



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



INSTITUTE OF OBSTETRICIANS
& GYNAECOLOGISTS
ROYAL COLLEGE OF PHYSICIANS OF IRELAND

CLINICAL PRACTICE GUIDELINE

The Irish Maternity Early Warning System (IMEWS)

Institute of Obstetricians and Gynaecologists,
Royal College of Physicians of Ireland
and
Directorate of Clinical Strategy and Programmes,
Health Service Executive

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1. Revision History

Version No.	Date	Modified By	Description
1.1	1 st July 2014	Dr Karen Power & Prof Michael Turner	Updated to add a Consider Maternal Sepsis box (Section 8.1); Acronym changed from I-MEWS to IMEWS; change from the red colour trigger to pink; upgraded the trigger for voice from yellow to pink in the AVPU neuro response section; an updated IMEWS chart including a trigger key and a pregnancy silhouette and a change in the text for normal respiratory rate from 10-19 to 11-19

2. Key Recommendations

1. The Irish Maternity Emergency Warning System (IMEWS) should be used for women who are clinically pregnant or who were delivered within the previous 42 days.
2. IMEWS should be used to complement clinical care and it is not designed to replace clinical judgement. Clinical concern about an individual woman should trigger a call to medical staff irrespective of the IMEWS.
3. The timing of clinical observations will depend on the woman's individual circumstances.
4. The blood pressure (BP) should be measured with the correct cuff size. In women with a mid-arm circumference (MAC) > 33 cms, the use of a standard cuff may overestimate the BP and lead to unnecessary interventions.
5. All maternity units should have effective communication systems in place to ensure that there is minimal delay between the triggering of a call for review and the arrival of a medical doctor.
6. The designation of who should be the senior doctor called should be agreed locally by the midwifery and medical senior management.
7. Depending on the acute illness, early consideration should be given to seeking professional assistance from other medical specialities either within or from outside the maternity unit.
8. The Sepsis Six Box customised for pregnancy should be added to the IMEWS Escalation Guideline – see Appendix 1

3. Purpose and Scope

The purpose of this guideline is to improve the management of the pregnant patient between confirmed pregnancy and 6 weeks postpartum. These guidelines are intended for healthcare professionals, particularly those in training, who are working in HSE-funded obstetric and gynaecological services. They are designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the woman.

4. Background

Critical illness is an uncommon but potentially devastating complication of pregnancy (Baskett, 2008). It may be devastating, not only for the woman who becomes ill, but also for her family and for those healthcare professionals responsible for her care. At its most extreme, critical illness may lead to the death of the woman during pregnancy or shortly afterwards. The Confidential Maternal Deaths Enquiry published in 2012 confirmed that Ireland continues to have a low maternal mortality ratio by international standards. However, there is no room for complacency and efforts to improve the quality of clinical care in the maternity services must be continually renewed.

Critical illness in pregnancy may be due to conditions unique to pregnancy, due to conditions exacerbated by pregnancy or due to coincidental conditions. This is reflected in the classification of maternal deaths into direct, indirect and coincidental deaths (CMACE, 2011). The conditions unique to pregnancy include obstetric haemorrhage, pre-eclampsia/eclampsia, pulmonary embolism (venous and amniotic fluid), chorioamnionitis/endometritis, uterine rupture, placenta accreta and acute fatty liver (Nelligan and Laffey 2011).

It has been estimated that for every maternal death there are nine women who develop severe maternal morbidity (Plaat and Naik, 2011). In a study of severe maternal morbidity for 2004/5 in the three Dublin maternity hospitals, the rate of severe maternal morbidity was 3.2 per 1,000 maternities (Murphy et al, 2009). The commonest cause was haemorrhage. A national review of postpartum haemorrhage in Ireland over 11 years between 1999 and 2009 found that there were increasing rates of atonic postpartum haemorrhage (Lutowski et al, 2011).

As critical care has evolved worldwide, attempts to identify early the clinically deteriorating patient has led to the introduction in hospitals of Early Warning Scores (Smith et al, 2013). In Ireland, this has led to the National Early Warning Score (NEWS) being developed in collaboration with the HSE Acute Medicine Clinical Care Programme. The NEWS was also the first guideline to be approved by the National Clinical Effectiveness Committee and it was launched in March of 2013 by the Minister for Health Dr James O'Reilly. It is notable, however, that the NEWS is not applicable to pregnant patients.

In 2008, a hospital report following a maternal death due to infection recommended the introduction in Our Lady of Lourdes Hospital, Drogheda of a

Modified Early Obstetric Warning System (MEOWS). The use of MEOWS has also been recommended by the Confidential Maternal Enquiry Reports both in the UK and Ireland (McClure et al, 2011).

In April of 2012, it was agreed with Dr. Bairbre Golden, Clinical Lead for the National Clinical Programme in Anaesthetics and Dr. Michael Power, Clinical Lead for the National Clinical Programme in Critical Care to produce a joint report on Pathways for the Acutely Ill Patient in Obstetrics. A number of multidisciplinary meetings were held with representatives, not only from the Clinical Care Programmes, but also the HSE Office of Nursing and Midwifery Services Director, Neonatology, the Institute of Obstetricians and Gynaecologists, the College of Anaesthetists and the Irish Society of Obstetric Anaesthesia.

As part of the Pathways Project, it was decided that the maternity services needed to address the issue in EWS in obstetrics and Ms Eilish Croke from the NEWS project was invited to present at the National Clinical Programme in Obstetrics and Gynaecology's National Working Party. An initial audit showed that MEOWS was being used in 10 of the 19 maternity units in the country. A number of issues, however, arose. The MEOWS used in Ireland were not standardised and differed from hospital to hospital. Their application was inconsistent across the specialty of obstetrics. Inadequacies in staff training were identified. To date, there has been no national audit of the use of MEOWSs in the maternity services.

