

# Maternity Early Warning System



## Factsheet for clinicians – frequently asked questions

### Why do we need a maternity early warning system?

Evidence suggests that earlier recognition and response could prevent the severity of maternal morbidity approximately 50 percent of the time.<sup>1,2</sup> Early warning systems support maternity services to recognise maternal morbidity and respond quickly. A standardised maternal early warning system (MEWS) will support clinical judgement and best practice, particularly in cases with increasing complexity (eg, older women with comorbidities).<sup>3</sup> A MEWS will also support consistent education, practice and documentation across services in New Zealand.

### What evidence supports having a maternity-specific early warning system?

Pregnant women have a different physiology from the general adult population. For example:

- the vital sign values of a pregnant woman may be seen as abnormal in a non-pregnant woman<sup>4,5</sup>
- when a usually healthy pregnant woman becomes unwell, her body will often compensate for a period of time before suddenly and rapidly deteriorating.<sup>4</sup>

Therefore, measuring vital signs against a standard adult vital signs chart does not provide an accurate reading of a pregnant woman's health status. Evidence supports the use of a maternity-specific vital signs chart to effectively recognise when a pregnant woman is unwell.<sup>6,7,8</sup> An early warning system specifically designed for pregnant women sets tighter parameters and thresholds for identifying specific conditions. It also supports clinicians to recognise any sudden or rapid changes in a woman's condition, and to respond appropriately

### Do I use the maternal vital signs chart with all pregnant, or recently pregnant women?

You should begin the maternity vital signs chart (MVSC) for any pregnant, or recently pregnant (up to and including 42 days later), woman who is assessed as needing or admitted requiring repeat observations of vital signs. You should not use the MVSC for routine intrapartum care. In the rare circumstance that a woman is identified with pre-existing or emerging concerns during labour (eg, known cardiac condition or emerging sepsis), you may use it to supplement the partogram. Women who require intensive or high-dependency care do not require the MVSC. However, before these women are transferred to the ward area, the final vital signs should be charted on an MVSC with a plan to address any ongoing abnormalities in a set timeframe.

## Will the maternity early warning system add to my workload?

Feedback from clinicians shows that they do not want any system or tool to create further work on top of already large and complex workloads. We have taken this into account in developing the MEWS. The system is designed to support clinical decision-making and help with overall workload, rather than simply to add a further burden to what we know are already stretched clinical environments. Staff should consider any care they provide in the context of their own professional standards in any documentation. This could be important during audit, which should consider acuity.

The MVSC contains eight vital sign parameters to measure, which is a lower number than many current charts. The Maternal Morbidity Working Group recommends that each hospital reviews its current documentation requirements and rationalises clinical documentation to support the introduction of MEWS. The MEWS provides a consistent shorthand way to record a woman's condition that is recognised across all maternity and hospital-wide services. For example, you might write 'score = 0' instead of writing all the vital signs again in the clinical notes.

## What does the maternity early warning system mean for clinical judgement?

The MEWS recognises the importance of critical thinking and autonomy. If you are concerned about the woman you are caring for, then you can escalate her care immediately, just as you should if she herself or her family or whānau are concerned about her health. The national MEWS should complement, rather than hinder, the autonomy and critical thinking of clinicians. A national system does not replace professional care or clinical judgement or take away its importance. Rather, it provides a safety net to reduce failures to identify maternal morbidity and prompts clinicians to take action. The system is designed to influence a change in culture so escalation of clinical care is consistent and fully supported using objectively defined criteria.

## What wider support do we need to set up an effective maternity early warning system?

To be effective and sustainable, the MEWS must have underpinning principles, structures for clinical leadership and governance, sufficient clinical and administrative resources, education, teamwork and communication, and measurement and evaluation. A vital signs chart is a tool in a much wider system approach to providing a safe environment for women and clinicians alike.

## What does the maternity vital signs chart look like?

The MVSC includes the eight physiological vital signs used to detect early deterioration. An essential part of using it successfully is clinician critical thinking and assessment skills to determine if other physiological changes (eg, changes in fetal heart, pain score or lochia/bleeding) need to be more frequently assessed to inform judgements about the seriousness of a woman's condition.

## Who is leading the implementation of the maternity early warning system?

The Health Quality & Safety Commission is leading the MEWS implementation as part of our five-year (2016–21) programme to help New Zealand hospitals improve the care of adult patients who acutely deteriorate while in hospital. The Maternal Morbidity Working Group is supporting the introduction of a consistent national MEWS in maternity services.

