within 5 minutes for all calls) decide upon what is achievable given the limited resources and ensure that this standard is understood by all of the team.

Decide upon how communication will occur. One element of the response bundle states that SBAR will be used and there are many examples across Wales of clinicians who use SBAR, not only in rapid response situations, but also for transferring patients between departments or even for shift handovers (see SBAR How to Guide). The hospitals in Powys use an SBAR based tool to communicate with the out of hours service which acts as a record of subsequent actions (see resources section).
Frequently asked questions

How will the data surrounding a call for rapid response be captured?

At present review of rapid response events can be found in a diverse number of locations including medical and nursing notes, observation charts and handover sheets. It might be more effective to include all information on reason for the call, response times and subsequent treatment on one sheet of paper. Involve the whole team in using PDSAs to develop this single record.

How will the team learn from events?

Set up a system for rapidly feeding back process and outcome measures so that the whole team understands how well it works and what needs to be improved. The development of executive dashboards has ensured that the executive team understands how measures of bundle compliance and process reliability provide accurate indicators of quality across the whole organization. It is precisely this type of data that you will be generating so make sure that senior management is updated as to your progress.

How do we know what response is appropriate?

It is not the purpose of this booklet to dictate what responses are appropriate in each clinical situation. This is both unachievable and undesirable. In order to promote ownership of the change, levels of response should be decided at a local level involving all stakeholders in the process. Using process mapping may be very useful in developing these guidelines.

Reference

1 Department of Health. 2008. Care of the Acutely Ill Patient in Hospital: Competency Framework
Driver: Sepsis Six Bundle

Sepsis six bundle - Appropriate and timely treatment for severe sepsis within 1 hour of diagnosis

- Oxygen - TARGET saturations >94%
- Blood Culture - PRIOR to IV antibiotics
- IV antibiotics - Broad spectrum
- Fluid Resuscitation
- Serum Lactate and Hb - Ensure Hb >7g/dl
- Hourly Urine Output Monitoring - Catheterisation Or self-void.

Elements/Interventions of the Surviving Sepsis Campaign Resuscitation Bundle - within 6 hours of diagnosis

- Serum lactate measured
- Blood cultures obtained prior to antibiotic administration
- From the time of presentation, broad-spectrum antibiotics to be given within 3 hours for ED admissions and 1 hour for non-ED ICU admissions
- In the event of hypotension and/or lactate >4mmol/L (36mg/dL):
  - Deliver an initial minimum of 20 ml/kg of crystalloid (or colloid equivalent)
  - Give vasopressors for hypotension not responding to initial fluid resuscitation to maintain mean arterial pressure (MAP) > 65 mm Hg.
- In the event of persistent arterial hypotension despite volume resuscitation (septic shock) and/or initial lactate >4 mmol/L (36 mg/dl):
  - Achieve central venous pressure (CVP) of >8 mm Hg
  - Achieve central venous oxygen saturation (ScvO2) >70%

What are the Surviving Sepsis Campaign bundles?

The Surviving Sepsis Campaign is an International campaign to reduce mortality and morbidity from sepsis partly through the introduction of Severe Sepsis Care Bundles.

These bundles consist of interventions that have solid evidence in improving mortality and consist of 3 elements; the first ‘sepsis six’ details the actions to be taken within 1 hour of diagnosis, the second 6 hours from the diagnosis of Severe Sepsis known as the Resuscitation Bundle and the third, 24 hours from diagnosis known as the Management Bundle. The SSC care bundles have, in some areas, been operationalised as a care pathway.

It is obvious that tackling the problem of severe sepsis cannot be the sole responsibility of the ICU and that a level of integration between acute and
critical services must exist. With this in mind many hospitals have now set up an Outreach service whereas others have established Acute Care and Rapid Response Teams which operate independently of the ICU. Even without these systems individual clinical areas have made significant progress with implementing the sepsis six.

**Measures:**

For this intervention, use the following process measures:

- % compliance with sepsis resuscitation bundle
- % compliance with ‘sepsis six’
- Score-2-Door time

**Applying the Model For Improvement**

**What are we trying to achieve?**

Before starting improvement work it is important to agree upon the eventual outcome. There are a number of process and outcome measures attached to these interventions which are detailed below (see reporting section): improvements in these could be adopted as targets for your improvement work.