A review of the literature found that MEOWS in pregnancy has not been fully validated in any country. More importantly, there are studies which have highlighted the limitations of MEOWS in women with chorioamnionitis or other serious infections during pregnancy (Lappen et al, 2010; Loughren et al, 2010). While the introduction of MEOWS was well intended and aimed at improving the quality of maternity care, there was a serious risk that the initiative would not succeed and may potentially increase the clinical risk for pregnant women. This was particularly likely to occur in circumstance where an overreliance was placed on the MEOWS. It is clear that any early warning system is only a complementary tool and should never be used to replace clinical judgment. Thus, it was agreed that the introduction of any standardised MEOWS nationally needed to be carefully planned.

In March of 2013 the Irish Maternity Early Warning System (IMEWS) was completed by a Design Team and a multidisciplinary educational programme was implemented for all 19 maternity units. The IMEWS was introduced nationally on April 2nd 2013.

5. Methodology

IMEWS was developed as part of the HSE Directorate for Clinical Strategy Programme's strategic plans for the acutely ill patient in obstetrics and gynaecology. It is a collaborative project between the Office of Nursing and Midwifery Director and the National Clinical Programmes in anaesthetics, critical care and obstetrics and gynaecology.

The Project Lead for IMEWS was Professor Michael Turner, Clinical Lead for the National Clinical Programme in Obstetrics and Gynaecology.

The IMEWS Project Design Team included: Ms Ina Crowley (Chairperson), Professor Michael Turner (Clinical Lead for the National Clinical Programme in Obstetrics and Gynaecology), Ms. Mary Doyle (Limerick), Ms. Triona Cowman (Centre for Midwifery Education), Ms. Marie Horgan (NEWS Team), Ms. Una Carr (Galway), Ms. Anna O'Connor (Coombe), Mr. Mikey O'Brien (Rotunda), Ms Eilish Croke (National Lead for NEWS), and Dr. Paula Connolly (Anaesthetist).

The IMEWS Reference Team included: Ms. Sheila Sugrue (Chairperson, National Lead Midwife), Professor Michael Turner (Clinical Lead for the National Clinical Programme in Obstetrics and Gynaecology), Dr. Paula Connolly (Anaesthetist), Ms. Ina Crowley (Chair of the Design Team), Ms. Geraldine Keohane (Director of Midwifery), Ms. Eilish Croke (National Lead for NEWS), Dr. Ailis Quinlan (Clinical Indemnity Scheme), Dr. Karen Robinson (Clinical Indemnity Scheme), Ms. Mary Wynne (NMPD, Dublin Mid-Leinster), Ms. Patricia Hughes (Director of Midwifery), Mr. Brian Lee (National Programme Manager for the National Clinical Programme in Obstetrics and Gynaecology).

As part of the design work, multidisciplinary consultation meetings were held involving clinical staff from all 19 maternity units. The project also received strong support from Ms Eilish Croke and her team from the National Early Warning System (NEWS). Prior to introducing the IMEWS, multidisciplinary educational workshops were conducted in March 2013.

The international literature on the application of early warning systems in obstetric care was reviewed. The use of Modified Obstetric Early Warning Systems (MEOWS) has been recommended but, however, it has not been standardised as it has not been well validated in pregnancy, particularly, for infection in pregnancy.

This guideline was developed by Ms. Anna O'Connor (Coombe).

The guideline was peer reviewed by Ms. Margurite Hogan (Therapy Professionals) Ms. Eithne Coen (NMPD, South East), Ms. Mary O'Reilly (Rotunda) and the Programme's Clinical Advisory Group. The guideline was endorsed by the National Clinical Programme in Obstetrics and Gynaecology's Clinical Advisory Group and the National Working Party.

6. Definitions

Early Warning Score (EWS)

An early warning score is a bedside track and trigger system which midwifery / nursing staff calculate from the vital signs recorded, and aims to indicate early signs of a patient's deterioration (HSE, 2012).

IMEWS Irish Maternity Early Warning System

IMEWS is a nationally agreed scoring system developed for early detection of life threatening illness in pregnancy and the postnatal period.

ISBAR

ISBAR is a communication tool, and the acronym stands for Identify, Situation, Background, Assessment, and Recommendation. This technique is used for prompt and appropriate communication within healthcare organisations. (See 9.0).

Full set of Vital Signs

Where a full set of vital signs is indicated, this includes recording respiratory rate, temperature, maternal heart rate, blood pressure, neurological response and pain score.

Urinalysis is required on admission. Thereafter, the frequency of urinalysis following admission depends on the clinical assessment, diagnosis and care plan for the woman.

7. Clinical Guideline: Recording Physiological Observations

The nationally agreed IMEWS is included in Appendix 1. For convenience a sample antenatal observation sheet is included in Appendix 2 and a sample postnatal observation sheet is included in Appendix 3. These should be filed beside the IMEWS in the maternity chart so that all clinical observations are easily accessible to the different disciplines. Some maternity hospitals may opt to individualise their observation sheets but this should be implemented in a way that prioritises clinical care and quality.

7.1 Respiration

- Respiratory rate is a mandatory observation as changes in respiratory rate have been identified as being the earliest and most sensitive indicator of deterioration in wellbeing (Johnson and Taylor, 2010). Respiratory rate should be recorded on all monitoring events.
- An assessment of respiration should be carried out for 60 seconds, following the assessment of heart rate, as making the woman aware of counting her respirations will cause her to be conscious of her breathing and lead to a false reading. If the wrist is supported across the woman's chest, it is possible to count the pulse and then to either feel the rise and fall of the chest, or observe it, counting respirations. Factors such as sound, depth and regularity are observed at the same. If respirations are regular, the rate is counted for 30 seconds and doubled. If any abnormalities are detected, respiration is counted for a whole minute (Johnson & Taylor, 2010).