## Does the maternity early warning system recognise the role of the lead maternity carer?

The development of any MEWS must be aware of the role of the lead maternity carer, who has a professional responsibility to advocate for women's decisions in the complex maternity service environment. Clinicians in maternity services provide care in environments that are sometimes complex, unpredictable and uncertain, while sharing the intention of achieving the best possible outcome for women and their babies. A collaborative approach with the lead maternity carer helps women to navigate these processes and systems.

## Who will provide us with education for this new system?

Throughout the process of implementing the system, the Health Quality & Safety Commission will support hospitals to develop the resources and education they need to implement it.

## Why does the escalation pathway consider the fetus?

While fetal status is not part of the total MEWS score, acute fetal concern can be a reason to escalate care. Evidence shows that deterioration of the fetus can indicate maternal wellbeing; for example, a fetal tachycardia can indicate that a woman is developing sepsis. For this reason, monitoring the mother's vital signs can benefit her if you have any concerns about immediate fetal wellbeing.<sup>9</sup>

## How do I manage the privacy of the maternity vital signs chart if the woman is concealing her pregnancy?

By taking a good history of the woman, you will know where to best display the chart and document it accordingly. For example, a pregnant woman admitted to an orthopaedic ward at eight weeks' gestation after a motor vehicle accident may not have disclosed her pregnancy to her family or whānau, and having the chart at the bedside would be inappropriate. All practitioners should be aware of the Privacy Act 1993 and their individual hospital protocols when using documentation, remembering all clinical notes should be treated as confidential.

## Why does the maternity vital signs chart assess level of consciousness as 'normal' or 'abnormal'?

It is essential to have an objective way to measure level of consciousness and we have referred to adult, non-pregnant evidence for this purpose. Changes in level of consciousness may be obvious (unconscious) or subtle (personality change) and may reflect a variety of causes. An abnormal level of consciousness is always a significant abnormality in the maternity population. Assessing level of consciousness as 'normal' or 'abnormal' is a simple approach.

Some systems have used other ways to assess and document changes in level of consciousness linked with specific conditions or interventions. For example, research shows sedation scores are an effective way of detecting the impact of sedative medicines like opioids but not for detecting changes in level of consciousness from other causes (eg, infection or hypotension).<sup>10</sup>

Similarly, the Glasgow Coma Scale (GCS) was developed as a tool for assessing patients with neurological injury. As a relatively complex scoring system, it has significant inter-rater variability.<sup>11</sup> For patients with specific neurological injury, clinicians must use the individual components of the GCS. Tertiary hospitals usually manage such patients in specific neurosurgical or neurology wards where clinicians are more familiar with the complexity of the GCS.

## How do I score level of consciousness if the woman is asleep?

If you think a woman has low clinical risk and does not need to be woken to record a full set of vital signs at night, then document this assessment in the clinical plan. Otherwise, when you wake the woman to check the full set of vital signs, score her level of consciousness at that time. If the woman does not wake normally from sleep, then score that.

## Why are pain scores not part of the maternity early warning system score?

Some clinicians, particularly specialist pain teams, have proposed pain as a vital sign for a number of years.<sup>12,13</sup> To date, no research has validated that pain scores are a useful component of early warning scores. However, it is important to record pain on the MVSC under the MEWS score total to help interpret abnormal vital signs and effectively manage the woman's pain.

## How does the system deal with a woman who is deteriorating because of opioids?

The MVSC will detect both early and late signs of opioid toxicity by scoring abnormal respiratory rate, heart rate, systolic blood pressure and, subsequently, altered conscious state or hypoxaemia. Such abnormalities will prompt escalation to those with the skills needed to assess and manage opioid toxicity. The MVSC supports maintaining the integrity of serial data around high-frequency vital signs such as respiration rate for intrathecal opiates or patient-controlled analgesia. In maternity wards you can use the notation 'EX' for 'exemption from scoring' in the total MEWS score box to show why you did not include a full set of vital signs and total MEWS score in this circumstance.

## Why do we not record urine output on the maternity vital signs chart?

Although it can be useful to identify end-organ perfusion, urine output is difficult to measure in certain circumstances and can be affected by a variety of factors. Women without a urinary catheter who are able to walk to the toilet will be difficult to assess, as will women with chronic renal failure who may normally produce little or no urine. Some medicines may either increase or decrease the volume of urine output. Another influence can be normal postoperative states where there is an appropriate release of antidiuretic hormone to conserve volume in the face of (elective surgical) trauma. For these reasons, urine output is not part of the MVSC. If you are concerned about a woman's urinary output, start her on a fluid balance chart.

