Acknowledgements

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Date of publication

This guide was published in March 2011 and will be reviewed in March 2013 or before if necessary. 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:

- Rapid Response to Acute Illness
- Preventing Hospital Acquired Thrombosis
- Improving Critical Care
- Transforming Care - soon to be published
- SBAR - soon to be published

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

For every clinical practitioner involved in maternity care, the safety and wellbeing of women and babies is of paramount importance. The aim is to achieve the best outcomes and satisfaction with the service, with minimal intervention, in the most appropriate setting, and with ready access to support when things do not go according to plan.

This guide recognises that things do go wrong and sometimes the ‘plan’ is missing or not acted upon. There is a greater challenge within maternity because most women having babies are ‘normal’ and therefore not patients in the sense used by other areas of work within 1000 Lives Plus. Critical incidents and adverse events are thankfully rare. However, the transition from ‘wellbeing’ to ‘illness’ can be sudden and catastrophic.

By focusing initially on venous thromboembolism (VTE) prevention and improving the recognition and response to sepsis, we appreciate that many returns will be zero (eg VTE mortality rate). However just as with the UK Obstetric Surveillance System (UKOSS) processes, valuable lessons can be learnt at both a local and national level. This work will test the mechanisms and processes of achieving change and improvement in practice, whilst developing standards to enable quality improvement. As the mini-collaborative develops, additional work will also be undertaken to determine if a further intervention may be introduced at a later date. One area, which has been identified by the service, is around the management of undiagnosed IUGR and stillbirth.

This is a dynamic process to which you are all invited to contribute as we embark on this exciting challenge.

‘Yn gwneud gwahaniaeth!- Make a difference!’

Philip Banfield MD DA FRCOG
Consultant Obstetrician
Faculty Lead - 1000 Lives Plus
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Introduction

The overall aim of the Transforming Maternity Services Mini-Collaborative is to improve the experience and outcomes for women, babies and their families within Maternity Services. The primary drivers for this will be to reduce mortality and harm during pregnancy and the postnatal period by improving the recognition and response to the acutely deteriorating woman, and reducing the risk of venous thromboembolism (see Driver Diagram page 11). The nature of improving the recognition and response to the acutely deteriorating woman means that this will apply not only to sepsis but to other causes of deterioration in the maternal condition. There should, therefore, be wider benefits to all acutely ill service users in maternity.

This guide focuses on the acute setting, but work is underway to devise interventions that extend specifically to the community. Once the interventions have been tested and refined, a further ‘How to Guide’. will be developed to assist with implementation.

What is the problem?

Rapid Response to the Acutely Deteriorating Woman

General Overview

Patients who are admitted to a hospital have an expectation that they are entering a place of safety, where they have a right to receive the best possible care. They should have confidence that, should their condition deteriorate, they will receive prompt and effective treatment.

There is evidence to the contrary. Patients who are, or become, acutely unwell in hospital may receive suboptimal care. This may be because their deterioration is not recognised, or because - despite indications of clinical deterioration - it is not appreciated and/or not acted upon sufficiently rapidly. Communication and documentation are often poor, experience might be lacking and provision of critical care expertise, including admission to critical care areas, delayed.1

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 deterioration2 whilst several national enquiries have identified frequent sub-optimal care prior to cardiac arrest or critical care admission.3,4,5

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD)3 identified that 21% of ICU admissions were avoidable. This does not include those patients who deteriorate and die in acute hospital areas without ICU admission.

Most alarming is that a large proportion of these patients with acute deterioration are known to have had recognisable symptoms for many hours prior to an event, with one study finding that 60% of cardiac arrests, deaths or unplanned admissions to ICU were preceded by documented abnormal physiological changes.6,7
Acute clinicians in Wales have been tackling this problem through membership of the 1000 Lives Plus Rapid Response to Acute Illness Learning Set (RRAILS). Using tools and techniques developed as part of 1000 Lives Campaign, frontline teams have implemented bundles of care based upon NICE CG 50¹ and Surviving Sepsis Campaign Guidelines⁴ and demonstrated an increase in the speed with which deteriorating patients are identified and treated.

**Maternity**

During the 2006-2008 triennium, sepsis superseded venous thromboembolism (VTE) as the leading cause of maternal death in the United Kingdom.⁹ Although maternal mortality is declining overall, deaths due to sepsis have risen and account for 26 direct deaths and 3 further deaths classified as ‘Late Direct’.⁹ The Centre for Maternal and Child Enquiries (CMACE) Alert: Genital Tract Sepsis ⁹ was published in advance of the full report because of the significance of the findings relating to deaths due to genital tract sepsis, as indicated in the table below:

<table>
<thead>
<tr>
<th>Maternal Mortality Rate due to sepsis per 100,000 maternities</th>
<th>2000-2002</th>
<th>2003-2005</th>
<th>2006-2008</th>
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<tr>
<td></td>
<td>0.65</td>
<td>0.85</td>
<td>1.13</td>
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Many cases in the current CMACE triennia report¹⁰ were identified whereby the early warning signs and symptoms of impending severe maternal illness or collapse went unrecognised. There was also evidence that frontline junior trainees and midwives who attend women in emergencies did not have adequate support and back up, with a clear lack of clinical knowledge. Explicit guidance is recommended about when to request appropriately skilled multi-disciplinary senior help.

**Venous Thromboembolism (VTE)**

**General Overview**

In the population as a whole, thrombosis has been - and remains - a major cause of death in the United Kingdom. Yet this fact is not widely known amongst patients or health care workers outside of maternity. Many have little or no understanding about the causes and effects of thrombosis, and how it can be prevented. Every year, an estimated 25,000 people in England die from venous thrombosis (also called venous thromboembolism) contracted in hospital and it is the most common cause of hospital deaths in the UK that can be prevented.¹¹

Some general facts about VTE:

- Up to one in every 1,000 people are affected in the UK each year.
- Up to one in ten people who suffer a pulmonary embolism will die if not treated.
- One in three surgical patients can develop a deep vein thrombosis (DVT) if no preventative measures are given.
In 2010, as part of 1000 Lives Plus, all NHS organisations in Wales supported the implementation of a hospital acquired thrombosis risk assessment for patients admitted into hospital. They managed to achieve some significant successes and in some areas 100% of patients are risk assessed. The work is ongoing to follow this through to ensure that patients receive appropriate thromboprophylaxis. The sharing of good practice across Wales has seen the development of tools to help organisations to identify and therefore measure the rate of hospital acquired thrombosis. This work concentrated on the acute areas of a hospital and now the intervention needs to include maternity services.

**Maternity**

The recent CMACE triennia report has seen a significant drop in the numbers of maternal deaths from VTE which has changed the rankings of direct death by cause. Deaths from VTE, which was the leading cause of maternal death in the UK since 1985, are now in third position. Within 2006-2008 there were 18 maternal deaths attributed to this condition as opposed to 41 in the preceding year.¹⁰

Obstetricians and midwives must not become complacent as the mortality rate from VTE in pregnancy and the postnatal period falls. There is an ‘epidemic of obesity’ amongst young women and it is unclear whether the fall in fatal outcomes is as a result of improved risk assessment and prophylaxis or better recognition and treatment of established thrombo-embolic events.

As VTE still remains a leading cause for maternal death in the UK,¹² interventions aimed at prevention plus a low threshold for investigation and treatment of suspected cases are essential. Pregnancy confers increased risk of VTE, with the risk beginning in the first trimester but being greater after the birth, particularly during the first postnatal week.¹³ With appropriate thromboprophylaxis, many VTEs are preventable.¹⁴ The Royal College of Obstetricians and Gynaecologists (RCOG)¹⁵ has issued guidance on the risk assessment of women in pregnancy, but the implementation and timing of such assessments is often incomplete, as evidenced from local hospital audits. In addition, opinion seems to vary in clinical practice, especially with regards to the cut-off BMI for obese women that triggers the use of low molecular weight heparin (LMWH) prophylaxis. This makes standardising practice a challenge for Wales, although guidelines have been updated and accepted in Scotland recently.⁸

Maternal mortality due to VTE is indicated in the table below:

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</thead>
<tbody>
<tr>
<td>Maternal Mortality Rate due to VTE per 100,000 maternities</td>
<td>1.50</td>
<td>1.94</td>
<td>0.79</td>
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</tbody>
</table>
VTE is up to 10 times more common in pregnant than in non-pregnant women of a similar age.\textsuperscript{14}

VTE occurs in about 1/1,000 pregnancies in women under the age of 35 and occurs in 2.4/1,000 pregnancies in women over the age of 35.

In terms of the impact of maternal weight and mortality from thromboembolism, 78% of the mothers who died between 2006-2008 were overweight or obese.\textsuperscript{10}

Inherited thrombophilia is present in 30%-50% of women with pregnancy-associated VTE.\textsuperscript{15}

62% of women with fatal VTEs die in the first trimester although the risk per day is actually greatest in the weeks following delivery.\textsuperscript{11}

10% of postpartum deaths from VTE occur following operative (interventional) vaginal delivery.\textsuperscript{11}

**Harm associated with DVT**

Post-thrombotic syndrome (PTS) is the most common complication of deep venous thrombosis (DVT) yet has received little attention from clinicians and researchers. Clinically, PTS is characterised by chronic pain, swelling, heaviness and other signs in the affected limb. In severe cases, venous ulcers may develop. PTS is burdensome and costly to patients and society because of its high prevalence, severity and chronicity.\textsuperscript{16} From the few prospective studies available, it appears that post-thrombotic syndrome is established by one year after DVT in 17%-50% of patients.\textsuperscript{17}

**References**


\textsuperscript{3} NCEPOD, (2005) National Confidential Enquiry into Patient Outcome and Death.

\textsuperscript{4} P McQuillan et al. (1998) Confidential inquiry into quality of care before admission to intensive care. BMJ; 316:1853-1858


\textsuperscript{7} Krause et al. (2004) A comparison of antecedents to cardiac arrests, deaths and emergency intensive care admissions in Australia and New Zealand, and the United Kingdom the ACADEMIA study. Resuscitation 62: 275-82


OVERALL AIM:
To improve experience and outcomes for mothers, babies and their families within maternity services

Aim

Primary Drivers

- Reducing mortality and harm from venous thromboembolism in pregnancy and the postnatal period.
- Reduce mortality and harm by improving the recognition and response to the acutely deteriorating woman.