A new addition to the measures is ‘Score-2-Door’ time which has been developed by a team including Dr Chris Subbe of Betsi Cadwaladr ULHB as part of a UK wide initiative. The measure is from time of first alert to patient deterioration (trigger “Score”) until admission to ICU (“Door”) and provides a potential means for measurement of the efficiency of escalation to critical care. Teams from UHW, Prince Charles Hospital, Ysbyty Glan Clwyd, Ysbyty Gwynedd and Maelor Hospitals have contributed data to the development of this tool. The data collection form for ‘Score-2-Door’ is included in the resources section.

The ICUs at UHW and Nevill Hall have been providing data to the SSC dataset for many years and are consequently able to draw upon a rich seam of data for improvement targets. The link to the SSC website is included in the appendices.

**How will we know that change has been an improvement?**

The only way to know whether a change has been an improvement is through measurement. The measures for severe sepsis are listed below (see reporting section) and these can be uploaded to the 1000 lives Plus extranet database.

The Medical Assessment Unit at the Maelor Hospital has used an annotation of the compliance with the sepsis resuscitation bundle to demonstrate an extremely low level of escalation to level 2 and 3 critical care. The team can therefore demonstrate that the application of the Sepsis Six and Resuscitation Bundles is effective in reducing the need for ICU admission.

The important thing to remember about the measures is not whether they can be
benchmarked with other wards or hospitals but rather whether they are specific to the way your team practice and therefore show improvement over time.

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

Remember to include all members of the team in suggesting which changes to test and by using the small scale rapid cycle PDSA methodology these changes can be tried out quickly and with minimal investment.

Ward 4 at Prince Charles Hospital tested out various ways of recording ‘at risk’ patients before hitting upon the idea of using the white board in the office. Now medics, therapists and the Outreach team can prioritise patients quickly and effectively without having to search for members of the ward team.

**Frequently asked questions**

*How do we start implementing the bundles and collecting the data in acute areas where it is much more difficult than ICU?*

It can be more difficult but involving the team in developing the documentation can be an invaluable first step. Based upon a template from Ron Daniels of the SSC, the teams at the ICU in UHW and in Velindre Cancer Centre have developed pro formas which detail the patient’s journey through the sepsis pathway from diagnosis to critical care admission.

These forms therefore act as diagnostic tool, treatment guide, education aid and auditable record which can then be stored in the patient’s notes. Both forms are reproduced in the resources section.

*Do we need to have an Outreach service before we can start with this improvement?*

It does seem to be true that hospitals that have a Critical Care Outreach or Acute Care Team in place do seem to have had more success in coordinating the response to severe sepsis to date.

However there are notable exceptions to this where an individual ward has commenced sepsis work without the direct support of the ICU. A tool that has proved hugely popular with acute ward staff has been the pocket sized aide memoire. Two are reproduced in the resources section, one from the team at West Wales General Hospital based upon the SSC template which can be printed at A5 size and laminated and the plastic credit card which was developed by the team at the Maelor Hospital in Betsi Cadwalladr ULHB.

Try changing things on a small scale first, one patient, one shift one nurse before rolling out to a larger area.

*(See also Improving Critical Care How to Guide)*
What if nurses cannot initiate oxygen, fluids or antibiotics on our ward?

It is important that this improvement work is viewed within the context of a whole organisational approach to patient safety. Therefore any moves towards implementing the Sepsis Six at ward level must be mirrored by leadership and innovation from senior management in establishing Patient Group Directives (PGD) for oxygen administration and standardisation of antibiotic therapy.

It is important that compliance data should be collected and analysed by the clinical team while this is happening even if the compliance figure is low as it will then show which changes are effective.

How can we collect data on this bundle without having to go through the patient's notes retrospectively?

Using a form such as those detailed in the resources section ensures that the diagnosis and initial actions are recorded alongside the time carried out and person responsible. It is therefore relatively easy to see whether the bundle has been completed within the first hour of diagnosis.

How do we know when to start using the Sepsis Six forms?

‘Time Zero’ is the time at which severe sepsis is diagnosed and it is from this time that the compliance is measured.

However, it is possible to see from the examples in the resources section that the response to sepsis is similar and includes many of the elements of response to any deterioration. Therefore it may be agreed that a form will be started for any patient who scores above a particular level of risk on the track and trigger score.
Driver: Ensure competence in monitoring, measurement, interpretation and prompt response to the acutely deteriorating patient

**NICE CG50 recommends:**

Physiological observations should be recorded and acted upon by staff who have been trained to undertake these procedures and understand their clinical relevance.

Staff caring for patients in acute hospital settings should have competencies in monitoring, measurement, interpretation and prompt response to the acutely ill patient appropriate to the level of care they are providing. Education and training should be provided to ensure staff have these competencies, and they should be assessed to ensure they can demonstrate them.