- The rate should be documented as a numerical value in the appropriate box e.g. respiratory rate of 16 per minute should be documented numerically in to the white box allocated to a respiratory rate of 11-19. Likewise, a respiratory rate of 20 should be documented numerically in the yellow box allocated to respiratory rate of 20-29.
- The accepted normal parameters for respiration rate on IMEWS are 11-19 respirations/min.
- Tachypnoea is strong evidence of sepsis until proven otherwise (CMACE, 2011)

7.2 Oxygen Saturation

- Oxygen saturation levels reflect the percentage of arterial haemoglobin saturated with oxygen in the blood, and is referred to as SpO₂ (Johnson and Taylor, 2010).
- Oxygen saturation levels are not routinely measured on all women, and only measured in the following circumstances:
 - If the respiration rate is outside the normal parameters and within the 'trigger' pink or yellow values
 - If a medical/obstetric condition necessitates measurement of oxygen saturation levels e.g. respiratory disorder, High Dependency Care.
- Accuracy of the measurement depends on an adequate flow of blood through the light probe i.e. if peripheral circulation has shut down and a woman is in a critical condition, the SpO₂ result may be inaccurate or unobtainable.
Note: artificial nails and nail polish will also affect the accuracy of results.
- The SpO₂ should be documented as the percentage in the appropriate box i.e. SpO₂ of 94% should be documented numerically in the pink box allocated to SpO₂ readings of ≤95%. Likewise the SpO₂ of 96% should be documented numerically in the white box allocated to 96-100%.
- The accepted parameters for SpO₂ on IMEWS are 96-100%.

7.3 Temperature

- Temperature should be recorded at the appropriate site (i.e. oral, axilla, tympanic) according to local guidelines, ensuring correct use of the appropriate thermometer and equipment.

- The recorded temperature should be documented numerically in the appropriate box. Therefore, the temperature of 35.8°C should be documented numerically in the yellow box allocated to 35.1-35.9°. Likewise 38.1 °C should be documented numerically in the pink box allocated to $\geq 38^{\circ}\text{C}$.
- The accepted temperature parameters on the IMEWS are 36-37.4° C.
- A fall or rise in temperature or swinging pyrexia may indicate sepsis.
- Hypothermia is a significant finding that may indicate infection and should not be ignored.
- Pyrexia may be masked if antipyretics have been administered.
- If pyrexial, a sepsis screen and appropriate antibiotic therapy should be considered at an early stage.

7.4 Heart Rate

- The most commonly used site to assess heart rate in the adult is the radial artery as it is readily accessible. The brachial artery is used in the measurement of blood pressure and the carotid and femoral arteries may be palpated in the case of collapse, where cardiac output cannot be detected in the peripheral circulation (Johnson & Taylor, 2010).
- The radial artery should be palpated using the index and middle finger, supporting the woman's wrist across her chest, and the rate counted for 30 seconds and doubled if the rate is regular, or sixty seconds if irregular (Kozier et al, 1998).
- Pulse oximeters also give a heart rate reading. However, if the woman has a bradycardia or tachycardia detected electronically, the pulse should be assessed manually for noting rate, rhythm and strength.
- The heart rate should be documented numerically on the IMEWS in the appropriate box i.e. heart rate of 86 bpm should be documented into the white box area allocated to 80-89 bpm. A heart rate of 102 bpm should be documented numerically in the yellow box allocated to 100-109 bpm.
- The accepted parameters for heart rate on IMEWS are 60-99bpm
- Persistent tachycardia over 100bpm is an important sign that may indicate serious underlying disease and should be fully investigated.

7.5 Blood Pressure

- Systolic and diastolic blood pressure, are recorded separately to facilitate the appropriate triggers to be assigned to two separate results from one recording.
- Blood pressure must be measured using the correct cuff size, and the size of the cuff used should be documented in the woman's notes.
- It is recommended that the mid-arm circumference (MAC) should be measured in all pregnant women particularly those with BMI > 29.9kg/m² at their first antenatal visit. If the MAC is > 33 cms, a large cuff should be used for BP measurements subsequently (HSE, 2011).
- The mid-arm point is determined by measuring the length of the upper arm from the shoulder joint to the antecubital fossa. The mid arm point is taken as the point halfway between these two landmarks (Hogan et al, 2010).
- Systolic blood pressure should be documented at Korotkoff I or first clear sound, and the diastolic blood pressure at Korotkoff V, when sounds are no longer audible.
- Electronic recording of blood pressure can underestimate readings. It is recommended good practice that if a blood pressure is raised with an electronic reading, the BP should be rechecked manually at least once using an aneroid sphygmomanometer.
- Findings should be documented as a numerical value in the appropriate box i.e. systolic blood pressure of 156mmHg is written into the yellow box representing 150-159mmHg. The diastolic reading of 86mmHg should be documented numerically in the white box allocated to 80-89mmHg.
- It is recommended that a dotted line is used between the systolic and diastolic numbers is used, to display a graphic trend.
- The acceptable parameters for Systolic blood pressure on the IMEWS are 100-139mmHg. The acceptable parameters for diastolic blood pressure on the IMEWS are 50-89mmHg (i.e. 100/50mmHg to 139/89mmHg).
- Hypotension is a late sign of deterioration as it signifies decompensation. The physiological changes caused by pregnancy and childbirth can mean that early signs of impending collapse are not easily recognised.
- Hypertension: The conventional definition of hypertension in pregnancy is
 - Two readings of 140/90mmHg taken at least 4 hours apart, (NCCWCH, 2010)
 - An increase or 15mm/Hg above the booking blood pressure
 - One reading of 160/100mmHg of greater.
- Concerns regarding blood pressure readings should be discussed with the Obstetrician/Anaesthetist as appropriate.