Secondary Drivers

- All women on admission/transfer in:
  - Observation baseline, including DVT risk assessment and booking BMI recorded within 2 hrs of admission, a plan and communicated with clinical team
- All women in hospital have at least daily risk assessment for deterioration
- Appropriate/timely treatment of women at risk of DVT and/or acute deterioration
- Appropriate and timely treatment for severe sepsis within 1 hour of diagnosis
- Patient involvement
- Ensure clinical competence in DVT risk assessment and monitoring, measurement, interpretation and prompt response to acutely ill woman

Interventions

Admission bundle

- Full set of observations on admission
- Booking BMI recorded
- Recorded DVT risk assessment
- Clear monitoring plan specifying the physiological observations and how often
- Communicate this with the clinical team

‘Acutely ill’ Recognition Bundle

- Monitor observations at least 12 hourly as according to plan
- Record track and trigger risk assessment
- Consider severe sepsis if patient is ‘at risk
- Communicate this information with the clinical team using SBAR format/safety briefs/patient status board

Response Bundle

- Prescribe/administer appropriate thromboprophylaxis
- Inform appropriate staff using SBAR tool of any deterioration in observations
- Change frequency of observations
- Additional monitoring if appropriate
- Timely assessment and initiation of response
- Initiate Sepsis Six Bundle if appropriate

Sepsis Six Bundle

- Oxygen
- Blood culture
- Iv antibiotics
- Fluid resuscitation
- Serum lactate and Hb
- Hourly urine output monitoring

- Utilising agreed patient information
- Patient awareness and education of the risks & symptoms of thrombosis
- Patient involvement in care

- Regular and frequent multidisciplinary reviews of circumstances surrounding patient deterioration
- Multidisciplinary training in monitoring, measurement, interpretation and prompt response to the acutely ill & assessment and risks of DVT & appropriate prophylactic treatment including mechanical methods, pharmaceutical methods and early mobilisation

Transforming Maternity Services Mini-Collaborative Driver Diagram
Measures:

Process Measures

- Compliance with Admissions Bundle
- Compliance with Recognition Bundle
- Compliance with Response Bundle
- Compliance with Sepsis Six Bundle
- Surveys demonstrating increased awareness of women re the risks for both DVT and sepsis
- Numbers of multidisciplinary reviews
- % of staff trained

Outcome Measures

- Number of calls for response to women at medium and high maternal risk of deterioration
- Number of women escalated to high dependency or critical care
- Severe Sepsis Mortality Rate
- Incidence of VTE
- VTE Mortality Rate
The Solution

*Rapid Access for the Acutely Deteriorating Woman*

The early detection of severe illness in women remains a challenge to all clinicians involved in their care. The relative rarity of such events, combined with the normal changes in physiology associated with pregnancy and childbirth, compounds the problem. Early recognition is essential because deterioration can be alarmingly rapid.

The regular recording and documentation of vital signs, using a Modified Early Warning System was a top ten recommendation within the Saving Mothers Lives Report of 2007 and has remained so in the recently published CMACE Report of 2011. Both reports strongly recommend the use of the Modified Early Obstetric Warning System (MEOWS) in the absence of an alternative validated chart.

Within Wales, a national early warning system is under development for general use. There should be an opportunity for it to be adapted to suit maternity care, which needs to account for the physiological changes and altered presentations of disease in pregnancy. This makes finding a ‘tool’ that has acceptable sensitivity and specificity to allow for a consensus agreement, a challenge for the professions. Currently within Wales, all of the obstetric units are using MEOWS charts, adapted to local use to varying degrees.

This work will facilitate, re-focus and spread to all areas of maternity units to work towards a consistent approach. What is essential is that there needs to be local guidance for the use of MEOWS in relation to escalating concerns. This must be clear, concise and communicated to all clinical staff.

To this end, the mini-collaborative National Steering Group suggested linking such development to the aim of preventing harm and mortality from severe maternal sepsis. This links to the concerns about genital sepsis expressed by CMACE.

One focus of the Transforming Maternity Services Mini-Collaborative is this early identification and appropriate response to acutely ill women by implementing care bundles that enable a rapid response without adding a significant burden of work on the clinical team, in a way that is entirely owned by those challenged with their implementation.

The Surviving Sepsis Campaign (SSC) was an international campaign to reduce mortality and morbidity from sepsis by 25% over a 5 year period through the introduction of Sepsis Care Bundles. These bundles consist of interventions that have strong evidence of improving mortality.

1000 Lives Plus has enabled teams in acute and critical care to implement these bundles with particular emphasis upon the sepsis six. This work is affiliated with the Global Sepsis Alliance through participation in the UK sepsis group.
CMACE (2011) conclude that adequate management of genital tract sepsis entails:

- ‘Clear recognition and prompt management of genital tract sepsis
- Clear clinical leadership and multidisciplinary approach
- Careful documentation of both signs and treatment
- Adequate doses of appropriate systemic antibiotics, started promptly
- Fluid balance to be carefully managed
- A collaborative approach where necessary: laparotomy, with or without hysterectomy, is a difficult decision but can save lives. Where possible a general surgeon should be involved’

‘Sepsis is complex, incompletely understood, often difficult to recognise and manage, and presents a continuing challenge. Some deaths will always be unavoidable, but better training, a structured approach, good care in the community, and, in hospital, prompt investigation and treatment, particularly immediate intravenous antibiotic treatment and early involvement of senior obstetricians, anaesthetists and critical care consultants, may help in future to save lives.’

<table>
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<th>VTE risk assessment</th>
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In 2009 the RCOG produced full guidance ‘Reducing the Risk of Thrombosis and Embolism during Pregnancy and the puerperium’. This guidance includes recommended risk assessment tools and thromboprophylaxis for the antenatal and postnatal period.

The RCOG guidance recommends that all women should have a recorded DVT risk assessment in early pregnancy or before pregnancy. This assessment should be repeated if the woman is admitted to hospital for any reason or develops intercurrent problems. All women should then be reassessed following delivery. Many obstetric units within Wales have developed their own guidance and risk assessment templates in line with the RCOG guidance. The Mini-Collaborative interventions will compliment this work and ensure consistency of VTE prevention. The National Specialist Advisory Group (NSAG) is currently exploring the need for nationally recommended risk assessment templates for both the antenatal and postnatal period. If it is decided that this is the best way forward, this will be made available.
Improving Communication

Safe, effective clinical care depends on reliable, flawless communication between caregivers. Communication breakdowns between health care providers are a central feature in episodes of avoidable harm.

As clinical teamwork often involves hurried interactions between human beings with varying styles of communication, a standardised approach to information sharing is needed. This ensures that information is consistently and accurately imparted - especially true during critical events, shift handovers, or when women are transferred. Whilst there are other models, SBAR is one example of an effective communication tool:

**SBAR - Situation-Background-Assessment-Recommendation**

SBAR is an easy to remember mechanism that you can use to frame conversations, especially critical ones, requiring a clinician's immediate attention and action. It enables you to clarify what information should be communicated between members of the team, and how. It can also help you to develop teamwork and foster a culture of safety. Utilised extensively in medicine, and originating from the nuclear submarine service, SBAR stands for:

- **S** - Situation: What is happening at the present time?
- **B** - Background: What are the circumstances leading up to this situation?
- **A** - Assessment: What do I think the problem is?
- **R** - Recommendation: What should we do to correct the problem?

The tool consists of standardised prompt questions within four sections, to ensure that staff are sharing concise and focused information. It allows staff to communicate assertively and effectively, reducing the need for repetition.

The tool helps staff anticipate the information needed by colleagues and encourages assessment skills. Using SBAR prompts staff to formulate information with the right level of detail.4

Continuity of information is vital to the safety of women. With the move to shift work patterns for all healthcare providers, which increase the number of individuals caring for women, the need for comprehensive handover of clinical information is more important than ever.

Good hand-over does not happen by chance. It requires work by all those involved, from organisations to the individuals:

- Shifts must coordinate.
- Adequate time must be allowed.
- Handover should have clear leadership.
- Adequate information technology support must be provided.
Sufficient and relevant information should be exchanged to ensure the woman’s safety:

- The women that are clinically at high risk of deterioration, are known to the senior and covering clinicians.
- Junior members of the team are adequately briefed on concerns from previous shifts.
- Tasks not yet completed are clearly understood by the incoming team.

Lastly, hand-over is of little value unless action is taken as a result:

- Tasks should be prioritised.
- Plans for further care are put into place.
- Unstable women are reviewed.

There are many working examples of templates/prompts for SBAR. Please refer to Useful Resources (Appendix E) for two examples.
Transforming Maternity Services Mini-Collaborative

In order to support clinicians in achieving these goals, the Transforming Maternity Services Mini-Collaborative aims to:

- Support the introduction of care bundles based upon the guidance from CMACE, NICE and RCOG and the Welsh Professional Groups.
- Enable measurement of compliance with these bundles with the use of feedback and the Model for Improvement (MFI). This will improve reliability in the process of recognising and responding to the acutely deteriorating woman and to reduce deaths and harm from VTE.
- Facilitate the identification and prompt remedy 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 women's outcomes by reducing maternal mortality and morbidity, the number of potentially preventable admissions to ICU and the incidence of severe maternal sepsis and VTE.

Four care bundles should be introduced, and you may want to consider the attached questions:

- **Admissions bundle** - What proportion of the women 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? How many have a DVT risk assessment recorded? Do all women have a recorded booking BMI within their hand held notes?

- **Recognition bundle** - What proportion of your women are regularly risk assessed using a track and trigger system and are routinely screened for severe sepsis if found to be at risk? How often during a hospital stay is the DVT risk assessment repeated? Do you have a trigger mechanism for a change of maternal risk status?

- **Response bundle** - What proportion of your women are treated appropriately and in a timely manner if their condition deteriorates? How often are senior clinicians (consultants from obstetrics and the wider team) called for assistance? Does the cardiac arrest team have the details of how to access the maternity department - or even where it is? Is the appropriate prophylaxis given to all women as outlined in the risk assessment? Does your hospital have an acute care team/critical outreach team? If so, is this service utilised in your maternity unit?

- **Sepsis Six** - What proportion of your women with sepsis 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 Plus 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 to 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 without having to change everything at once.

Do we have to use all elements of the bundles?

The care bundles are all evidence-based. As indicated above, when they are consistently applied together, they substantially improve outcome. In line with local guidance for inclusion, all elements of the bundle should be completed for the woman. There are however, exceptions that can be applied to certain elements within the bundles (in order to retain full compliant) if supported by evidence/clinical judgement.

References


5 Surviving Sepsis Campaign Website: www.survivingsepsis.org/Pages/default.aspx

Transforming Care

- The work within this Mini- Collaborative will be based upon the Transforming Care framework. Each Maternity Unit in NHS Wales has been invited to take part within this project.

Transforming Care is now a national programme within 1000 Lives Plus, and it commenced in late 2009 involving newly identified frontline wards from across all the Health Boards in Wales. Many of the Health Boards had already been involved in either Transforming Care at the Bedside or the Releasing Time to Care Programme. Transforming Care now aims to support them by spreading the learning in a unified way to additional wards within all Health Boards. At the same time, Transforming Care will help to build local capacity and capability within Health Boards by training local Transforming Care facilitators to set up and spread the framework and interventions within their organisations. The face to face collaborative learning events will take place over the first year and then the local facilitators will continue to spread the work.

The Overall Aim of Transforming Care

To transform the quality and safety of patient care, including maternity care, across Wales by the end of Dec 2011 incorporating the following:

Underlying principles:

- To engage staff of all disciplines and at every level within NHS organisations in improving the experience and outcomes of care for patients/women by:
  - empowering healthcare staff to continuously improve the quality, safety and fundamentals of the care they provide to patients/women and service users.
  - engaging multidisciplinary staff at every level in the planning, testing, monitoring, implementation and spread of the improvements.
  - providing staff with the tools, techniques and support they need to improve the experience and care of patients/women, carers and service users.
  - ensuring each improvement is sustainable and can be spread as far as possible.
  - building a vibrant network across Wales to share learning and provide peer support, coaching and mentoring.

Transforming Care Specific objectives within maternity services:

1. To increase the amount of time healthcare staff spend in direct/value added care of women to 70%.

2. To reduce locally defined adverse events as per agreed maternity interventions.

3. Increase satisfaction of women cared for within maternity services to at least 95%.

4. Increase staff satisfaction to at least 95%.
The Transforming Care objectives link closely with the Transforming Maternity Care Mini-Collaborative and will run alongside the maternity work.