**Applying the Model For Improvement**

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

Ensure that there are regular and frequent multidisciplinary reviews of the circumstances surrounding patient deterioration. The care bundle compliance data should be used at these meetings to demonstrate where the system has worked or failed and what needs to be done to improve.

Velindre Cancer Centre hold a monthly Serious Critical Incident Forum (SCIF) which is open to all, systematically reviews incidents and formulates recommendations to remedy the situation.

Use the care bundle compliance data to investigate where systems failures are due to a competence shortfall within the team. The response to this can then be very quick in terms of ensuring that skills training is appropriate for the individuals role within the clinical area.

The Outreach team at Nevill Hall in collaboration with West Glamorgan University run a competency based course that is based upon the Competencies for NICE CG 50 and which is entirely assessed in practice.
People who live with a chronic condition and their carers are often better placed than healthcare professionals to recognise when the symptoms of that condition change and initiate action when deterioration is detected.

This experience is often played down or ignored by clinicians when the person enters the healthcare system and so valuable expertise is lost and consequently the person’s condition may deteriorate unrecognized and untreated.

Patients and carers should be encouraged and taught wherever practicable to recognize changes in their condition and act appropriately.

There is some early work taking place in Wales on developing a track and trigger score for use in the community by people with chronic conditions.
### Daily Admissions Bundle Compliance

**Hospital**  

**Ward**  

**Month**

---

**Bundle elements**

- Full set of observations on admission
- Record at least:

  Clear monitoring plan specifying the physiological observations to be recorded and how often.

---

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
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**Variances**

<table>
<thead>
<tr>
<th>Day</th>
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</table>
# Safe Admissions Form

**Date __________________**

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Bed No.</th>
<th>Admission Time</th>
<th>First Observations Time</th>
<th>Track and Trigger Score</th>
<th>Observations Frequency</th>
<th>Sepsis Considered (if score raised)</th>
<th>Admissions Bundle Completed</th>
</tr>
</thead>
<tbody>
<tr>
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Note: If time between admission and first observations is greater than 2 hours then ‘Admissions Bundle’ has not been completed for that patient.

**Number of Admissions**

**Number with bundle completed**
First-line antibiotic therapy for adult medical patients with **severe** sepsis

NB: Always give 1st dose within 1 hour

<table>
<thead>
<tr>
<th>Patient fulfils criteria for severe sepsis follow this pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>If not please follow Trust guidance on the investigation and management of common infections</td>
</tr>
</tbody>
</table>

**Community Acquired Pneumonia** ▶ see Trust pathway

- **Co-amoxiclav 1.2g TDS IV**
- **PLUS**
- **Clarithromycin 500mgs BD IV**

**UTI** ▶ see Trust pathway

- **Co-amoxiclav 1.2g TDS IV**
- **PLUS**
- **Gentamicin 8mg/kg OD IV**

**Skin & soft tissue infection/ cellulitis** ▶ see Trust pathway

- **Meropenem 1g TDS IV**
- **PLUS**
- **Clindamycin 600mg QDS IV**

Contact Surgeons urgently if signs of Necrotising Fasciitis

**Meningitis**

- **Ceftiraxone 2g OD IV**

Add Amoxicillin 2g 4hourly IV if age >50years or if immunocompromised

**Neutropenic Sepsis**

- **Piperacillin/Tazobactam 4.5g TDS IV**
- **PLUS**
- **Aminocillin 15mg /kg OD IV**

**Sepsis – unknown source**

- **Meropenem 1g TDS IV**
- **PLUS**
- **Gentamicin 8mg/kg OD IV**

2. Severe Sepsis Pathway Booklet. Courtesy of Gemma Ellis, Cardiff and Vale University Health Board. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
2. Severe Sepsis Pathway Booklet. Courtesy of Gemma Ellis, Cardiff and Vale University Health Board. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
3. Severe Sepsis Pathway Booklet. Courtesy of Gemma Ellis, Cardiff and Vale University Health Board. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
2. Severe Sepsis Pathway Booklet. Courtesy of Gemma Ellis, Cardiff and Vale University Health Board. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
3. Severe and Neutropaenic Sepsis Screening Tool. Courtesy of Ceri Stubbs, Velindre NHS Trust. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
3. Severe and Neutropaenic Sepsis Screening Tool. Courtesy of Ceri Stubbs, Velindre NHS Trust. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
Rapid Response to Acute Illness