7.6 Urine

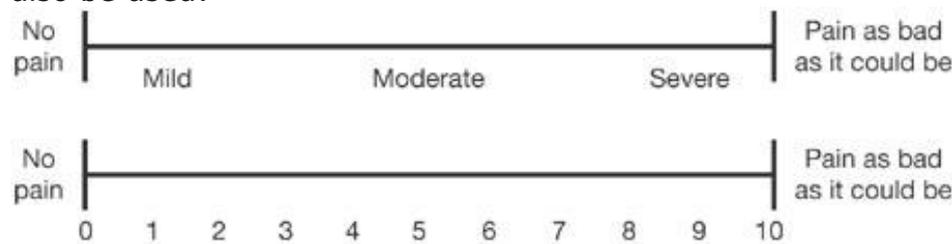
- Urinalysis of freshly voided urine should be undertaken for the purpose of screening, diagnosis or assessment of management and documented on the IMEWS on the following occasions:
 - On admission to the hospital for any reason as a baseline observation
 - Specific maternal disorders or treatment, e.g. hypertensive disease, diabetes.
 - Clinical symptoms, e.g. dysuria
- The frequency of urinalysis following admission depends on the clinical assessment and diagnosis of the woman i.e.
 - An antenatal woman admitted with hypertensive disease or urinary tract infection may require a minimum of daily urinalysis or more frequently if her clinical condition deteriorates.
 - However, an antenatal or postnatal woman without risk factors may not require daily urinalysis.
- All urinalysis findings should be documented as they appear on the dipstick or urinalysis machine printout e.g., neg, trace, +, ++, +++, +++++.
- **Proteinuria** may indicate infection, underlying renal disease which may be as a result of hypertension or may be a contaminated specimen (from liquor or vaginal discharge). Transient positive tests are usually insignificant, due to the physiological changes in pregnancy resulting in the presence of small amounts of albumin and globulin in the urine. To exclude infection a midstream specimen (MSU) should be obtained, tested and sent for laboratory analysis.
- **Glucose** is common in pregnancy due to the physiological changes of pregnancy resulting in altered renal function. However, glucose also appears in the urine
 - When blood glucose levels rise (hyperglycaemia).
 - If renal absorption lowers.
 - Transiently following the administration of corticosteroids e.g. Betamethasone / Dexamethasone.
- **Others:** (this list is not exhaustive)
 - **Ketones:** Mild ketonuria is a normal physiological change in pregnancy, and provided it is mild, is insignificant. However ketonuria is also indicative of women who are fasting, vomiting or with uncontrolled diabetes mellitus. Some drugs may also give a positive result.
 - **Blood:** Blood should not appear in the urine; its presence may be indicative of infection, trauma or calculi or may be due to contamination by blood from another part of the body, e.g. vaginal discharge or haemorrhoids. A positive result warrants further investigation.
 - **Nitrites:** Nitrites in the urine are indicative of urinary tract infection and an MSU should be sent for laboratory analysis.

7.7 Assessment of Neurological Response- AVPU Scale

- A neurological response is a measure of consciousness and the best response of the following should be measured and documented on all women using the AVPU scale, indicating
 - **A** - Alert and orientated to person, place, time and event.
 - **V** - Responds to voice / verbal stimuli (e.g. post op. recovery)
 - **P** - Responds to painful stimuli with a purposeful or nonpurposeful movement.
 - **U** - Unresponsive - The patient does not respond to any stimuli.
- The neurological response assessment should be documented in the appropriate box.
- Alert (A): white box (accepted neurological response parameter)
- Responds to Voice (V): Pink box
- Responds to Pain (P) Pink box
- Unresponsive (U): Pink box.
- **Any fall in the level of consciousness (AVPU scale) should ALWAYS be considered significant and acted on IMMEDIATELY.**

7.8 Pain Score

- Women should be asked to score their pain on a scale of 0-10 (0: No pain, 10: extreme pain) when a full set of observations is recorded and the numerical value recorded on the IMEWS. The following tools may also be used:



Wong-Baker FACES Pain Rating Scale



From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: *Wong's Essentials of Pediatric Nursing*, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

- Any concerns regarding pain management should be referred appropriately e.g. to the Midwife/Nurse in charge, Obstetrician, Anaesthetist.

7.9 Total Yellow/Pink Scores

- All triggers should be added up and documented at the bottom of the IMEWS each time observations are recorded.
- **If the woman scores any yellow or pink scores, the escalation guideline should be initiated (See 8.0).**
- **IF CONCERNED ABOUT A WOMAN, ESCALATE CARE REGARDLESS OF TRIGGERS.**

7.10 Initials

- The initials of the person that has completed and recorded the observations should be clearly written in the initials box on the IMEWS.
- An Initials/Signature Bank should be maintained in each hospital as per local guidelines.

7.11 Frequency of Recording Observations on the IMEWS

- All women who present to or are admitted to a maternity unit should have a full set of vital signs recorded as a baseline on the IMEWS.
- The IMEWS should be used for all pregnant women with a confirmed clinical pregnancy and up to 42 days postnatal who are admitted or transferred to a general hospital.
- **The frequency that subsequent observations should be recorded is then determined by the results of the initial observations and the presenting clinical condition.**
- Women in labour should have their vital signs recorded on the partogram. The IMEWS should not be used for women in labour.
- **The last set of observations recorded in the Labour Ward or in Recovery should be documented on the IMEWS prior to transfer to the postnatal ward.**

IMEWS Frequency Table

Clinical Situation	Minimum frequency of recording observations on IMEWS
Antenatal Low risk (inpatient) woman with an uncomplicated pregnancy	Full set of vital signs recorded on the IMEWS on admission. Thereafter as clinically required.
Postnatal low risk inpatient woman with an uncomplicated pregnancy and birth	Full set of observations following the birth of the baby. Thereafter TPR, Pain Score and AVPU score recorded until discharge unless otherwise indicated.
Antenatal <u>or</u> Postnatal	Minimum frequency of recording observations on IMEWS
<ul style="list-style-type: none"> Hypertensive disorders of pregnancy 	Full set of vital signs including urinalysis recorded daily. Thereafter BP recorded 4 hourly
<ul style="list-style-type: none"> Suspected and/or confirmed maternal infection 	Full set of vital signs recorded daily. Thereafter TPR, Pain Score and AVPU recorded 4 hourly.
Any other clinical concerns	Full set of vital signs recorded daily and thereafter as required.
Emergency situation	As clinically required
Blood Transfusion	See local Blood Transfusion Guidelines
Post Caesarean Section or Post Surgery during Pregnancy/Postnatal period (including recovery)	
Full set of vital signs (urinalysis only if applicable) to be recorded: <ul style="list-style-type: none"> Every 5 minutes for 15 minutes Thereafter, every 15 minutes for 1 hour Thereafter, every 30 minutes for 1 hour Thereafter, every hour for 2 hours Thereafter, every 4 hours for 48 hours Thereafter, daily until discharge 	

