Situation/Introduction

The Transforming Maternity Services Mini-Collaborative was launched in March 2011 with an overall aim to improve the experience and outcomes for women, babies and their families within Welsh maternity services. One of the primary drivers for this programme is to ‘improve the recognition and response to 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 (1) and has remained so in the recently published CMACE Report of 2011 (2). Both reports strongly recommend the use of the Modified Early Obstetric Warning System (MEOWS) in the absence of an alternative validated chart.

| Early Warning Systems are intended to identify sick women and initiate the right action, at the right time by the appropriately skilled clinicians, at a time when treatment might make a difference. |

This paper has been initiated by clinicians within Welsh maternity services in a bid to provide clarification and consensus in relation to the use of early warning systems in obstetrics.

The overall AIM is to inform and complement local practice, by providing an obstetric early warning system that is of an acceptable, agreed standard. An exemplar tool which will be available for use by Health Boards following testing.

In order to achieve this, the following issues need to be addressed:

- Agree and understand the language used with early warning systems.
- Agree the normal/abnormal physiological parameters for obstetrics in order to devise an effective trigger system.
- Agree effective accompanying escalation guidance.
- Work with the National Early Warning System (NEWS) and explore its alignment for the use in obstetrics.
Background

During the 2006-2008 triennium, sepsis superseded venous thromboembolism as the leading cause of maternal death in the United Kingdom (2). 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’ (2). The CMACE Alert: Genital Tract Sepsis (3) 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></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UK Maternal Mortality Rate due to sepsis per 100,000 maternities</strong></td>
<td>0.65</td>
<td>0.85</td>
<td>1.13</td>
</tr>
</tbody>
</table>

Many cases in the current CMACE triennia report (2) were identified whereby the early warning signs and symptoms of impending severe maternal illness or collapse went unrecognised. Explicit guidance is recommended about when to request appropriately skilled multi-disciplinary senior help.

A report published by the Royal College of Anaesthetists in 2011 (4) estimates that for every one maternal mortality, there are 8 women who suffer from severe maternal morbidity.

Complementary to the mortality data is that pertaining to numbers of women transferred to a higher level of care (Level 2 & 3). UK critical care admission data is estimated at 260/100,000 but a definitive number is difficult to ascertain and may be as high as 1200/100,000.

The box below shows admission data of pregnant and postnatal women admission to Level 1 & 2 within Wales (5). Of these numbers it is difficult to determine the numbers of women transferred with a diagnosis of sepsis due to coding issues.
Assessment

The language used
It is important that there is clarification around the terminology used with early warning systems:

- **Early warning system** - a tool to aid the recognition and management of a deteriorating woman e.g. MEOWS
- **Track and trigger** describes how you use the tool
- **Track** - periodic observation of vital signs recorded on observation chart
- **Trigger** - pre-determined criteria ‘trigger’ the summoning for help - timely response, appropriate level of assistance

**WHAT TO DO AND WHEN TO DO IT!**

As indicated previously, many cases in the current CMACE triennia report (2) 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. (2)**

Both the previous CEMACH 2007 and CMACE 2011 Reports (1&2) and NICE CG 50 (6) 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 in obstetrics 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 Guidance recommend the use of aggregated numerical scoring systems. There are varying examples in use across the UK (see example in Appendix of first edition How to Guide).

Many different adaptations of the MEOWS are in use across maternity units in Wales with varying 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.
Literature Review
There is no validated early warning system for use in obstetrics.

From the limited literature on the use of early warning systems in obstetrics, there are differing conclusions. Kodikara et al (7) established that MEOWS identifies potentially sick women but that there is a high false positive rate. The blood pressure parameters are also reportedly set incorrectly. Carle et al (8) concluded that the general early warning system was sensitive to predict obstetric mortality but that the obstetric MEOWS did not confer any additional benefit. Lappen (9) disagreed with this and concluded that the general early warning systems should not be applied to the obstetric population. They reported that the relative infrequency of sepsis among pregnant women limits the positive predictive value of any scoring system and may preclude the development of a clinically useful obstetric model. It is agreed that most critically ill women had early triggers which continued through their illness (10).