4. Severe Sepsis Screening Tool (pocket sized). Courtesy of Sandra Miles, Hywel Dda Local Health Board. Based upon an original template from Dr Ron Daniels of the Surviving Sepsis Campaign.
# Patient Safety Board

**Date ___________**

<table>
<thead>
<tr>
<th></th>
<th>Early</th>
<th>Late</th>
<th>Night</th>
</tr>
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<tbody>
<tr>
<td>No. of patients requiring observations</td>
<td></td>
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<tr>
<td>No. of patients' observations presented at handover</td>
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<tr>
<td>No. of patients identified as 'at risk'</td>
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**Acute Illness Risk**

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Bed no</th>
<th>Track and Trigger Score</th>
<th>NEWS time</th>
<th>Sepsis Considered?</th>
<th>Response?</th>
<th>New observations frequency</th>
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</table>
Rapid Response to Acute Illness

Out of hours SBAR communication form. Courtesy of Jo Wolfenden, Powys Teaching Health Board.

<table>
<thead>
<tr>
<th>Label</th>
<th>Pilot/Draft</th>
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</thead>
</table>

OOH Contact with Shrop doc-to be filed in patient notes on completion.

Date: 

Time: Initial call...........hrs

Nurse: 

Call back.............hrs

Patient Flagged Y/N

1. Reason for call:

2. Background:

3. Assessment:
   - BP
   - P
   - Temp
   - Resps
   - BM
   Track and trigger score:

   Other:

4. Expectations-What do you want from Doctor?
   - A ward visit
   - Telephone advice
   - A prescription
   - Other

5. Recommendation by Nurse/Doctor-Docs name:

6. Action taken:

Signature:

Print name:
### 1. YOUR HOSPITAL

<table>
<thead>
<tr>
<th>Number of ICU beds</th>
<th>Number of acute hospital beds</th>
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<tbody>
<tr>
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</table>

<table>
<thead>
<tr>
<th>Number of members of RRT</th>
<th>Working hours of RRT</th>
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</tbody>
</table>

Score used (please attach copy)

### 2. SCORE-2-DOOR© DATA

<table>
<thead>
<tr>
<th>Age of patient in years</th>
<th>Male</th>
<th>Female</th>
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At time of trigger in hospital > 24’s or < 24’s

**Speciality**

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<tr>
<th>Medicine</th>
<th>Surgery</th>
<th>Orthopaedics</th>
<th>A&amp;E</th>
<th>Others</th>
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<tbody>
<tr>
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</table>

**Trigger**

<table>
<thead>
<tr>
<th>Date</th>
<th>/</th>
<th>/09 Time</th>
<th>Rapid Response team called Date</th>
<th>/</th>
<th>/09 Time</th>
<th>Arrival in Intensive Care Date</th>
<th>/</th>
<th>/09 Time</th>
</tr>
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<tbody>
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</table>

**On admission to Intensive Care**

<table>
<thead>
<tr>
<th>APACHE II score</th>
<th>Working diagnosis</th>
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</table>

Calculated Score-2-Door©

### 3. OBSERVATIONS AT TIME OF TRIGGER

<table>
<thead>
<tr>
<th>Respiratory Rate</th>
<th>Saturations</th>
<th>FiO2</th>
<th>Blood pressure</th>
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<tr>
<td></td>
<td></td>
<td>0.</td>
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<tr>
<td></td>
<td></td>
<td>%</td>
<td>/ /mmHg</td>
</tr>
<tr>
<td>Heart rate</td>
<td></td>
<td>bpm</td>
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</tbody>
</table>

Level of consciousness: Alert | Responsive to Voice | Pain |

Unresponsive

Temperature | ° C | Urine less than 0.5 ml/kg /h |

Staff worried

### 4. REASONS FOR DELAY/COMMENTS

---

'Score-2-Door' Data Collection Form. Courtesy of Dr Chris Subbe, Betsi Cadwaladr University Health Board.
5. Severe Sepsis Screening Tool (credit card sized). Courtesy of Dr Chris Subbe, Betsi Cadwaladr University Health Board.
### Appendix A - Measures and Definitions