The following Driver Diagram demonstrates how the maternity work and Transforming Care link together.
Transforming Care
Driver Diagram

Content Area

Drivers

Interventions

- Establish, oversee and communicate system level aims for improvement
- Align measures, strategy, projects and leadership learning system
- Channel leadership attention to quality improvement and safety
- Build the right team
- Engage medical staff in improving care at all levels
- Align quality projects to finance

Transformational Leadership

Increase the percentage of time healthcare staff spend in direct/value-added care to 70%
- Understand measurement for improvement
- ‘knowing how we’re doing’
- Empower staff to develop a ‘well organised ward’
- Enable staff to identify ‘patient status at a glance’

To transform the quality and safety of patient care in maternity services across Wales.

Releasing Time to Care (Value-added care)

Reducing mortality and harm during pregnancy by improving the recognition and response to the acutely deteriorating woman and reducing the risk of venous thromboembolism.

Safety and Reliability

Increase staff satisfaction to at least 95%
- Empower ward managers to create teams with the ability and authority to act and transform care.
- Build capability for Innovation and improvement in frontline staff and middle managers
- Optimise communication across the care team
- Improve physical environment for staff and reduce injuries

Teamwork and Vitality

Increase patient satisfaction to at least 95%
- Support and involve patients and families
- Create patient-centred healing environments
- Ensure patients’ physical comfort
- Optimise care transitions to home or elsewhere
- Maintain patients’ Privacy and Dignity
- Provide emotional and spiritual support

Patient and Family Centred Care

1000 Lives

Lives ofwydau
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 measures:

- Number of calls for response to women at medium and high maternal risk of deterioration
- Number of women escalated to high dependency or critical care
- Severe sepsis mortality rate
- Incidence of VTE
- VTE Mortality rate

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’ Tools for Improvement 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’ Tools for Improvement 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.
Applying the Model for Improvement: Fundamental Questions

Before exploring the individual bundle content and its application, the following diagrams represent a breakdown of the driver diagram in relation to the three fundamental questions in IHI’s Model for Improvement (Appendix C):

What are we trying to achieve?
Driver Diagram

OVERALL AIM:
To improve experience and outcomes for mothers, babies and their families within Maternity Services

Reducing mortality and harm from venous thromboembolism in pregnancy and the postnatal period

Reduce mortality and harm by improving the recognition and response to the acutely deteriorating woman
How will we know that the change is an improvement?

**Driver Diagram**

### Outcome Measures
- Number of calls for response to women at medium and high risk
- Number of women escalated to higher level of care
- Severe Sepsis Mortality Rate
- Incidence of VTE
- VTE Mortality Rate

### Process Measures

#### Compliance with Admissions Bundle
- Admission bundle
  - Full set of observations on admission
  - Booking BMI recorded
  - Recorded DVT risk assessment
  - Clear monitoring plan specifying the physiological observations and how often
  - Communicate this with the clinical team

#### Compliance with Recognition Bundle
- Recognition Bundle
  - Monitor observations at least 12 hourly as according to plan
  - Record track and trigger risk assessment
  - Consider severe sepsis if patient is ‘at risk’
  - Communicate this information with the clinical team using SBAR format/safety briefs/patient status board

#### Compliance with Response Bundle
- Response Bundle
  - Prescribe/administer appropriate thromboprophylaxis
  - Inform appropriate staff using SBAR tool of any deterioration in observations
  - Change frequency of observations
  - Additional monitoring if appropriate
  - Timely assessment and initiation of response
  - Initiate Sepsis Six Bundle if appropriate

#### Compliance with Sepsis Six Bundle
- Sepsis Six Bundle
  - Oxygen
  - Blood culture
  - IV antibiotics
  - Fluid resuscitation
  - Serum lactate and Hb
  - Hourly urine output monitoring

#### Pt surveys
- Utilising agreed patient information
- Patient awareness and education of the risks & symptoms of thrombosis
- Patient involvement in care

### Interventions

- Regular and frequent multidisciplinary reviews of circumstances surrounding patient deterioration
- Multidisciplinary training in monitoring, measurement, interpretation and prompt response to the acutely ill & assessment and risks of DVT & appropriate prophylactic treatment including mechanical methods, pharmaceutical methods and early
### What changes can we make that will result in improvement?

#### Driver Diagram

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>All women on admission/transfer in: Observation baseline, including DVT risk assessment and booking BMI recorded within 2 hrs of admission, a plan and communicated with clinical team</td>
<td>Admission bundle • Full set of observations on admission • Booking BMI recorded • Recorded DVT risk assessment • Clear monitoring plan specifying the physiological observations and how often • Communicate this with the clinical team</td>
</tr>
<tr>
<td>All women in hospital have at least daily risk assessment for deterioration and DVT</td>
<td>Recognition Bundle • Monitor obs at least 12 hrly as according to plan • Record track and trigger risk assessment • Consider severe sepsis if patient is ‘at risk’ • Communicate this information with the clinical team using SBAR format/safety briefs/patient status board</td>
</tr>
<tr>
<td>Appropriate/timely treatment of women at risk of DVT and/or acute deterioration</td>
<td>Response Bundle • Prescribe/administer appropriate thromboprophylaxis • Inform appropriate staff using SBAR tool of any deterioration in observations • Change frequency of observations • Additional monitoring if appropriate • Timely assessment and initiation of response • Initiate Sepsis Six Bundle if appropriate</td>
</tr>
<tr>
<td>Appropriate and timely treatment for severe sepsis within 1 hour of diagnosis</td>
<td>Sepsis Six Bundle • Oxygen • Fluid resuscitation • Blood culture • Serum lactate and Hb • Iv antibiotics • Hourly urine output monitoring</td>
</tr>
<tr>
<td>Patient involvement</td>
<td>• Utilising agreed patient information • Patient awareness and education of the risks &amp; symptoms of thrombosis • Patient involvement in care</td>
</tr>
<tr>
<td>Ensure clinical competence in DVT risk assessment and monitoring, measurement, interpretation and prompt response to acutely ill woman</td>
<td>• Regular and frequent multidisciplinary reviews of circumstances surrounding patient deterioration • Multidisciplinary training in monitoring, measurement, interpretation and prompt response to the acutely ill &amp; assessment and risks of DVT &amp; appropriate prophylactic treatment including mechanical methods, pharmaceutical methods and early mobilisation</td>
</tr>
</tbody>
</table>
Interventions

Intervention: Admission Bundle
The admissions bundle consists of the following elements, all to be completed within 2 hours of admission for all women (this will be sooner than 2 hours if the woman presents as ‘unwell’):

- Full set of observations
- Booking BMI calculation recorded
- Recorded DVT risk assessment
- Plan for frequency of observations
- Communication of this information to the clinical team

This bundle will apply to all women admitted to a ward setting within an obstetric unit, including women transferred from the delivery environment.*

*It is important that all women are reassessed for the risk of DVT following birth as per RCOG recommendations with baseline observations recorded.

Full set of observations
NICE Clinical Guidance 501 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 frequency and timing of maternal physiological observations will vary with the perception of maternal risk and wellbeing. On admission to the wards, all women should have a full set of observations as per admission bundle above. It is important that there is then a robust trigger mechanism and agreement to the point at which further observations are required and subsequently acted upon. The following table demonstrates the NICE Guidance recommendations for consideration when deciding local guidance.
NICE Clinical Guidance recommendations in relation to recording maternal physiological observations during pregnancy and following birth:

<table>
<thead>
<tr>
<th>Guidance Number</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICE CG 62: Antenatal Care$^2$</td>
<td>- There is no reference to recording physiological observations during pregnancy/admission to hospital/community.</td>
</tr>
</tbody>
</table>
| NICE CG 55: Intrapartum Care$^1$ | - Initial assessment: temperature (T), pulse (P), blood pressure (BP), Urinalysis  
- 1st stage: 4hrly T & BP, hrly P  
- 2nd stage: hourly BP & P, 4hrly T  
- 3rd stage: colour, respiration & how woman feels |
| NICE CG 13: Caesarean Section$^4$ | - ‘After recovery from anaesthesia, observations (respiratory rate, heart rate, blood pressure, pain and sedation) should be continued every half hour for 2 hours, and hourly thereafter provided that the observations are stable or satisfactory. If these observations are not stable, more frequent observations and medical review are recommended.  
- Following intrathecal opioids, epidural opioids, and patient controlled analgesia with opioids, they recommend hourly resp rate, sedation and pain scores throughout treatment and at least 2 hours following discontinuation of treatment.’  
- No further reference. |
| NICE CG 37: Postnatal Care$^3$ | - ‘At each postnatal contact, the healthcare professional should ask the woman about her health and wellbeing... Any symptoms reported by the woman or identified through clinical observations should be assessed.’  
- Signs and Symptoms table: ‘Fever, shivering, abdominal pain and/or offensive vaginal loss’ = infection  
- In the absence of any signs and symptoms of genital tract sepsis, routine assessment of temperature is unnecessary.  
- Temp should be taken and documented if infection is suspected. If >38 degrees centigrade - repeat in 4-6 hours.  
- If temp remains >38 degrees centigrade on the second reading or there are other observable symptoms/measurable signs of sepsis, evaluate further (emergency action). |
Booking Body Mass Index (BMI) Recorded

The NICE Antenatal care guidance\(^2\) and CMACE/RCOG Management of Women with obesity in Pregnancy guidance\(^6\) recommend that all pregnant women should have their weight and height measured using appropriate equipment, and their body mass index calculated at the antenatal booking visit (ideally by 10 weeks gestation). Measurements should be documented in the handheld notes. This should not be a calculation based on self reported measurements.

For women with obesity in pregnancy, re-measurement of maternal weight should be undertaken in the third trimester\(^6\)

The booking BMI calculation needs to be available for DVT risk assessment. If not available, this should be calculated at first admission.

Recorded DVT Risk Assessment

The RCOG Green Top Guidance on reducing the risk of VTE in pregnancy\(^7\) recommends that all women should have a recorded DVT risk assessment in early pregnancy or before pregnancy. This assessment should be repeated if the woman is admitted to hospital for any reason or develops inter-current problems or changes during a hospital stay. All women should then be reassessed following birth. Many maternity units within Wales have developed their own guidance and risk assessment templates in line with RCOG guidance. The National Specialist Advisory Group is currently exploring the need for nationally recommended risk assessment templates for both the antenatal and postnatal period. If it is decided that this is the best way forward, these will be expanded further. Please refer to Useful Resources (Appendix E) for RCOG risk assessment guidance and example of locally adapted risk assessment.

Clear monitoring plan

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

- Diagnosis
- Co-morbidities/obstetric complications
- The agreed treatment plan

Communication of this information to the clinical team

As with the additional bundles in this 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 at times when information should be transferred but is not. Inclusion of the communication element in this bundle is to ensure that making the process of admitting patients runs correctly every time and does not depend upon who happens to be on duty at the time.

Experience from other high risk industries demonstrates that effective communication is vital in the reduction of adverse events and serious clinical
incidents. Making information highly visible by the use of a ‘Status at a Glance Board’/whiteboard enhances the identification of the at risk women. Regular safety briefings have been shown to alert clinicians to ‘at risk’ women and enable more rapid treatment.

In maternity care there are challenges produced by separate handovers between midwifery staff and obstetricians with varying involvement of the multi-disciplinary team, also involving obstetric anaesthetists & other specialties as appropriate (Multi-disciplinary team: MDT). Although the MDT handover is essential on a delivery suite, this does not always take place on the wards and is inappropriate in birthing centres. The communication of the need for a higher level of care is therefore crucial.

Example of the Model for Improvement

What are we trying to achieve?