8. Escalation Guideline

Hospital Name:
 Ward:

Woman's Name:
 Date of Birth:
 Healthcare Record No:
 Addressograph

Irish Maternity Early Warning System (IMEWS) Escalation Guideline

Version 1.1

ALL IMEWS TRIGGERS

Consider context and complete full clinical assessment. Implement measures to reduce triggers if appropriate. Complete a full set of observations on IMEWS immediately. Inform the Midwife in charge.

1 YELLOW

Repeat full set of observations on IMEWS after 30 and before 60 minutes.

2 YELLOWS OR 1 PINK

Call the obstetrician to review. Repeat a full set of observations after 30 minutes.

>2 YELLOWS OR ≥2 PINKS

Call the obstetrician and request immediate review. Repeat a full set of observations within 15 minutes or monitor continuously.

ALL IMEWS TRIGGERS

Liaise with the Midwife in charge
 Document all communication including:

- Redefined plan of care
- Ongoing frequency of observations

IMPORTANT:

1. If concerned about a woman, escalate care regardless of triggers.
2. If action is not carried out as above, CMM/Midwife in charge must contact the senior obstetrician on duty.
3. Document all communication and management plans in notes.

CONSIDER MATERNAL SEPSIS

<p style="text-align: center; font-weight: bold;">Are 2 or more of the following SIRS criteria present?</p> <ul style="list-style-type: none"> • Temperature ≥38°C or <36°C • Respiratory rate ≥20 breaths per min • Heart rate ≥100 beats per min • White cell count >16.9 or <4.0 x 10⁹/L • Bedside glucose >7.7 mmol/L (in the absence of diabetes) • Acutely altered mental status 	<p>AND</p> <p style="color: red; font-weight: bold;">If infection is suspected after medical review</p> <p style="font-size: 2em;">➔</p>	<p style="text-align: center; font-weight: bold;">Intervention: within one hour COMPLETE SEPSIS SIX</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">TAKE 3</td> <td>1. Appropriate cultures*</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">GIVE 3</td> <td>2. FBC +/- lactate</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;"></td> <td>3. Start urine output chart</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;"></td> <td>4. Maintain O₂ (94-98%)</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;"></td> <td>5. Consider IV fluid bolus**</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;"></td> <td>6. IV antibiotics</td> </tr> </table> <p style="font-size: 0.8em;">*e.g. blood, wound, vaginal swab, urine etc **exercise caution in presence of pre-eclampsia</p>	TAKE 3	1. Appropriate cultures*	GIVE 3	2. FBC +/- lactate		3. Start urine output chart		4. Maintain O ₂ (94-98%)		5. Consider IV fluid bolus**		6. IV antibiotics
TAKE 3	1. Appropriate cultures*													
GIVE 3	2. FBC +/- lactate													
	3. Start urine output chart													
	4. Maintain O ₂ (94-98%)													
	5. Consider IV fluid bolus**													
	6. IV antibiotics													

8.1 Consider Maternal Sepsis

The bottom of the escalation guide outlines the Systemic Inflammatory Response Syndrome (SIRS) criteria that are indicative of sepsis. If two or more SIRS criteria are present and infection is suspected after a medical review, the sepsis six needs to be completed within 1 hour.

Systemic Inflammatory Response Syndrome (SIRS) is the presence of 2 or more SIRS criteria

Sepsis is the presence (probable or documented) of infection together with systemic manifestations of infection

Severe Sepsis is sepsis plus sepsis-induced organ dysfunction or tissue hypoperfusion

Septic Shock is sepsis-induced hypotension persisting despite adequate fluid resuscitation

9. Effective Communication and ISBAR

All maternity units should have effective communication systems in place to ensure that there is minimal delay between the triggering of a call for a review and the arrival of a medical doctor. The designation of who should be "senior doctor" called should be agreed locally by the midwifery and medical senior management and should be clearly communicated to staff members. The designation may depend on the availability of staff resources.

Depending on the acute illness, early consideration should be given to seeking professional assistance from other medical specialities such as an anaesthetist, haematologist or microbiologist either from within or from outside the maternity unit. Once the patient is clinically stable, it may be necessary to transfer the patient to an Intensive Care Unit (ICU). If this is anticipated, early communications with the ICU is important.

Attention should also be paid to staff handovers in all disciplines. This is particularly important at weekends and holidays when staffing levels may be lower than usual.

A structured communication system for patients may be helpful, such as the ISBAR system. Further information on the ISBAR is also available from the Training Manual for the NEWS and can be downloaded as a smart app for the iPhone, iPod Touch and iPad available from <https://itunes.apple.com/us/app/isbar-hd/id465890794>

ISBAR Communication Tool	
I Identify	Identify: You, Doctor, Patient
S Situation	Situation: Why are you calling? (Identify your concerns)
B Background	Background: What is the relevant background?
A Assessment	Assessment: What do you think is the problem?
R Recommendation	Recommendation: What do you want them to do?

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11. Implementation Strategy

- Distribution of guideline to all members of the Institute and to all maternity units.
- Implementation through HSE Obstetrics and Gynaecology Programme local implementation boards.
- Distribution to the Director of the Acute Hospital Services for dissemination through line management in all acute hospitals.
- Distribution to other interested parties and professional bodies.

12. Key Metrics

- Number of times IMEWS is triggered annually.
- Number of cases of serious adverse clinical outcomes when the IMEWS was not triggered.
- Clinical outcomes of adverse outcomes when IMEWS was triggered.