## Why do we not record fluid balance on the maternity vital signs chart?

Fluid balance is measured over a 24-hour period. MVSCs may cover much longer periods depending on how frequently it is necessary to measure the woman's vital signs, which varies with the degree of illness. For this reason, the MVSC does not include fluid balance.

## Why do we not record blood loss/lochia on the maternity vital signs chart?

The MVSC is a tool that facilitates clinical assessments; for example, a tachycardia and/or hypotension should prompt you to consider haemostasis. Rather than replacing clinical judgement, the MVSC supports assessment. To give context to relevant clinical information, appropriately skilled professionals, such as a midwife in reviewing lochia/blood loss, must provide input. You can record blood loss/lochia on a fluid balance chart, avoiding duplication of the documentation.

## Why do we score oxygen?

Oxygen is a medicine and should be prescribed and titrated to a target oxygen saturation (usually measured with a pulse oximeter).<sup>14</sup> Any woman who develops a new need for supplemental oxygen to maintain normoxia is at higher risk of deterioration. This is recognised in the score weighting (2).

Women who are hypoxaemic despite receiving additional oxygen will score twice (once for the hypoxaemia and once for the supplemental oxygen). Such women are at greater risk of adverse outcomes so they require more senior review. Other methods of oxygen delivery, such as high-flow devices or non-invasive ventilation, may be required. You should normally discontinue oxygen if the woman no longer needs it to maintain normal oxygen saturations.

## What does 'or apply exemption (EX)' mean in the total MEWS score box?

In maternity wards the exception to calculating a total MEWS score is when it is not necessary to take all vital signs for a woman. In this instance, please record 'EX' for 'exemption' in the total score box.

This approach is acceptable with:

- regular repeated blood pressure recordings, such as every 15 minutes following antihypertensive administration
- a woman who requires repeated respiratory rate observations following intrathecal opioid administration
- a woman who requires repeated respiratory rate observations because of a patient-controlled analgesia pump
- women requiring an iron infusion.

It is important to record all vital signs on the same chart, both to visualise change and to prompt initiation of a full set of observations and appropriate assessment, either as part of a routine observation schedule or in response to deterioration. This requirement also makes it clear that you should never leave the total MEWS score box blank.

**In non-maternity wards a full set of vital signs is always completed. It is not an option to use 'EX' for exemption.**

## How does the maternity early warning system deal with sepsis?

Sepsis may be challenging to recognise early on because the symptoms may be subtle and can mimic those of many other possible conditions; the normal physiological changes in pregnancy may conceal early signs of sepsis.<sup>15,16</sup> Because the uteroplacental circulation is not autoregulated, maternal sepsis resulting in circulatory insufficiency may result in compromised fetal perfusion, so the fetus is a useful early marker of maternal wellbeing.<sup>17</sup> Given sepsis prevalence, significant associated risks and sometimes rapid progression in the maternity population, you need to have a high level of suspicion about it so that you consider it early when acute deterioration occurs.

It is important to note that MEWS scores are not designed to predict severe sepsis. Rather, they are intended to detect early signs of illness and trigger timely review and appropriate intervention, whatever the cause.<sup>18</sup>

## How did you develop the maternity early warning system?

We developed the MEWS through robust sector consultation involving clinicians from all district health boards (DHBs) and a variety of specialities, as well as a trial during 2018 involving three DHBs. While the system grew from work on deterioration among general adult patients, the professional colleges and clinicians who work with deteriorating maternity inpatients day to day also supplied important information.

## How will our DHB be adequately represented in any development or consultation?

All DHBs had representatives at the first large sector consultation workshop in December 2017. We kept key stakeholders, such as the clinical director for obstetrics and gynaecology and the DHB midwifery leaders' group, informed of progress throughout this work development. It is essential that local developmental work, such as the escalation pathway, draws from a wide range of clinical representatives, including lead maternity carers.

## Is my professional college involved in this work development?

Three professional colleges are providing input through the national MEWS programme team. These are the New Zealand College of Midwives, the Royal Australian and New Zealand College of Obstetricians and Gynaecologists and the Australian and New Zealand College of Anaesthetists.