The admissions bundle forms an entry point to clinical assessment. It is important that all members of the team know what it is they are trying to achieve; changes and improvements in practice are more likely with clinical ownership of this process.

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

Measurement and data collection should be started at the same time as the intervention is launched.

How will we know that change is an improvement?

You will only know that change is an improvement if you measure it. The measures detailed below for this intervention are either processes or outcomes and are best represented on a run chart, which is a visual way of communicating progress back to the team - as long as it is put somewhere prominent where everyone can see it! This is NOT a scientific study, so the process of observing the intervention may also result in change (the Hawthorne effect). The pragmatic approach to this is that patient care improves.

Data collection should be as easy as possible. Although this is best done by integrating data collection into the normal practice in the clinical area, maternity data collection in Wales is variable and we appreciate that there may be a bit more effort required because of this.

The use of ‘Status at a Glance Boards’ / whiteboards to record admission bundle data plus a short safety briefing at the beginning of each shift to communicate and record the data is an example of an effective process.
The bundle compliance sheet in the Useful Resource section (Appendix D) of this guide is intended to be used during shift handover or safety briefing and requires 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

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

By involving the whole team in your improvement work you may be surprised by how easily a problem can be solved by the application of a different perspective. In some existing teams it is non-clinical staff who assumed the responsibility for collecting the admissions bundle data.

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

No. The aim of this work is to make existing systems more efficient and effective, not to add extra work in checking up on people. Improving communication is key to this. As errors of omission in existing systems occur most commonly at times when information is transferred it makes sense to include measurement of compliance with this bundle as part of the shift handover process.

**Measure:**

For this intervention, use the following process measure:

- % compliance with admission bundle

References

**Intervention: ‘Acutely ill’ Recognition Bundle**

The ‘Acutely ill’ Recognition Bundle consists of the following elements:

- Monitor physiological observations at least every 12 hours in accordance with the patient’s observation plan
- Record track and trigger risk assessment
- Consider severe sepsis if patient is ‘at risk’
- Communicate this information to the clinical team

This bundle will apply to all women admitted to a ward setting within an obstetric unit using clear local guidance in relation to how often the observations are recorded.

**Monitor physiological observations**

The NICE Clinical Guidance 50\(^1\) recommends monitoring physiological observations at least every 12 hours unless decided by a competent practitioner to increase or decrease the frequency for an individual woman.

You should monitor:

- heart rate
- respiratory rate
- systolic blood pressure
- level of consciousness
- oxygen saturation
- temperature

**Record track and trigger score**

As indicated previously, many cases in the current CMACE triennia report were identified where the early warning signs and symptoms of impending severe maternal illness or collapse went unrecognised. One of the top 10 recommendations states:
6.1. There remains an urgent need for the routine use of a national modified early obstetric warning score (MEOWS) chart in all pregnant or postpartum women who become unwell and require either obstetric or gynaecology services. This will help in the more timely recognition, treatment and referral of women who have, or are developing, a critical illness during or after pregnancy. It is equally important that these charts are also used for pregnant or postpartum women who are unwell and are being cared for outside obstetric and gynaecology services e.g. Emergency Departments. Abnormal scores should not just be recorded but should also trigger an appropriate response.\(^1\)
Both the previous Confidential Enquiry into Maternal And Child Health (CEMACH) 2007 Report¹ and NICE CG 50² also recommend that a physiological track and trigger system be used to monitor all adult patients in acute hospital settings. The recommended tool to use is the Modified Obstetric Early Warning System (MEOWS) in the absence of an alternative validated obstetric tool. This track and trigger system relies on colour coded triggers whereas NICE recommend the use of aggregated scoring systems, which allow a graded response.

Many different adaptations of the MEOWS are in use across maternity units in Wales with local guidance in relation to appropriate responses. Although colour-coded charts may trigger review or intervention, an objective scoring system would allow the grading of progressive responses and monitoring of progression of disease or success of treatment.

Please refer to Useful Resources (Appendix E) for examples of MEOWS charts that are both coloured and numerically scored plus escalation processes.

This work will facilitate, re-focus and spread to all areas of maternity units to work towards a consistent approach.

<table>
<thead>
<tr>
<th>It is essential that local guidance is in place for the use of MEOWS in relation to both grading and escalating concerns. This must be clear, concise and communicated to all clinical staff. This guidance should be consistent across all maternity units - obstetric or birthing centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>* The trigger for using the MEOWS chart in labour might be ‘exit’ from the normal labour pathway. The guidance may then differ depending on the availability of full emergency services and the level of critical care.</td>
</tr>
</tbody>
</table>

Perform risk assessment - is the woman ‘at risk’?

NICE CG 50² recommends thresholds are set locally in relation to level of risk, and review regularly to optimise sensitivity and specificity - the professional groups may wish to take an All-Wales approach. This would reduce error as staff, students and trainees work and travel between different units in Wales.

Consider sepsis

Mortality from severe sepsis is considerably 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 woman is identified as being ‘at risk’. This consistent standardised approach can save practitioners from over-reliance on clinical judgement that may be mis-placed.

Communicate with the clinical team

An observation chart is only useful when the information on it is communicated
to others with resulting action(s). Making 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, is a huge step in avoiding unnecessary harm.

Use shift handovers, safety briefings, ‘Status at a Glance Boards’ or handover sheets to ensure that this information is passed on. The use of SBAR as a communication tool is recommended for all referrals requiring a response.

Example of the Model for Improvement

**What are we trying to achieve?**

Experience within 1000 Lives Plus suggests that it takes longer to change outcomes than it does to demonstrate improvements in processes. Good processes lead to better outcomes and greater satisfaction for women, their families, and staff.

**How will we know that change is an improvement?**

Improvement can be measured. Time, effort and money may be wasted if changes are made before starting measurement as it will be unclear whether your intervention has improved things (or not).

Wales has undergone a radical re-organisation of hospitals recently and there has been a temptation to standardise the format of observation charts and other documentation before starting to improve the recognition of deteriorating patients. Whilst this may result in standardisation it may necessitate the postponement of action for too long a time until agreement is reached on formatting. Measurement of bundle compliance as you make changes to the charts gives a good idea of what changes work and what do not.

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

‘Status at a Glance Boards’/ whiteboards are a familiar sight on labour wards - the ‘labour ward board’. It is easy to add any extra items you wish to consider, but they will depend on the clinical setting - labour ward, antenatal or postnatal ward.

A safety briefing at the start of handover, in which ‘at risk women’ are identified, the frequency of observations and other interventions is shared and the goal for that particular woman is agreed, should take no longer than 5 minutes, and be multidisciplinary with all participants remaining standing to promote brevity. Other risks such as immobility or obesity may be identified at the same time.

**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 then the bundle has still been
cомplied 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 ‘Status at a Glance
Boards,’ safety briefings or SBAR will assist with this.

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

Participation in RRAILS as part of 1000 Lives Plus has revealed that there is
frequently no guidance or protocol in existence in clinical areas to indicate how
frequently observations should take place. You may wish to explore this within
the multi-disciplinary team and with your local RRAILS team, referring to NICE
guidance.

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

No. The point of this exercise is to ensure that safer practice becomes ‘just the
way that we do things’, not to make extra work in auditing each other’s practice.

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

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**Measure:**

For this intervention, use the following process measure:

- % compliance with ‘Acutely Ill’ recognition bundle

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**References**

1. National Institute for Health and Clinical Excellence (2007) [Recognition of and
   response to acute illness in adults in hospital]. [CG50]. London: National Institute for
   Health and Clinical Excellence.

   The Eighth Report on Confidential Enquiries into Maternal Deaths in the United
   Kingdom. London: CMACE.

   London: CEMACH.
**Intervention: Response Bundle**

The response bundle consists of the following elements:

- Prescribe/administer appropriate thromboprophylaxis
- Inform appropriate staff using SBAR tool of any deterioration in observations
- Change frequency of observations
- Additional monitoring if appropriate
- Timely assessment and initiation of response
- Initiate Sepsis Six bundle if appropriate

This bundle will apply to all women admitted to a ward setting within an obstetric unit. However, consideration needs to be given to the use of the bundle within delivery suites, birthing centres and community. Clear guidance is required in relation to triggering the use of this bundle e.g. deviation from the normal labour pathway or abnormal physiological observations.

**Prescribe/administer appropriate thromboprophylaxis**

The RCOG Green Top Guidance on reducing the risk of VTE in pregnancy recommends both the use and dose of low-molecular-weight heparin as the choice of thromboprophylaxis in pregnancy and the postnatal period. Many maternity units have developed their own guidelines in line with this RCOG guidance.

**Antiembolic Stockings**

The use of properly applied graduated antiembolic stockings of appropriate strength is recommended in pregnancy and the puerperium (1) for:

- those who are hospitalised and have a contraindication to LMWH
- those who are hospitalised post-caesarean section (combined with LMWH) and considered to be at particularly high risk of VTE (such as previous VTE, more than three risk factors)

The use of calf compressors in pregnancy needs to be explored.

**Early mobilisation**

Early mobilisation is encouraged for all antenatal and postnatal women in hospital as soon as appropriate particularly following caesarean section or other surgical procedures and particularly when they have risk factors for developing VTE. Adequate hydration and the prevention of dehydration is also vital.
**Response to risk assessment for deterioration**

NICE CG 50 recommends that a graded response strategy (of 3 levels) for patients/women identified as being at risk of clinical deterioration should be agreed and delivered locally.

The groups below are an example of a graded response to the Modified Early Warning System (MEWS) which is being implemented on general wards within Wales:

**Low-score group:**
- Increased frequency of observations and the clinician in charge alerted.

**Medium-score group:**
- Urgent call to team with primary obstetric 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.

The above general graded response could potentially be adapted for use within obstetrics. Consideration would need to be given to specific recognition and pathological changes in pregnancy.

Please see the Useful Resources section (Appendix E) for examples of existing maternity graded responses, both numerical and colour graded.

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Although MEOWS enables recognition of risk it does not stratify the severity of the risk or any deterioration or improvement in condition. The evidence presented in CG 50\(^1\) would support a recommendation that Maternity Services should therefore aim towards the development of a numerical based early warning score system.
**Measure:**

For this intervention, use the following process measure:

- % Compliance with response bundle

**References**


**Intervention: Sepsis Six Bundle**

The Sepsis Six Bundle focuses on the appropriate and timely treatment for severe sepsis within 1 hour of diagnosis. The bundle consists of the following elements:

- **Oxygen** - TARGET saturations >94%
- **Blood Culture** - PRIOR to IV antibiotics: Women with sepsis following caesarean section should have had peri-operative antibiotic prophylaxis which needs to be recorded on laboratory request forms.
- **IV antibiotics** - Broad spectrum
- **Fluid Resuscitation**
- **Serum Lactate and Hb** - Ensure Hb >8g/dl
- **Hourly Urine Output Monitoring** - Catheterisation or self-void. There is also a need to consider pregnancy induced hypertensive disorders as urine output may be reduced and fluid challenge may have iatrogenic adverse effects.

This bundle will apply to all women who have suspected/diagnosed sepsis.

The sepsis six bundle has been successfully applied to non-pregnant women. The diagnosis of sepsis in pregnancy can be difficult because the ‘normal’ parameters alter. For example, the maternal pulse is often around 100bpm and the PCO2 may be below 32mm/Hg due to relative hyperventilation. The white cell count increases in pregnancy and the oxygen requirement in pregnancy increases, in part because of feto-placental metabolism. Thus, delivery of the baby is a consideration in maternal resuscitation. This can be further complicated by the presence of severe maternal compromise. This then may be influenced by discussions about fetal maturity and whether the maternal condition may or may not improve without delivery. Delays in decision making may cost lives and involvement of consultants in obstetrics, obstetric anaesthetists, critical care and microbiology are sometimes needed immediately.