13. Qualifying Statement

This guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. Clinical material offered in this guideline does not replace or remove clinical judgment or the professional care and duty necessary for each pregnant woman. Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.

This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible for:

- Discussing care with women in an environment that is appropriate and which enables respectful confidential discussion.
- Advising women of their choices and ensure informed consent is obtained.
- Meeting all legislative requirements and maintaining standards of professional conduct.
- Applying standard precautions and additional precautions, as necessary, when delivering care.
- Documenting all care in accordance with local and mandatory requirements

14. Appendices

Appendix 1: IMEWS Chart (Front and reverse side)

Appendix 2: Antenatal Observation Record (Front and reverse)

Appendix 3: Postnatal Observation Record (Front and reverse side)

Appendix 4: IMEWS Information Leaflet

Appendix 1 – IMEWS Chart

Hospital Name:

Ward:

Woman's Name:

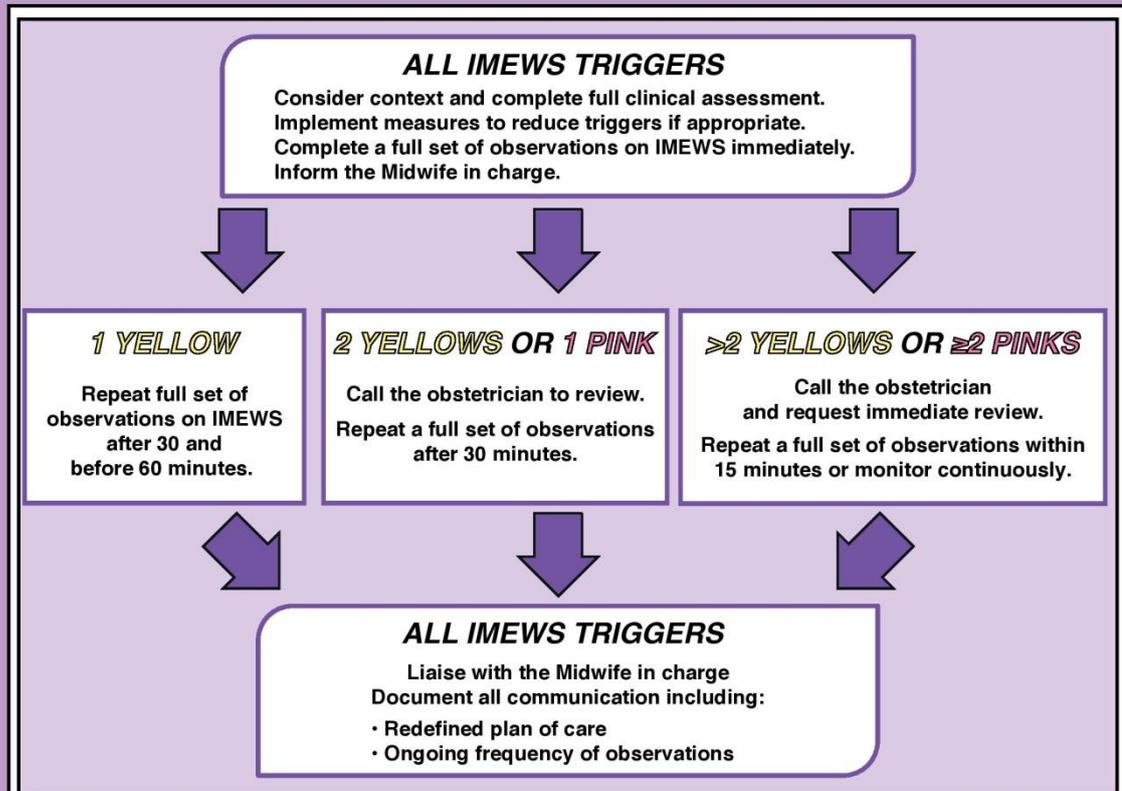
Date of Birth:

Healthcare Record No:

Addressograph

**Irish Maternity Early Warning System (IMEWS)
Escalation Guideline**

Version 1.1



IMPORTANT:

1. If concerned about a woman, escalate care regardless of triggers.
2. If action is not carried out as above, CMM/Midwife in charge must contact the senior obstetrician on duty.
3. Document all communication and management plans in notes.

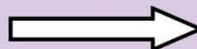
CONSIDER MATERNAL SEPSIS

Are 2 or more of the following SIRS criteria present?

- Temperature $\geq 38^{\circ}\text{C}$ or $< 36^{\circ}\text{C}$
- Respiratory rate ≥ 20 breaths per min
- Heart rate ≥ 100 beats per min
- White cell count > 16.9 or $< 4.0 \times 10^9/\text{L}$
- Bedside glucose > 7.7 mmol/L (in the absence of diabetes)
- Acutely altered mental status

AND

If infection is suspected after medical review



Intervention: within one hour
COMPLETE SEPSIS SIX

TAKE 3

1. Appropriate cultures*
2. FBC +/- lactate
3. Start urine output chart

GIVE 3

4. Maintain O_2 (94-98%)
5. Consider IV fluid bolus**
6. IV antibiotics

*e.g. blood, wound, vaginal swab, urine etc
**exercise caution in presence of pre-eclampsia

Document Number (eg. 1, 2):

Booking BP:

Gestation at Booking (weeks):

IMEWS Triggers Key

IMEWS Trigger	Normal Values	Yellow Zone	Pink Zone
Respiratory rate (bpm)	11-19	20-24	≤10 or ≥25
SpO ₂ (%)	96-100	-	≤95
Temperature (°C)	36.0-37.4	35.1-35.9 or 37.5-37.9	≤35 or ≥38
Maternal HR (BPM)	60-99	50-59 or 100-119	<50 or ≥120
Systolic BP (mmHg)	100-139	90-99 or 140-159	<90 or ≥160
Diastolic BP (mmHg)	50-89	40-49 or 90-99	<40 or ≥100
AVPU	Alert	-	Voice, Pain or Unresponsive