A UK wide obstetric anaesthetic survey in 2009 (11) revealed the consensus of opinion of the need for a nationally agreed early warning tool for obstetrics with the associated training, skills and resources.

National Early Warning System (NEWS) - non obstetric
Early detection, timeliness and competency of the clinical response are determinants of clinical outcome in people with acute illness. A range of early
warning systems are in use across Wales/UK but the approach has not been standardised.

The All Wales National Early Warning System (NEWS) is now in the late stages of development and plans spread across Wales by 2013. This will provide a consistent approach to the recognition and response to acutely ill patients across Wales. It also provides the same language especially for clinicians who work between different hospitals across Wales. It has been extensively validated within the UK and Canada (12).

NEWS is a surveillance system which is based on a simple scoring system of which the scores are allocated to physiological measurements. The scores are aggregated and the clinical team are alerted to any clinical deterioration and a triggered timely, appropriate response.

Within Wales, the agreement is that the track and trigger of NEWS should compliment the varying observation sheets that are in use across hospitals in Wales. These are important points to consider for obstetrics when addressing this issue.

**National Early Warning System**

![NEWS Score Table]

**Agreeing the Physiological Parameters in obstetrics - What is normal/abnormal?**

There are a number of existing obstetric early warning charts in use across the United Kingdom. MEOWs has been adapted in many Health Boards/Authorities in order to ‘work’ locally. There are also a number of numerical warning systems in use.

When comparing the tools for physiological parameters there is a wide differing range of normal and abnormal. This only further demonstrates the difficulties faced in reaching agreement and consensus on the physiological parameters.

It has been agreed that when devising an early warning system for obstetrics, it should link to the general NEWS.

There was also a piece of work undertaken by representatives from all Welsh health boards at the last Maternity National Learning Session (Nov 2011). Clinicians from across Wales were invited to add their knowledge and experience and suggest what they thought were the appropriate scoring values.

The following DRAFT Obstetric Early Warning and associated Escalation tool (over page) have been devised with consideration of the following:

- MEOWS
- Existing numerical obstetric early warning systems
- NEWS
- Work undertaken with maternity clinicians (Nov 11)
- Specific physiological differences in pregnancy
- Report: Providing equity of critical and maternity care for the critically ill pregnant or recently pregnant woman (4)

**Draft Obstetric National Early Warning System (Version 1) Jan 12**

**The Scoring System!**

<table>
<thead>
<tr>
<th>Physiological Parameters / SCORE</th>
<th>LOOKS / FEELS UNWELL?</th>
<th>Respiratory Rate</th>
<th>Oxygen Sats (Air)</th>
<th>Pulse</th>
<th>Systollic BP</th>
<th>Diastollic BP</th>
<th>AVPU</th>
<th>Temperature (°C)</th>
<th>Other: Urine output</th>
<th>Urinary protein</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>≤8</td>
<td>8-10</td>
<td>11-20</td>
<td>21-24</td>
<td>≥25</td>
<td>NO</td>
<td>35.0</td>
<td>&lt;0.5ml/kg/hr</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤93</td>
<td>93-94</td>
<td>94-95</td>
<td>≥96</td>
<td></td>
<td>YES</td>
<td>35.1-36</td>
<td>&lt;1ml/kg/hr</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤40</td>
<td>41-50</td>
<td>51-100</td>
<td>101-110</td>
<td>111-130</td>
<td>Alert</td>
<td>36.1-37.5</td>
<td>&gt;1ml/kg/hr</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤80</td>
<td>81-90</td>
<td>91-100</td>
<td>101-139</td>
<td>140-149</td>
<td>VPU</td>
<td>37.6-38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤60</td>
<td>61-70</td>
<td>71-79</td>
<td>≥80</td>
<td></td>
<td></td>
<td>38.1-39</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤35</td>
<td>35.1-36</td>
<td>36.1-37.5</td>
<td>37.6-38</td>
<td></td>
<td></td>
<td>≥39.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.5ml/kg/hr</td>
<td>35.1-36</td>
<td>36.1-37.5</td>
<td>37.6-38</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>&lt;1ml/kg/hr</td>
<td>35.1-36</td>
<td>36.1-37.5</td>
<td>37.6-38</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>&gt;1ml/kg/hr</td>
<td>35.1-36</td>
<td>36.1-37.5</td>
<td>37.6-38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Concern about a woman should lead to escalation, regardless of the score.
### Draft Escalation Obstetric NEWS (Version 1) Jan 12