**Elements of the Surviving Sepsis Campaign Resuscitation Bundle - within 6 hours of diagnosis.**

This bundle is usually initiated by clinicians with critical care skills. These critical care skills are provided by various individuals - e.g. obstetric anaesthetist/critical care staff or acute care/outreach team and include:

- 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/critical care facility on delivery suite 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\(^1\) was an international campaign to reduce mortality and morbidity from sepsis by 25% over a five year period through the introduction of Sepsis Care Bundles. These bundles consist of interventions that have solid evidence in improving mortality.

They consist of three 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.

Tackling the problem of severe sepsis cannot be the sole responsibility of the ICU and that a level of integration between maternity 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. Where these teams exist, they sometimes do not work closely with maternity. Even without these systems individual clinical areas have made significant progress with implementing the sepsis six.

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**Example of the Model for Improvement (in non-maternity patients)**

**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: improvements in these could be adopted as targets for your improvement.

The ICUs at University Hospital of Wales and Nevill Hall have been providing data to the Surviving Sepsis Campaign (SSC) dataset for many years and are consequently able to draw upon a rich seam of data for improvement targets.

**How will we know that change is an improvement?**

The Medical Assessment Unit at Wrexham Maelor Hospital has used an annotation of the compliance with the sepsis resuscitation bundle to demonstrate an extremely low level of escalation to critical care.

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 and show improvements in the way your team practice.

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

Remember to include all members of the team in suggesting what changes to test and by using the small scale rapid cycle ‘Plan Do Study Act’ (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 find members of the ward team. Many maternity units within Wales are already using this approach.

<table>
<thead>
<tr>
<th>1000 Lives Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remember that there is work being undertaken locally within the general wards in relation to the acutely deteriorating patient and DVT - learn from each other. Each Health Board has a nominated lead for this work.</td>
</tr>
</tbody>
</table>

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

It is 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 from many ICUs across Wales have now produced a proforma which detail the patient’s journey through the sepsis pathway from diagnosis to critical care admission (see Useful Resources Appendix E for an example from Betsi Cadwaladr University Health Board).

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

**Don’t we have to have an Outreach Service before we can start with this improvement?**

It is true that hospitals that have a Critical Care Outreach or Acute Care Team in place do seem to have had more success in co-ordinating the response to severe sepsis to date. These teams are not always utilised in maternity.

In maternity, the consequences of maternal sepsis are potentially catastrophic, thankfully rare, and usually the subject of critical incident reporting, so there is high motivation to make this improvement.

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

The 1000 Lives Plus Improving Critical Care ‘How to Guide’ will assist you further.

**How can we collect data on this bundle without having to go through the women’s notes retrospectively?**

Using a form such as one detailed in the Useful Resources section (Appendix E) ensures that the diagnosis and initial actions are recorded alongside the time carried out and person responsible. The form also records all of the processes and can be filed into the woman’s notes. Therefore it is relatively easy to see whether the bundle has been completed within the first hour of diagnosis.

**Measure:**

For this intervention, use the following process measure:

- % Compliance to the Sepsis Bundle

**Reference**

*Surviving Sepsis Campaign Website:*

www.survivingsepsis.org/Pages/default.aspx
Intervention: Patient Involvement

Good quality and consistent education play a vital role in helping women take responsibility for their own health, including preventing illness.

VTE

Risk Assessment

Women should be made aware of their risks of developing VTE and the risk assessment should be undertaken in partnership with the woman. This information will also be included in the Pregnancy Book which will be revised later this year.

Requirements for support, advice and information are given in the NICE guidance and the RCOG guidance. The guidance recommends that ‘women at high risk of VTE in pregnancy, such as those with previous VTE, should be offered pre-pregnancy counselling and a prospective management plan for thromboprophylaxis in pregnancy. Those who become pregnant before receiving such counselling should be referred to a consultant obstetrician or trust-nominated expert in thrombosis in pregnancy, early in pregnancy.’

In the absence of local written patient information, a leaflet specifically aimed for pregnant women is available to download from Lifeblood: The Thrombosis Charity. The All Wales Pregnancy book will also be updated later on this year to reflect this work but in the meantime, written information will need to be developed.

Sepsis

The recent CMACE triennia report recommends that advice for all women should include both verbal and written information about genital sepsis. This should include both verbal and written information about its prevention, signs and symptoms and the need of accessing early advice. The importance of good personal hygiene and the need to avoid contaminating the perineum by hand washing before and after using the toilet should be stressed. This is especially important when the woman has contact with anyone who has a sore throat or upper respiratory infection.

Measure:

For this intervention, use the following process measure:

Patient Survey

This will be developed to ascertain whether women are informed of the risk of genital tract sepsis and VTE (if appropriate) and if written information is received.
References


4 Thrombosis Charity Website: www.thrombosis-charity.org.uk

Invention: Ensure competence in monitoring, measurement, interpretation and prompt response to the acutely deteriorating patient and DVT prophylaxis’

As part of this intervention, NICE CG50¹ and CMACE² recommend:

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

All clinicians caring for women in maternity units/birth centres and community 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. Training should also include issues relating to VTE such as importance of risk assessment, how to assess and the correct thromboprophylaxis.

- There is a need for regular and frequent multidisciplinary reviews of the circumstances surrounding patient deterioration or those diagnosed with a VTE so that lessons can be learnt.

The following recommendation is from the CMACE Report of 2011³ in relation to clinical skills and training requirements:

- “Back to Basics”. All clinical staff must undertake regular, written, documented and audited training for the identification and initial management of serious obstetric conditions or emerging potential emergencies, such as sepsis, which need to be distinguished from commonplace symptoms in pregnancy.

- The understanding, identification, initial management and referral for serious commoner medical and mental health conditions which, although unrelated to pregnancy, may affect pregnant women or recently delivered mothers. These may include the conditions in recommendation 1, although the list is not exclusive.

- The early recognition and management of severely ill pregnant women and impending maternal collapse.

- The improvement of basic, immediate and advanced life support skills. A number of courses provide additional training for staff caring for pregnant women and newborn babies.

- To assist the above, CMACE has produced a short new section, “Back to Basics”. Whilst its contents may appear simplistic or self-evident to many readers, it nevertheless reflects the fact that these basic signs and symptoms were too often overlooked and may have contributed to some maternal deaths this triennium.
Example of 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 and those diagnosed as having a VTE. 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.

Each maternity unit has varying processes in place for local reviews to be undertaken, perhaps the criteria to instigate reviews needs amending in line with this work.

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 individual’s role within the clinical area.

**Measures:**

For this intervention, use the following process measures:

- Number of reviews
- % Clinicians trained

**References**


#Appendix A - Measures and Definitions

## Process Measures

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>% compliance admission bundle</td>
<td>In order to be compliant with a bundle, all elements must have been undertaken - ‘all or nothing’!</td>
</tr>
<tr>
<td>Recorded per month</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Determine the numerator: the number of women fully compliant within 2 hours of admission/transfer with the admissions bundle in one day.</td>
</tr>
<tr>
<td></td>
<td>2. Determine the denominator: all admissions/transfers to the ward in that day.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying by 100.</td>
</tr>
<tr>
<td>% compliance with ‘Acutely ill’ recognition bundle</td>
<td>1. Determine the numerator: the number of women fully compliant with the acutely ill recognition bundle in one day.</td>
</tr>
<tr>
<td>Recorded per month</td>
<td>2. Determine the denominator: the number of women on the ward on that day.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying by 100.</td>
</tr>
<tr>
<td>% compliance with response bundle</td>
<td>1. Determine the numerator: the number of women, identified as being at low, medium or high risk of deterioration fully compliant with the acutely ill response bundle in one day.</td>
</tr>
<tr>
<td>Recorded per month</td>
<td>2. Determine the denominator: all women identified as being at low, medium or high risk of deterioration in that day.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying by 100.</td>
</tr>
<tr>
<td>Percentage compliance with ‘sepsis six’</td>
<td>1. Determine the numerator: the number of women fully compliant within 1 hour with the ‘sepsis six’ in one month.</td>
</tr>
<tr>
<td>Recorded per month</td>
<td>2. Determine the denominator: all women identified as having sepsis requiring a response in one month.</td>
</tr>
<tr>
<td></td>
<td>3. Calculate the bundle compliance as a percentage by dividing the numerator by the denominator and multiplying the result by 100.</td>
</tr>
</tbody>
</table>
| Numbers of multidisciplinary reviews Recorded per month | A count of the number of reviews undertaken per month.  
- Multidisciplinary definition to be agreed - depending on the individual case, but suggest Obstetrician, Midwife, Obstetric Anaesthetist, Community Midwife, Risk Midwife.  
- Regular and frequent multidisciplinary reviews of the circumstances surrounding patient deterioration or those diagnosed with a VTE so that lessons can be learnt. |
| % Clinicians that are trained | Denominator: How many clinicians need to be trained  
Numerator: How many clinicians are trained.  
- Consider professional role (Midwife, Obstetrician, Anaesthetist) and seniority (trainee, consultant)  
- To include 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 that staff have these competencies, and they should be assessed to ensure they can demonstrate them. Training should also include issues relating to VTE such as importance of risk assessment, how to assess and the correct thromboprophylaxis. |
## Outcome Measures

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of calls for rapid response to medium and high risk acute illness</td>
<td>Monthly number of calls for a response to women who have been assessed as being of medium or high risk of acute deterioration.</td>
</tr>
<tr>
<td>(depending on local guidance and which track and trigger system is used)</td>
<td></td>
</tr>
<tr>
<td>Number of women escalated to higher level of care</td>
<td>1. Determine the denominator: all women triggered as having severe sepsis requiring a response in one month.</td>
</tr>
<tr>
<td></td>
<td>2. Determine the numerator: the number of women within above set that were transferred to high dependency unit, delivery suite or 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>
</tr>
<tr>
<td>Severe Sepsis Mortality Rate</td>
<td>1. Determine the denominator: all women triggered as having severe sepsis requiring a response in one month.</td>
</tr>
<tr>
<td></td>
<td>2. Determine the numerator: the number of women within above set where hospital discharge = deceased.</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 100,000.</td>
</tr>
<tr>
<td>VTE Incidence per month</td>
<td>Crude number of women who are either pregnant or within an agreed postnatal period (e.g. 6 weeks) who have had a positive diagnosis of VTE.</td>
</tr>
<tr>
<td></td>
<td>This needs to capture all pregnant women regardless of inpatient status up until an agreed time postnatally (e.g. 6 weeks).</td>
</tr>
<tr>
<td></td>
<td>A monthly measure of DVT/PE rate will be very difficult to undertake as the denominator must include the number of all pregnant and postnatal women regardless of gestation or inpatient status during a given month. This will be extremely difficult to count but the possibility will be explored.</td>
</tr>
<tr>
<td></td>
<td>1. Denominator: Total number of pregnant women and postnatal women up to an agreed postnatal period (eg 6 weeks).</td>
</tr>
<tr>
<td></td>
<td>2. Numerator: Patients diagnosed with DVT/PE</td>
</tr>
<tr>
<td>VTE Mortality Rate</td>
<td>1. Determine the denominator: all women with a diagnosed DVT/PE in one month</td>
</tr>
<tr>
<td></td>
<td>2. Determine the numerator: the number of women within the above set that died</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 100,000.</td>
</tr>
<tr>
<td></td>
<td>This needs to capture all pregnant women regardless of inpatient status up until an agreed time postnatally (e.g. 6 weeks).</td>
</tr>
</tbody>
</table>
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 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?
In order to develop local clinical ownership, representation should be from each maternity unit (as appropriate) within your Health Board. You might draw from:

- Obstetricians
- Midwives
- Obstetric anaesthetists
- Consultant Midwives
- Practice Development/Risk Midwives
- Student Midwives
- Obstetric trainees
- Transforming Care link Midwife
- Community Midwives

- Improvement/measures lead
- Transforming Care Facilitator
- Local clinical lead for general VTE Collaborative
- Local clinical lead for general RRAILs Collaborative
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. 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

Primary drivers

Secondary drivers

Interventions

Will

Create an organisational culture and environment for improvement

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

Consult Faculty members to agree standards to be achieved

Use critical sub sets of key content areas to improve the outcome

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

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)

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

PDSA cycles:
Test - implement - spread - sustain

Establish reliable process

Use reliability model

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?
**Model for Improvement-PDSA Cycle**

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
One area that bears extra attention is measurement because we have found that this is often the Achilles heel of improvement projects.