Contact appropriate doctor for early intervention if the woman triggers one PINK or two YELLOW zones at any one time

Year:	Date :																	
		Time :																
Resp. Rate per min	≥25																≥25	
	20-24																20-24	
	11-19																11-19	
	≤10																≤10	
SpO ₂ %	96-100%																96-100%	
	≤95%																≤95%	
Temp °C	≥38.0																≥38.0	
	37.5-37.9																37.5-37.9	
	36.0-37.4																36.0-37.4	
	35.1-35.9																35.1-35.9	
	≤35.0																≤35.0	
Maternal Heart Rate	120																120	
	110																110	
	100																100	
	90																90	
	80																80	
	70																70	
	60																60	
	50																50	
	Systolic Blood Pressure	170																170
		160																160
150																	150	
140																	140	
130																	130	
120																	120	
110																	110	
100																	100	
90																	90	
80																	80	
70																70		
Diastolic Blood Pressure	110																110	
	100																100	
	90																90	
	80																80	
	70																70	
	60																60	
	50																50	
	40																40	
Urine	Protein																Protein	
	Glucose																Glucose	
	Other																Other	
Pain Score 0-10																	Pain Score	
AVPU Neuro Response	Alert (A)																A	
	Voice (V)																V	
	Pain (P)																P	
	Unresponsive (U)																U	
Total Yellow Zones																	Total yellow zones	
Total Pink Zones																	Total pink zones	
Initials																	Initials	

Appendix 2 - ANTENATAL OBSERVATION RECORD (Sample)

Agreed E.D.D. _____	Anti D Administered No <input type="checkbox"/> Yes <input type="checkbox"/> (1) Date _____ (2) Date _____	Weight _____ kgs B.M.I. _____ kg/m ²
-------------------------------	--	---

Date							
Time (24 HrClock)							
Gestation							
Legible ID Band							
Vital Signs to be recorded on IMEWS Chart							
Abdominal Examination:							
Inspection							
Palpation	Fundal Height						
	Lie						
	Presentation						
	Position						
	Fifths palpable Engaged /Not						
Auscultation of Fetal Heart Rate							
Fetal Wellbeing:							
If SROM Please Record Date _____ Time _____ hrs							
Fetal Movement							
Membranes / Liquor/P.V.Loss							
CTG Recorded (✓) (if applicable)							
Maternal Wellbeing:							
Emotional State							
Sleep / Rest							
Eating & Drinking							
Intake Output chart required (Yes / No)							
Bowels							
Oedema							
Signature, PRINTED NAME, & Role							
Investigations Performed (Please date and initial when investigations are performed)							
Ultrasound Scan/Dopplers							
FBC/Kleihauer							
U&E							
LFTs							
Coag							
Group&Antibodies							
Blood Cultures							
MSU							
24 Hour Urine							
Total Protein							
HVS/LVS							
Other:							

Suggested Antenatal Observations (Reverse Side)

(This list is not exhaustive and is only intended for useful reference)

Any concerns / deviations from the norm should be reported to the appropriate Midwife / Obstetrician.		
Agreed EDD	Refer to agreed EDD (confirmed with early dating ultrasound scan)	
Weight / BMI	All women should have their weight, height and BMI calculated and documented at booking. Women with a BMI > 29.9 kg/m ² should commence a pregnancy/obesity care pathway / action plan.	
Vital Signs on IMEWS		
All physiological observations must be recorded on the Irish Maternity Early Warning System		
Abdominal Examination		
Inspection	NAD, size, shape, scars, striae	
Palpation	Fundal Height	Equal to dates, height measured in cms, small for dates /gestational age, large for dates/gestational age
	Lie	Longitudinal, transverse, oblique, unstable
	Presentation	Cephalic, breech, shoulder
	Position	OA, LOA, ROA, LOT, ROT, OP, LOP, ROP
	Fifths palpable Engaged /Not	Engaged, 1/5, 2/5, 3/5, 4/5, 5/5, ballotable, free
Auscultate: Fetal Heart Rate	Average rate measured in beats per minute with Pinard Stethoscope/ Doppler/CTG.	
Fetal Wellbeing:		
Fetal Movement	Normal pattern, increased activity, reduced fetal movements, absence of fetal movements	
Membranes / Liquor/P.V.Loss	Membranes intact, ruptured, suspected ruptured membranes. Liquor/ PV Loss: <u>Colour</u> : clear, pink, blood stained, meconium, <u>Volume</u> : small / large amount, <u>Odour</u> : no odour, foul smelling	
CTG Recorded (Yes / No) (if applicable)	If applicable record CTG and comment on the features / findings in the woman's notes.	
Maternal Wellbeing:		
Emotional State	Coping well, anxiety, tearful, low mood.	
Eating & Drinking	Normal intake, fasting, restricted fluid intake, reduced appetite, special diet, nausea, vomiting.	
Intake/Output Chart required (Yes/No)	(Yes / No) if Intake/Output chart or Fluid Balance chart required.	
Bowels	B.O (bowels opened), BNO (bowels not opened), constipation, diarrhoea, leakage, urgency, haemorrhoids	
Sleep / Rest	Sleeping/resting well, insomnia, fatigue.	
Oedema	NAD, Facial generalised leg, ankle. (Comment x 2 or indicate (L) Left & (R) Right) Mild, moderate, severe.	
Investigations Performed:		
Document if any investigations are performed by inserting date and initials in the appropriate box		

Appendix 3 - Postnatal Observation Record: Mother (Sample)

Orientation to Ward (carried out by the Midwife accepting the transfer to the postnatal ward)

Introduction to Midwife Yes No Visiting arrangements explained Yes No
 Introduction to Ward Layout Yes No Meal times explained Yes No
 Information on Baby Security Yes No

Discussion re expected date of discharge Yes No Expected date of discharge ___/___/___