## Who do we go to with questions on this work?

The members of the MEWS national programme team are:

- Gail Austin, maternity specialist (midwife) Health Quality & Safety Commission
- Dr Leona Dann, patient safety specialist Health Quality & Safety Commission
- Dr Matthew Drake, clinical lead obstetric anaesthesia
- Dr Suzanne Esson, clinical lead obstetrics.

Please email your query to [mews@hqsc.govt.nz](mailto:mews@hqsc.govt.nz) and we will forward it to the most appropriate team member.

- 1 Lawton B, MacDonald E, Brown S, et al. 2014. Preventability of severe acute maternal morbidity. *American Journal of Obstetrics & Gynecology* 210(6): 557.e1–6.
- 2 Sadler LC, Austin DM, Masson VL, et al. 2013. Review of contributory factors in maternity admissions to intensive care at a New Zealand tertiary hospital. *American Journal of Obstetrics & Gynecology* 209(6): 549.e1–7.
- 3 Jeffery J, Hewison A, Goodwin L, et al. 2017. Midwives' experiences of performing maternal observations and escalating concerns: a focus group study. *BMC Pregnancy and Childbirth* 17: 282.
- 4 Edwards S, Grobman W, Lappen J, et al. 2015. Modified obstetric early warning scoring systems (MOEWS): validating the diagnostic performance for severe sepsis in women with chorioamnionitis. *American Journal of Obstetrics & Gynecology* 212(4): 536.e1–8.
- 5 Smith G, Isaacs R, Andrews L, et al. 2017. Vital signs and other observations used to detect deterioration in pregnant women: an analysis of vital sign charts in consultant-led UK maternity units. *International Journal of Obstetric Anesthesia* 30: 44–51.
- 6 Mackintosh N, Watson K, Rance S, et al. 2014. Value of a modified early obstetric warning system (MEOWS) in managing maternal complications in the peripartum period: an ethnographic study. *BMJ Quality and Safety* 23: 26–34.
- 7 Shields L, Wiesner S, Klein C, et al. 2016. Use of maternal early warning trigger tool reduces maternal morbidity. *American Journal of Obstetrics & Gynecology* 214(4): 527.e1–6.
- 8 Isaacs R, Wee M, Bick D, et al. 2014. A national survey of obstetric early warning systems in the United Kingdom: five years on. *Anaesthesia* 69: 687–92.
- 9 Royal College of Obstetricians and Gynaecologists. 2012. Bacterial sepsis in pregnancy. Green-top guideline no. 64a. London: Royal College of Obstetricians and Gynaecologists.
- 10 Nisbet A, Mooney-Cotter F. 2009. Comparison of selected sedation scales for reporting opioid-induced sedation assessment. *Pain Management Nursing* 10: 154–64.
- 11 Gill M, Martens K, Lynch E, et al. 2007. Interrater reliability of three simplified neurologic scales applied to adults presenting to the emergency department with altered levels of consciousness. *Annals of Emergency Medicine* 49(4): 403–7.e1.
- 12 Lynch M. 2001. Pain: the fifth vital sign. Comprehensive assessment leads to proper treatment. *Advanced Nursing Practice* 9(11): 28–36.
- 13 Purser L, Warfield K, Richardson C. 2014. Making pain visible: an audit and review of documentation to improve the use of pain assessment by implementing pain as the fifth vital sign. *Pain Management Nursing* 15: 137–42.
- 14 Beasley R, Chien J, Douglas J. 2015. Thoracic Society of Australia and New Zealand oxygen guidelines for acute oxygen use in adults: 'Swimming between the flags'. *Respirology* 20: 1182–91.
- 15 Dellinger R, Levy M, Rhodes A. 2012. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock. *Intensive Care Medicine* 39: 165–228.
- 16 Cordioli R, Cordioli E, Negrini R, et al. 2013. Sepsis and pregnancy: do we know how to treat this situation? *Revista Brasileira de Terapia Intensiva* 25: 334–44.
- 17 Chau A, Tsen L. 2014. Fetal optimization during maternal sepsis: relevance and response of the obstetric anesthesiologist. *Current Opinion Anaesthesiology* 27: 259–66.
- 18 Maguire P, O'Higgins A, Power K, et al. 2015. Maternal bacteremia and the Irish maternity early warning system. *International Journal of Gynecology and Obstetrics* 129(2): 142–5.