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:

- **Plot data over time** - Tracking a few key measures over time is the single most powerful tool a team can use.
- **Seek usefulness, not perfection.** 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.
- **Use sampling.** Sampling is a simple, efficient way to help a team understand how a system is performing.
- **Integrate measurement into the daily routine.** Useful data is often easy to obtain without relying on information systems.
- **Use qualitative and quantitative data.** In addition to collecting quantitative data, be sure to collect qualitative data, which is often easier to access and highly informative.
- **Understand the variation that lives within your data.** Don’t over-react to a special cause and don’t think that random movement of your data up and down is a signal of improvement.
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.
# Appendix D - National Steering Group - Improving maternity Services Mini-Collaborative

<table>
<thead>
<tr>
<th>Name</th>
<th>Representing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBC</td>
<td>General Practitioner Representative</td>
</tr>
<tr>
<td>Alan Willson</td>
<td>1000 Lives Plus Director</td>
</tr>
<tr>
<td>Anita Dougall</td>
<td>NPSA</td>
</tr>
<tr>
<td>Cate Langley</td>
<td>NHS Wales Informatics - Maternity Project</td>
</tr>
<tr>
<td>Cath Roberts</td>
<td>Programme Manager</td>
</tr>
<tr>
<td>Cathy Dowling</td>
<td>Heads of Midwives</td>
</tr>
<tr>
<td>Chris Hancock</td>
<td>1000 Lives Plus</td>
</tr>
<tr>
<td>Eleanor Sanders</td>
<td>WAG - Office of the Director of Strategy and Planning</td>
</tr>
<tr>
<td>Helen Rogers</td>
<td>Royal college of Midwives</td>
</tr>
<tr>
<td>Isobel Smith</td>
<td>Welsh Risk Pool</td>
</tr>
<tr>
<td>Jackie Foster</td>
<td>Health Inspectorate Wales Lay Reviewer</td>
</tr>
<tr>
<td>Jan Davies</td>
<td>1000 Lives Plus Director</td>
</tr>
<tr>
<td>Jean Keats</td>
<td>Local Supervising Authority - Midwifery</td>
</tr>
<tr>
<td>Julia Sanders</td>
<td>Consultant Midwife</td>
</tr>
<tr>
<td>Julie Maddocks</td>
<td>CMACE</td>
</tr>
<tr>
<td>Lisa Sedbury/Desmond Brown/Jackie Parsons</td>
<td>Transforming Care</td>
</tr>
<tr>
<td>Maggie Davies</td>
<td>Consultant Midwife</td>
</tr>
<tr>
<td>Nigel Davies</td>
<td>National Specialist Advisory Group - Maternity</td>
</tr>
<tr>
<td>Phil Banfield</td>
<td>Faculty Lead</td>
</tr>
<tr>
<td>Polly Ferguson</td>
<td>Nursing Officer (WAG) - Midwifery</td>
</tr>
</tbody>
</table>
Appendix E - Useful resources

**Situation:**
I am (name), a midwife in (X Birth Centre / home birth)
I am calling about (name and dob)
I am calling because I am concerned about ............(Eg raised blood pressure, FH rate, PV bleeding)

**Background:**
(Woman’s name) is Gravida..............Para.............at..........gestation
Give background Eg:
Relevant Medical/obstetric history
Brief labour summary
Latest Assessment/Vital signs

**Assessment:**
My clinical impression is that.........................
And I have............................... Eg Drugs administered, plan of care to this point
OR
I don't know what is wrong but I am concerned

**Recommendation:**
I need to transfer in immediately
I have ordered an ambulance
I need you to ......(eg have an obstetrician/paediatrician ready)
AND
is there anything else I need to do in the meantime ............Eg
(Start Oxygen, give a specific drug)

Ask receiver to repeat key information to ensure understanding

Source: Powys Teaching Health Board
CWM TAF HEALTH BOARD

S B A R  Multidisciplinary Communication Tool.

S B A R

This tool should be used to communicate patient details / problems from one professional to another.

S  Situation
- What is occurring

B  Background
- Include relevant information specific to the situation
- Obstetric / medical history
- Give the clinical picture
- Pain relief
- CTG
- Observations

A  Assessment
- Give an analysis of the problem or event.
- Giver the clinical picture.
- Changes from prior assessment
- CTG interpretation / changes
- Present observations
- Present FBS result

R  Recommendation
- What do you think would help resolve the problem?
- Change in practice / way of working
- Status of unit

October 2009

Source: Cwm Taf Health Board
**Antenatal assessment and management** (to be assessed at booking and repeated if admitted)

### Obstetric thromboprophylaxis risk assessment and management

**High risk**
- Requires antenatal prophylaxis with LMWH
- Refer to trust-nominated thrombosis in pregnancy expert/team

**Intermediate risk**
- Consider antenatal prophylaxis with LMWH
- Seek trust-nominated thrombosis in pregnancy expert/team advice

**Lower risk**
- Mobilisation and avoidance of dehydration

#### Antenatal and postnatal prophylactic dose of LMWH
- **Weight < 50 kg**: 20 mg enoxaparin/2500 units dalteparin/3500 units tinzaparin daily
- **Weight 50-90 kg**: 40 mg enoxaparin/5000 units dalteparin/6500 units tinzaparin daily
- **Weight 91-130 kg**: 60 mg enoxaparin/7500 units dalteparin/7000 units tinzaparin daily
- **Weight > 130 kg**: 80 mg enoxaparin/10000 units dalteparin/9000 units tinzaparin daily

#### Risk factors
- **Single previous VTE+**
  - Thrombophilia or family history
  - Unprovoked/estrogen-related
  - Previous recurrent VTE (> 1)
- **Single previous VTE with no family history or thrombophilia**
- **Thrombophilia + no VTE**
  - MEDICAL COMORBIDITIES, e.g. heart or lung disease, SLE, cancer, inflammatory conditions, nephrotic syndrome, sickle cell disease, intravenous drug user
  - Surgical procedure, e.g. appendicectomy
- **Age > 35 years**
- **Obesity (BMI > 30kg/m²)**
- **Parity ≥ 3**
- **Smoker**
- **Gross varicose veins**
- **Current systemic infection**
- **Immobility, e.g. paraplegia, SPD, long-distance travel**
- **Pre-eclampsia**
- **Dehydration/hyperemesis/OHSS**
- **Multiple pregnancy or ART**

**Key**
- ART = assisted reproductive therapy, BMI = body mass index (based on booking weight), gross varicose veins = symptomatic, above the knee or associated with phlebitis/oedema/skin changes, immobility = ≥ 3 days, LMWH = low-molecular-weight heparin, OHSS = ovarian hyperstimulation syndrome, PPH = postpartum haemorrhage, SLE = systemic lupus erythematosus, SPD = symphysis pubis dysfunction with reduced mobility, thrombophilia = inherited or acquired, long-distance travel = > 4 hours, VTE = venous thromboembolism

**Source:** Royal College of Obstetricians and Gynaecologists
Postnatal assessment and management (to be assessed on delivery suite)

Obstetric thromboprophylaxis risk assessment and management

- Any previous VTE+
- Anyone requiring antenatal LMWH

Caesarean section in labour
- Asymptomatic thrombophilia (inherited or acquired)
- BMI > 40 kg/m²
- Prolonged hospital admission
- MEDICAL COMORBILITIES, e.g. heart or lung disease, SLE, cancer, inflammatory conditions, nephrotic syndrome, sickle cell disease, intravenous drug user

Age > 35 years
- Obesity (BMI > 30 kg/m²)
- Parity ≥ 3
- Smoker
- Elective caesarian section
- Any surgical procedure in the puerperium
- Gross varicose veins
- Current systemic infection
- Immobility, e.g. paraplegia, SPD, long distance travel
- Pre-eclampsia
- Mid-cavity rotational operative delivery
- Prolonged labour (> 24 hours)
- PPH > 1 litre or blood transfusion

Key
ART = assisted reproductive therapy, BMI = body mass index (based on booking weight), gross varicose veins = symptomatic, above the knee or associated with phlebitis/oedema/skin changes, immobility = ≥ 3 days, LMWH = low-molecular-weight heparin, OHSS = ovarian hyperstimulation syndrome, PPH = postpartum haemorrhage, SLE = systemic lupus erythematosus, SPD = symphysis pubic dysfunction with reduced mobility, thrombophilia = inherited or acquired, long-distance travel = > 4 hours, VTE = venous thromboembolism

High risk
- At least 6 weeks postnatal prophylactic LMWH

Intermediate risk
- At least 7 days postnatal prophylactic LMWH
- Note: if persisting or > 3 risk factors, consider extending thromboprophylaxis with LMWH

Lower risk
- Mobilisation and avoidance of dehydration

2 or more risk factors

< 2 risk factors

Source: Royal College of Obstetricians and Gynaecologists
## Risk assessment for venous thromboembolism (VTE)

<table>
<thead>
<tr>
<th>Pre-existing risk factors</th>
<th>Tick</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous recurrent VTE</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Previous VTE – unprovoked or estrogen related</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Previous VTE – provoked</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Family history of VTE</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Known thrombophilia</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Medical comorbidities</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Age (&gt; 75 years)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Obesity</td>
<td>1/2a</td>
<td>2</td>
</tr>
<tr>
<td>Parity ≥ 3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Smoker</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gross varicose veins</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Obstetric risk factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-eclampsia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dehydration/hyperemesis/OHSS</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Multiple pregnancy or ART</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Caesarean section in labour</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Elective caesarean section</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mid-cavity or rotational forceps</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Prolonged labour (&gt; 24 hours)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PPH (&gt;1 litre or transfusion)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Transient risk factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current systemic infection</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Immobility</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Surgical procedure in pregnancy or ≤ 6 weeks postpartum</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Score: 1 for BMI > 30 kg/m²; 2 for BMI > 40 kg/m² (BMI based on booking weight)*

Thromboprophylaxis with LMWH should be considered if:

- ≥ three risk factors antenatally and managed as an outpatient
- ≥ two risk factors antenatally and managed as an inpatient or any postnatal woman who is within 6 weeks of delivery

For women with an identified bleeding risk, the balance of risks of bleeding and clotting should be discussed in consultation with a haematologist with experience of thrombosis and bleeding in pregnancy.