<table>
<thead>
<tr>
<th>ESCALATION Obstetric NEWS</th>
<th>Minimal Monitoring</th>
<th>Alert …</th>
<th>Medical Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>12 hourly*</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>3-5</td>
<td>1-4 hourly</td>
<td>Midwife in charge and Obs SHO</td>
<td>Within 30 mins: Increased frequency of obs. Inform obs ST3 and obs anaes ST3 (or equiv) &amp; of review outcome. Could this woman have sepsis?</td>
</tr>
<tr>
<td>6 = SICK!</td>
<td>1-2 hourly</td>
<td>Obstetric ST3 and Obs anaesthetist</td>
<td>Urgent call to team with primary medical responsibility for the patient (maternity). Simultaneous call to personnel with core competences for acute illness. These competences can be delivered by a variety of models at local level, such as a critical care outreach team, a hospital-at-night team or a specialist trainee in anaesthesia, obstetrics, acute medical or surgical specialty.</td>
</tr>
</tbody>
</table>

**WHAT TO DO AND WHEN TO DO IT!** The Draft escalation guidance below will need to be localised in relation to the Alert and Medical Review columns in order that it is clear ‘who’ needs to be involved, depending on local availability and settings eg. Availability of outreach teams....
It is clear from within general care that a national standardised approach to the recognition and response of the acutely ill is now the way forward with both England and Wales are adopting this. It is important that any effort to standardise an obstetric tool needs to focus on adapting the NHS Early Warning System (NEWS). A consistent approach in obstetrics could also assist in embedding a culture of standardised training and education of clinical staff in maternity services across Wales.

In conclusion based upon the information presented in this paper, please refer to the following recommendations:

<table>
<thead>
<tr>
<th>Obs</th>
<th>9 = NOW</th>
<th>≥9</th>
<th>30 mins</th>
<th>Team with critical care competencies &amp; Obs ST3/Obs anaes ST3/Consultant obstetrician</th>
<th>Emergency call to team with critical care competences and maternity team. The team should include a medical practitioner skilled in the assessment of the critically ill patient, who possesses advanced airway management and resuscitation skills.</th>
</tr>
</thead>
</table>

* or as per local guidance

Note of Caution: Frequency of observations can be increased at the discretion of the clinical team. Equally, concern about a patient should lead to escalation, regardless of the score.

**Recommendations**

It is clear from within general care that a national standardised approach to the recognition and response of the acutely ill is now the way forward with both England and Wales are adopting this. It is important that any effort to standardise an obstetric tool needs to focus on adapting the NHS Early Warning System (NEWS). A consistent approach in obstetrics could also assist in embedding a culture of standardised training and education of clinical staff in maternity services across Wales.

In conclusion based upon the information presented in this paper, please refer to the following recommendations:
Maternity Units to continue using their existing observation tracking charts eg. MEOWS/MEWS but eventually work towards a national standardised version.

To agree necessary amendments to the parameters of the trigger scoring system of NEWS in relation to obstetrics and for the tool to be available for implementation following testing.

To agree necessary amendments to the Alert and Review sections of NEWS escalation guidance in relation to obstetrics and for the tool to be available for implementation following testing.

To agree on a name for the obstetric national early warning system.

The tool will be tested prior to availability for implementation (to be agreed). Proposed method of testing is:

Collect 10 last ICU maternal admissions and last 3 maternal deaths (in relation to sepsis) from each maternity unit within Health Boards. Review their observation charts in the 24 hours prior to admission/death and apply the proposed obstetric early warning trigger system. This will determine the sensitivity of the tool and possibly highlight any changes the need to be made.

A special thank you to Chris Hancock, Manager of the RRAILS programme for his continued support during this work.

References


5. Patient Episode Database Wales (PEDW) data from the Critical Care dataset.


Cath Roberts November 12 (V1)

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