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Operational Definition</th>
</tr>
</thead>
</table>
| RR01 - % compliance with 'Acutely Ill' admission bundle | 1. Determine the numerator: the number of patients fully compliant within 2 hours of admission/transfer with the admissions bundle in one day.  
2. Determine the denominator: all admissions/transfers to the ward in that day.  
3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying by 100. |
| RR02 - % compliance with 'Acutely Ill' recognition bundle | 1. Determine the numerator: the number of patients fully compliant with the acutely ill recognition bundle in one day.  
2. Determine the denominator: the number of patients on the ward on that day.  
3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying by 100. |
| RR03 % compliance with 'Acutely Ill' response bundle | 1. Determine the numerator: the number of patients, identified as being at low, medium or high risk of deterioration fully compliant with the acutely ill response bundle in one day.  
2. Determine the denominator: all patients, identified as being at low, medium or high risk of deterioration in that day.  
3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying by 100. |
| Number of cardiac arrest calls | Monthly calls for cardiac arrest team. |
| Number of do not attempt resuscitation (DNAR) orders | Monthly number of DNAR orders made. |
| Number of calls for rapid response to medium and high risk acute illness | Monthly number of calls for a response to patients who have been assessed as being of medium or high risk illness. |
Rapid Response to Acute Illness

Score-2-Door Time

“Score-2-Door” time is the time from the first high trigger score (in most systems 5 or above) to the door of the Intensive Care Unit.
Data collection sheet is included in the resources at the back of this document.
This measure can either be collected on an individual patient basis or represented as a monthly average.
Outreach or acute care team would be best placed to measure.

<table>
<thead>
<tr>
<th>% compliance with sepsis resuscitation bundle</th>
<th>1. Determine the numerator: the number of patients fully compliant within 6 hours with the sepsis resuscitation bundle in one month.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Determine the denominator: all patients identified as having severe sepsis requiring a response in one month.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the care bundle compliance as a percentage by dividing the numerator by the denominator and multiplying the result by 100.</td>
</tr>
</tbody>
</table>

% compliance with ‘sepsis six’

<table>
<thead>
<tr>
<th>% compliance with ‘sepsis six’</th>
<th>1. Determine the numerator: the number of patients fully compliant within 1 hour with the ‘sepsis six’ in one month.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Determine the denominator: all patients identified as having sepsis requiring a response in one month.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the care bundle compliance as a percentage by dividing the numerator by the denominator and multiplying the result by 100.</td>
</tr>
</tbody>
</table>

% Severe sepsis mortality

<table>
<thead>
<tr>
<th>% Severe sepsis mortality</th>
<th>1. Determine the denominator: all patients triggered as having severe sepsis requiring a response in one month.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Determine the numerator: the number of patients within above set where hospital discharge = dead.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the mortality as a percentage by dividing the numerator by the denominator and multiplying the result by 100.</td>
</tr>
</tbody>
</table>

% Severe sepsis escalation to level 2 or 3 critical care.

<table>
<thead>
<tr>
<th>% Severe sepsis escalation to level 2 or 3 critical care.</th>
<th>1. Determine the denominator: all patients triggered as having severe sepsis requiring a response in one month.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Determine the numerator: the number of patients within above set that were transferred to level 2 or 3 critical care within that month.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate as a percentage by dividing the numerator by the denominator and multiplying the result by 100.</td>
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</tbody>
</table>
Appendix B - Setting up your team

Achieving improvements that reduce harm, waste and variation at a wholeorganisation level needs a team approach: one person working alone, or groups of individuals working in an uncoordinated 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 want 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 45. 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**
- Ideas
  - Evidence Base (The what to)
  - Use the relevant content area ‘How to Guide’ to assess the latest evidence of best practice

**Interventions**
- Create an organisational culture and environment for improvement
- Consult Faculty members to agree standards to be achieved
- Use critical sub sets of key content areas to improve the outcome

**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
  - PDSA cycles: Test - implement - spread - sustain
- Use the relevant content area
- Use the reliability model
- Use critical sub sets of key content areas to improve the outcome

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

**Secondary drivers**
- Use the relevant content area
  - ‘How to Guide’ to assess the latest evidence of best practice

**Ideas**
- Use the relevant content area
  - ‘How to Guide’ to assess the latest evidence of best practice

- Establish reliable process
  - Use reliability model

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

- Ideas
  - Evidence Base (The what to)
  - Use the relevant content area ‘How to Guide’ to assess the latest evidence of best practice

- 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
    - PDSA cycles: Test - implement - spread - sustain
  - Use the relevant content area
  - Use the reliability model
  - Use critical sub sets of key content areas to improve the outcome
Rapid Response to Acute Illness

**Model for Improvement-PDSA Cycle**

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

**For more guidance on using the Model for Improvement, see the ‘How to Improve’ guide.**

**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

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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 46 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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