Signature _____ Print Name _____ Grade _____ Date ___/___/___ Time _____

Special Requirements:						
Anti D Required <input type="checkbox"/> Yes <input type="checkbox"/> No If yes: ___/___/___ date administered Signature _____		MMR Required <input type="checkbox"/> Yes <input type="checkbox"/> No If yes: ___/___/___ date administered Signature _____				
Postnatal Day	Admission	Day	Day	Day	Day	Day
Date						
Time (24hr clock)						
Legible I.D Band (Yes / No)						
Vital Signs to be recorded on IMEWS Chart						
Wellbeing/mood						
Sleep						
Breasts						
Nipples						
Breastfeeding						
Uterus						
Wound						
Perineum						
P.V Loss/Lochia						
Micturition						
Bowels						
Legs						
Postnatal Exercise						
Bonding						
Signature, Printed Name & Job Title						
Postnatal Education: <input type="checkbox"/> Yes <input type="checkbox"/> No (See reverse for list of same to be completed) (If all complete) Signature _____ Date _____						

Suggested Postnatal Observations (Reverse Side)

(This list is not exhaustive and is only intended for useful reference)

Any concerns / deviations from the norm should be reported to the appropriate Midwife / Obstetrician.	
Vital Signs:	All physiological observations must be recorded on the IMEWS
Wellbeing / Mood:	Coping well, baby blues, excessive anxiety, postnatal depression.
Sleep:	Good, intermittent, little, none, excessive sleep, inability to get sleep, premature waking
Breasts:	Indicate (L) Left & (R) Right or Comment x 2: Soft, filling, full, engorged, sore
Nipples:	Indicate (L) Left & (R) Right or Comment x 2: NAD, cracked, bleeding, bruised, healing, sore,
Breastfeeding:	Confidence with positioning, attachment, support required, expressing, any problems?
Uterus:	W/C (well contracted), abdominal tenderness, involuting, sub- involution, boggy, high
Wound:	Clean and dry, healing, moist, infammed, infected, suture / clip removal.
Perineum:	Soreness, bruising, swelling, sutures, infection
P.V.Loss/Lochia:	Type (rubra, serosa, alba), amount(minimal, average, heavy), colour (red, brown, pink) , offensive odour, presence of clots
Micturition:	Pain on passing urine, leakage, stress incontinence, urgency. Time and volume (mls) of first 2 voids to be documented. If either of first 2 voids is less than 200mls, consult Bladder Care Guideline
Bowels:	B.O (bowels opened), BNO (bowels not opened), constipation, diarrhoea, leakage, urgency, haemorrhoids
Legs:	Comment x 2 or indicate (L) Left & (R) Right , NAD, oedema, redness, swelling, pain, varicose veins, thrombophlebitis, cramps, deep vein thrombosis
Postnatal Exercises:	Explained and encouraged (Ex/ENC), doing them, not doing them
Bonding:	Good, reassured, mother expressing difficulty

Postnatal Education

(Please provide this education from the time of admission and clearly document same below)

Information Given and Discussed with Mother	Date	Signature
Rest/Hygiene/Nutrition		
Postnatal "Blues" / Depression		
Breastfeeding Support/Information		
Cervical Smear		
Family Planning		
Vaccination/ Immunisation/BCG		
*Instruction on the safe use of formula (if required)		
Changing / Top and tail/ Handling		
Cord Care		
Eye Care		
Bathing		
Prevention of SIDS		
Signs of effective feeding		
Plagiocephaly		
Vitamin D Supplementation		

Appendix 4 – Patient Information Leaflet

This leaflet was produced as a recommendation of a patient working group on ways to promote improved safety in patient care and to empower patients to take greater control over their health and well-being whilst in hospitals in Ireland.

Get involved!

Find out about how you can get involved in improving health services in Ireland.

The HSE is actively inviting service users to get involved on patient forums and quality improvement initiatives. To find out more contact:

National Advocacy Unit, HSE,
Quality & Patient Safety Directorate,
Health Service Executive, Oak House,
Millennium Park, Naas, Co. Kildare

Tel: (045) 880 400
Email: yoursay@hse.ie
www.hse.ie

Find out about (I-MEWS)
**Irish Maternity
Early Warning System**

people caring for people

To ensure that any change in your condition is picked up early, maternity hospitals in Ireland have an early warning system in place called I-MEWS. This system is used along with clinical assessment to detect any change in your condition and to improve the decision making about the care that you might need if you are ill during your pregnancy.

Pregnancy is a normal healthy event

Most healthy women have a normal pregnancy and birth and do not suffer any illness as a result of pregnancy. However, for a minority of women this is not the case. To ensure that any change in a woman's condition is picked up early, maternity hospitals in Ireland have a system in place called the Irish Maternity Early Warning System (I-MEWS).

Get involved!

The responsibility for patient safety remains with your healthcare team. However, you also play a vital role in the decision making about your care. We encourage you to ask questions and become fully informed and involved in the decision making about your care. **Remember - it's safer to ask.**

Your vital signs

The maternity team assess your vital signs while you are in hospital. Vital signs are signs that are essential for life, for example breathing and heart rate.

The maternity team:

- Assess your breathing, your heart rate and your level of consciousness
- Take your blood pressure and temperature
- Assess the level of oxygen in your blood.

All of these measurements are recorded in your observation chart for ongoing monitoring.

What is I-MEWS?

I-MEWS is a system for the early detection of illness during pregnancy and after a woman has had a baby. This system is in place across all maternity hospitals in Ireland. Due to the changes which take place in a woman's body during pregnancy and after the baby is born, it is often difficult to detect a severe illness. I-MEWS helps to detect earlier if a woman has developed a severe illness and it helps provide safe, high quality care in a timely manner for all women using our maternity services.

I-MEWS helps maternity teams to make decisions in relation to the care that women might need if they are ill during pregnancy.

It also alerts the maternity team to:

- Carry out a full review of your condition
- Carry out tests or investigations
- Make a plan for ongoing care
- Make the right decision in relation to the type of care that is needed.

Let your midwife know, if you are feeling unwell

The midwifery/nursing staff will inform the doctor requesting that they intervene early to prevent your condition from getting worse.