### Bleeding risk

- Haemophilia or other known bleeding disorder (e.g. von Willebrand's disease or acquired coagulopathy)
- Active antenatal or postpartum bleeding
- Women considered at increased risk of major haemorrhage (e.g. placenta praevia)
- Thrombocytopenia (platelet count < 75 \(\times 10^9\))
- Acute stroke in previous 4 weeks (haemorrhagic or ischaemic)
- Severe renal disease (glomerular filtration rate < 30 ml/minute/1.73 m²)
- Severe liver disease (prothrombin time above normal range or known varices)
- Uncontrolled hypertension (blood pressure > 200 mmHg systolic or > 120 mmHg diastolic)

*Source: Royal College of Obstetricians and Gynaecologists*
Summary of guideline for thromboprophylaxis in women with previous venous thromboembolism (VTE) and/or thrombophilia (prophylactic doses are given in Table 3; see also Figure 1)

<table>
<thead>
<tr>
<th>Risk</th>
<th>History</th>
<th>Prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>Previous VTE on long-term warfarin Antithrombin deficiency Antiphospholipid syndrome with previous VTE</td>
<td>Recommend antenatal high-dose LMWH and at least 6 weeks postnatal LMWH/warfarin Requires specialist management by experts in haemostasis and pregnancy</td>
</tr>
<tr>
<td>High</td>
<td>Previous recurrent or unprovoked VTE Previous estrogen-provoked (pill or pregnancy) VTE Previous VTE + thrombophilia Previous VTE + family history of VTE Asymptomatic thrombophilia (combined defects, homozygous FVL)</td>
<td>Recommend antenatal and 6 weeks postnatal prophylactic LMWH</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Single previous VTE associated with transient risk factor no longer present without thrombophilia, family history or other risk factors Asymptomatic thrombophilia (except antithrombin deficiency, combined defects, homozygous FVL)</td>
<td>Consider antenatal LMWH (but not routinely recommended) Recommend 6 weeks postnatal prophylactic LMWH Recommend 7 days (or 6 weeks if family history or other risk factors) postnatal prophylactic LMWH</td>
</tr>
</tbody>
</table>

FVL = factor V Leiden; LMWH = low-molecular-weight heparin

Source: Royal College of Obstetricians and Gynaecologists
## Venous Thromboembolism (VTE)

### Risk Assessment for Obstetric Patients

*ALL obstetric patients must be:*

1. Risk assessed and considered for thromboprophylaxis
2. Assessment should start at booking and be updated in clinic, on antenatal admission and after delivery.
3. If at risk, check for contraindications and prescribe thromboprophylaxis on drug chart

**NB Patients outside the given criteria should be assessed on a case-by-case basis**

*Check for all risks, assign a Risk Category, sign/date the form, file in the front of the Maternity hand held notes.*

<table>
<thead>
<tr>
<th>PRE-EXISTING RISK FACTORS</th>
<th>NEW ONSET or TRANSIENT RISK FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal or first-degree relative with hx of VTE</td>
<td>Caesarean section delivery</td>
</tr>
<tr>
<td>Thrombophilia (protein C,S Antithrombin def, Factor V Leiden Prothrombin gene mutation)</td>
<td>Other surgery in pregnancy or puerperium</td>
</tr>
<tr>
<td>Antiphospholipid / anticardiolipin antibodies</td>
<td>Acute Sepsis</td>
</tr>
<tr>
<td>Age &gt;35 years</td>
<td>Dehydration</td>
</tr>
<tr>
<td>Obesity (pre-pregnancy or early pregnancy BMI &gt;30kg/m²)</td>
<td>Ovarian hyperstimulation, hyperamnesis gravidarum, multiple pregnancy, pre-eclampsia</td>
</tr>
<tr>
<td>Significant medical co-morbidity (eg: heart disease, metabolic, endocrine or respiratory pathologies, acute infectious diseases or inflammatory conditions)</td>
<td>Antenatal/postnatal immobility (&gt;23 days bed rest)</td>
</tr>
<tr>
<td>Active cancer or cancer treatment</td>
<td>Critical care admission</td>
</tr>
<tr>
<td>Varicose veins with phlebitis</td>
<td>Blood loss &gt; 1000ml or needing transfusion</td>
</tr>
</tbody>
</table>

### Patient Groups Recommended for Thromboprophylaxis

<table>
<thead>
<tr>
<th>ANTE NATAL</th>
<th>HIGH RISK</th>
<th>INTERMEDIATE RISK</th>
<th>LOWER RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE previous VTE either unprovoked, oestrogen related, due to thrombophilia or with family history</td>
<td>Previous recurrent VTE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTERMEDIATE RISK</td>
<td>Single previous provoked VTE without thrombophilia or family history</td>
<td>Thrombophilia and no previous VTE</td>
<td></td>
</tr>
<tr>
<td>LOWER RISK</td>
<td>One or more risk factors</td>
<td>No risk factors</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTNATAL</th>
<th>HIGH RISK</th>
<th>INTERMEDIATE RISK</th>
<th>LOWER RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANY previous VTE</td>
<td>Asymptomatic thrombophilia</td>
<td>Caesarean section delivery</td>
<td></td>
</tr>
<tr>
<td>INTERMEDIATE RISK</td>
<td>Antiphospholipid antibodies and no VTE</td>
<td>Age &gt;35 yrs and one additional risk factor</td>
<td></td>
</tr>
<tr>
<td>LOWER RISK</td>
<td>BMI &gt;30 and one additional risk factor</td>
<td>Three or more other risk factors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fewer than three risk factors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISK ASSESSMENT</th>
<th>Date</th>
<th>Assessors Name</th>
<th>Assessor signature</th>
<th>Risk Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal booking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antenatal admission/clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antenatal admission/clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postnatal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: East & North Herts NHS Trust*
# RECOMMENDED THROMBOPROPHYLAXIS

<table>
<thead>
<tr>
<th>ANTENATAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIGH RISK</strong></td>
<td>Prophylaxis with enoxaparin. Refer to consultant Obstetrician. In addition refer to Haematologist if recurrent VTE or antiphospholipid syndrome with previous VTE or if antithrombin deficiency with h/o VTE</td>
</tr>
<tr>
<td><strong>INTERMEDIATE RISK</strong></td>
<td>Consider antenatal prophylaxis with enoxaparin. Refer to see consultant Obstetrician for opinion</td>
</tr>
<tr>
<td><strong>LOWER RISK</strong></td>
<td>Mobilisation and avoid dehydration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTNATAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIGH RISK</strong></td>
<td>At least 6 weeks postnatal prophylaxis with enoxaparin</td>
</tr>
<tr>
<td><strong>INTERMEDIATE RISK</strong></td>
<td>Consider 3-5 days postnatal prophylaxis with enoxaparin</td>
</tr>
<tr>
<td><strong>LOWER RISK</strong></td>
<td>Mobilisation and avoid dehydration</td>
</tr>
</tbody>
</table>

## CAESAREAN SECTION

All women who undergo a Caesarean section delivery must have antithrombotic stockings (eg TEDs) + sequential compression device (SCD) (eg flowtrons) in theatre.

In addition they should all be prescribed postnatal enoxaparin for 3-5 days.

---

## DOSAGE, TIMING and ADMINISTRATION of PROPHYLAXIS

### Dosage

- **Body weight <50kg:** enoxaparin 20mg once daily
- **Body weight 50kg-100kg:** enoxaparin 40mg once daily.
- **Body weight 101kg-150kg:** enoxaparin 40mg twice daily
- **Body weight >150kg:** enoxaparin 60mg twice daily

### Antenatal prophylaxis

Once in labour or if suspected labour antenatal enoxaparin should be discontinued. For women undergoing elective caesarean section stop antenatal prophylaxis 24 hours pre op.

### Postnatal prophylaxis

- **First Dose**: The first dose of enoxaparin should be prescribed and given as a once-only medication 4 hours post delivery, providing haemostasis secured. (For women who have had a general anaesthetic caesarean section the first dose can be given sooner than four hours post delivery)

- **Subsequent Doses**: For women receiving once-daily prophylaxis, subsequent doses should be prescribed in the regular section of the drug chart to be given at nearest drug round starting 24 hours after the first dose. (NB the time between first and subsequent doses must not be greater than 24 hours)

- For women receiving twice daily prophylaxis, subsequent doses should be prescribed to be given at nearest drug round starting 12 hours after the first dose. (NB the time between first and subsequent doses must not be greater than 12 hours)

### Epidural / CSE

Placement or removal of catheter should be delayed for 12 hours after administration of enoxaparin. Enoxaparin should not be given sooner than 4 hours after catheter removal or spinal anaesthetic.

---

## Contraindications to enoxaparin

<table>
<thead>
<tr>
<th>Contraindications to enoxaparin</th>
<th>Contraindications to antithrombotic stocking or SCDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatinine &gt; 150 umol/l (eGFR&lt;30ml/min)</td>
<td>Severe dermatitis/ulceration of the leg</td>
</tr>
<tr>
<td>Use enoxaparin 20mg daily</td>
<td>Recent skin graft</td>
</tr>
<tr>
<td>Active bleeding, thrombocytopoenia or bleeding disorder</td>
<td>Peripheral neuropathy, Gross leg deformity</td>
</tr>
<tr>
<td>Previous HIT or allergy to enoxaparin</td>
<td>Severe peripheral vascular disease</td>
</tr>
<tr>
<td>On therapeutic anticoagulation</td>
<td></td>
</tr>
</tbody>
</table>

---

Please ensure this form stays in the front of the Maternity hand-held notes

Source: East & North Herts NHS Trust
# Maternity Safety Briefing V2

**WARD/UNIT ____________________________**

**Week Commencing ____________________________**

<table>
<thead>
<tr>
<th><strong>Admissions Bundle 30 Seconds</strong></th>
<th><strong>Acute Illness Recognition Bundle 30 Seconds</strong></th>
<th><strong>Response Bundle 30 Seconds</strong></th>
<th><strong>Sepsis Six Bundle 30 Seconds</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. How many admissions have you had in this shift?</strong></td>
<td><strong>3. How many women are on the unit now?</strong></td>
<td><strong>5. How many women are ‘at risk’ of sepsis (as per local guidance)?</strong></td>
<td><strong>9. How many women have been diagnosed as having ‘severe sepsis’?</strong></td>
</tr>
<tr>
<td><strong>2. How many admissions have had:</strong></td>
<td><strong>4. During this shift how many of these women have had:</strong></td>
<td><strong>6. How many women have been administered appropriate DVT prophylaxis?</strong></td>
<td><strong>10. How many of these have received the ‘sepsis six’ within 1 hour of diagnosis?</strong></td>
</tr>
<tr>
<td>- a full set of observations</td>
<td>- Track and trigger score recorded</td>
<td></td>
<td><strong>Number of calls for rapid response to women with medium/high risk of sepsis?</strong></td>
</tr>
<tr>
<td>- Booking BMI recorded</td>
<td>- Frequency of observations record</td>
<td></td>
<td><strong>Number of women escalated to a higher level of care</strong></td>
</tr>
<tr>
<td>- Recorded DVT risk assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** 1000 Lives Plus
MODIFIED EARLY OBSTETRIC WARNING SYSTEM ESCALATION ALGORITHM

All women requiring regular physiological observations are to be commenced on the MEOWS chart. Monitor all 6 mandatory vital signs every 12 hours as a minimum

Note: mandatory as minimum for post-op, PPH>500MLs, pre-operatively, need for oxygen, any abnormal physiological observation

ALL WHITE BOXES
Continue current observations on MEOWS chart. Review as planned in obstetric records.

CALCULATE THE TRIGGER BOXES EACH TIME
(Identify the number of Yellow and / or Red boxes)

1 YELLOW BOX
- Repeat observations
- Consider Increasing frequency of observations
- Consider need to seek advice from Coordinator and/or medical staff

2 YELLOW BOXES
- Increase frequency of observations
- Inform Coordinator
- Immediate referral to obstetric registrar
Patient should be reviewed within 30 minutes
- Consider obstetric/anaesthetic review
- Consider more senior obstetric review
- Consider transfer to higher level of care

2 RED BOXES
- Inform midwife in charge
- Immediate review by obstetric registrar/anaesthetist
- Transfer to higher level of care
- Consider transfer to obstetric HDU
- Consider review by obstetric consultant

TRIGGER PERSISTS
Continue observations on MEOWS chart

All white boxes

TRANSFER TO LABOUR WARD OR OBSTETRIC HIGH DEPENDENCY CARE
Joint review with senior obstetric, anaesthetic and midwifery teams. Consider referral to CCOT via Vocera

Further deterioration and / or airway problem review by Obstetric and Anesthetic Consultants. Consider referral to ICU and / or involvement of critical care outreach team.

Source: Sherwood Forest Hospitals NHS Trust
Transforming Maternity Services

MATERNITY EARLY WARNING OBSERVATION CHART
Walsall Hospitals NHS Trust

Date of Admission:
Ward:
Consultant:
Chart Number

---

**Frequency of Observations Box**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Frequency of Observations</th>
<th>Signature</th>
<th>Print</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12 Hourly ☐</td>
<td>6 Hourly ☐</td>
<td>4 Hourly ☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 Hourly ☐</td>
<td>6 Hourly ☐</td>
<td>4 Hourly ☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 Hourly ☐</td>
<td>6 Hourly ☐</td>
<td>4 Hourly ☐</td>
</tr>
</tbody>
</table>

**Exception Box**

Exceptions box to be signed if Observations decided not appropriate for Inpatient admission

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Comment</th>
<th>Print and Signature</th>
</tr>
</thead>
</table>

---

**Temperature**

- 40°C
- 39°C
- 38°C
- 37°C
- 36°C
- 35°C
- 34°C
- 33°C
- 32°C
- 31°C
- 30°C
- 29°C
- 28°C
- 27°C
- 26°C
- 25°C
- 24°C
- 23°C
- 22°C
- 21°C
- 20°C
- 19°C
- 18°C
- 17°C
- 16°C
- 15°C
- 14°C
- 13°C
- 12°C
- 11°C
- 10°C
- 9°C
- 8°C
- 7°C
- 6°C
- 5°C
- 4°C
- 3°C
- 2°C
- 1°C
- 0°C

**Pulse and Blood Pressure**

- 120
- 110
- 100
- 90
- 80
- 70
- 60
- 50
- 40
- 30
- 20
- 10
- 0

**Resps**

- /min

**Sats**

- %

**O₂ Sat/Flow**

- % / l

**Pain Score**

**Proteinuria**

**Please enter early warning scores below**

**Guide** - Complete score every time the observations are recorded. • Observe pathway as overleaf following calculation of score.

Maternity Early Warning Observation Chart  Version 1, 2009
Building Better Health for Walsall

Source: Walsall Hospitals NHS Trust
Early Warning Score

<table>
<thead>
<tr>
<th>Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A-Alert</td>
<td>V-Responds to voice</td>
<td>P-Responds to pain</td>
<td>U-Unresponsive</td>
</tr>
<tr>
<td></td>
<td>9-20/min</td>
<td>21-24/min</td>
<td>25-29/min</td>
<td>≤8/min or ≥30/min</td>
</tr>
<tr>
<td></td>
<td>61-100/min</td>
<td>101-110/min</td>
<td>41-60/min or 111-129/min</td>
<td>≤40/min or ≥130/min</td>
</tr>
<tr>
<td></td>
<td>100-140mmHg</td>
<td>141-160mmHg</td>
<td>91-99mmHg</td>
<td>≤90mmHg or ≥101mmHg</td>
</tr>
<tr>
<td></td>
<td>Up to 90mmHg</td>
<td>91-99mmHg</td>
<td>100-109mmHg</td>
<td>≥110mmHg or ≤40mmHg</td>
</tr>
<tr>
<td></td>
<td>36-37.9°C</td>
<td>35.1-35.9°C</td>
<td>38-39°C</td>
<td>≤35°C or ≥40°C</td>
</tr>
<tr>
<td></td>
<td>≥95%</td>
<td>91-94%</td>
<td>91%</td>
<td>≤90%</td>
</tr>
<tr>
<td>Urine Output</td>
<td>Has Passed Urine in last 4 hours</td>
<td>Has not Passed Urine in last 4 hours</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAIN ASSESSMENT TOOL

1. Comfortable
2. Mild Discomfort
3. In Pain
4. In Bad Pain
5. In Very Bad Pain (Excruciating Pain)

Guide - Complete score every time the observations are recorded
• Observe pathway to be followed following calculation of score.

EARLY WARNING SCORE ALGORITHM

Score 0

YES
Continue observations at required frequency

Score ≥ 3

YES
Inform Midwife in charge who will alert medical staff

Score 1 - 2

YES
Repeat observations in 30 mins

Score 0

NO
Review patient within 30 mins

Contact Anaesthetic Registrar / Consultant as required

Contact Outreach Nurse Bleep 5021 / 4039 if concerned at any stage

Follow Medical Treatment Plan. Observations as requested

Call Obstetric Consultant

Source: Walsall Hospitals NHS Trust
MEWS CHART TO BE USED IN THE FOLLOWING CIRCUMSTANCES

1. Post Operative Recovery
2. Severe Pre-eclampsia
3. Eclampsia
4. Significant APH
5. Significant PPH
6. SEPSIS
7. Suspected/diagnosed Pulmonary Embolism
8. Severe Asthma
9. Anaphylaxis
10. High Epidural/Total Spinal
11. Any other sick patient

Commence a MEWS Chart for any women who develop:-

A Heart rate $\geq 120$ on two or more occasions.
Temp $> 38$
Systolic BP $\geq 160 \leq 80$
Diastolic BP $\geq 100$
Proteinuria $> ++$
Action to be taken:-

One red or two yellow scores at any one time. Contact obstetric team for review.

If patient does not improve with intervention, contact anaesthetic team for review.

Frequency of observations will depend on the circumstances and individual management plan for example:-

Pre-eclampsia woman being cared for on the antenatal ward will have as minimum 4hrly observations. If they develop any of the above indications then a mews chart should be commenced and the Obstetric team contacted who will determine the frequency of observations and management required.

The frequency of observations for Post operative women will be as determined in the recovery guidelines every five minutes for thirty minutes and then every ten minutes for a further thirty minutes unless they score two yellow or one red score when the Obstetric/Anaesthetic team will determine the frequency of observations required.

The Princess Alexandra Hospital NHS Trust
SEVERE SEPSIS CARE PATHWAY
(SEPSIS SIX BUNDLE)
To be completed within the FIRST HOUR Severe Sepsis is confirmed

<table>
<thead>
<tr>
<th>Patient label / Details:</th>
<th>Date:</th>
<th>Consultant:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ward:</td>
<td>Weight:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TIME ZERO:**

**1. OXYGEN:**
15 L/min via non-rebreath mask (aim SpO2 >94%)
*Caution with COPD patients *
TIME: EXCLUSION REASON
INITIALS:  

**2. BLOOD CULTURES:**
Take before antibiotics given.
Send: FBC / UEC / CRP / LFT / COAG / GLUCOSE
Consider: BC’s from long lines.
Urine / sputum / wound swabs / samples etc
TIME: EXCLUSION REASON
INITIALS:  

**3. IV ANTIBIOTICS:**
As per trust guidelines
TIME: EXCLUSION REASON
INITIALS:  

**4. FLUID RESUSCITATION:**
Boluses 20 ml/kg if hypotensive
0.9% Saline / Hartmann’s solution
TIME: EXCLUSION REASON
INITIALS:  

**5. SERUM LACTATE:**
Use Grey bottle
Send to lab on ice.
Notify lab lactate sample on the way.
TIME: EXCLUSION REASON
INITIALS:  

**6. CATHETERISE:**
Use hourly catheter bag
Strict fluid balance. ONE hourly urine measurement.
TIME: EXCLUSION REASON
INITIALS:  

**DESTINATION OF PATIENT:**
Ward/Unit:  

**BLEEP ACUTE CARE TEAM:**
(bleep 4495)
Time / Initial:  

"TIME ZERO" = THE TIME THE PATIENT FIRST FULFILLED THE CRITERIA ON THE SEVERE SEPSIS SCREENING TOOL.

Make copies of both Sepsis Six and Screening tool: Original with patient notes, Copy held on ward/unit for auditing.
## Appendix F: Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>body mass index</td>
</tr>
<tr>
<td>CEMACH</td>
<td>The Confidential Enquiry into Maternal and Child Health</td>
</tr>
<tr>
<td>CMACE</td>
<td>The Centre for Maternal and Child Enquiries</td>
</tr>
<tr>
<td>CG</td>
<td>clinical guidelines</td>
</tr>
<tr>
<td>CVP</td>
<td>central venous pressure</td>
</tr>
<tr>
<td>DVT</td>
<td>deep vein thrombosis</td>
</tr>
<tr>
<td>ED</td>
<td>emergency department</td>
</tr>
<tr>
<td>Hb</td>
<td>haemoglobin</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive care unit</td>
</tr>
<tr>
<td>IHI</td>
<td>Institute for Healthcare Improvement</td>
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<tr>
<td>IUGR</td>
<td>Intra-uterine growth restriction</td>
</tr>
<tr>
<td>LMWH</td>
<td>low molecular weight heparin</td>
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<tr>
<td>MAP</td>
<td>mean arterial pressure</td>
</tr>
<tr>
<td>MEOWS</td>
<td>Modified Obstetric Early Warning System</td>
</tr>
<tr>
<td>MFI</td>
<td>Model for Improvement</td>
</tr>
<tr>
<td>MDT</td>
<td>multi-disciplinary team</td>
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<tr>
<td>NICE</td>
<td>National Institute for Health and Clinical Excellence</td>
</tr>
<tr>
<td>NCEPOD</td>
<td>The National Confidential Enquiry into Patient Outcomes</td>
</tr>
<tr>
<td>NSAG</td>
<td>The National Specialist Advisory Group</td>
</tr>
<tr>
<td>PDSA</td>
<td>Plan: Do: Study: Act</td>
</tr>
<tr>
<td>PTS</td>
<td>post-thrombotic syndrome</td>
</tr>
<tr>
<td>RCOG</td>
<td>Royal College of Obstetricians and Gynaecologists</td>
</tr>
<tr>
<td>RRAILS</td>
<td>Rapid Response to Acute Illness Learning Set</td>
</tr>
<tr>
<td>SBAR</td>
<td>Situation: Background: Assessment: Recommendation</td>
</tr>
<tr>
<td>SCC</td>
<td>The Surviving Sepsis Campaign</td>
</tr>
<tr>
<td>Scv02</td>
<td>central venous oxygen saturation</td>
</tr>
<tr>
<td>UKOSS</td>
<td>United Kingdom Obstetric Surveillance System</td>
</tr>
<tr>
<td>VTE</td>
<td>venous thromboembolism</td>
</tr>
<tr>
<td>WCCIP</td>
<td>Welsh Critical Care Improvement Programme</td>
</tr>
</tbody>
</table>
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.

www.1000livesplus.wales.nhs.uk