



An Roinn Sláinte  
Department of Health

# Irish Maternity Early Warning System (IMEWS) V2

National Clinical Guideline No. 4

February 2019

The Irish Maternity Early Warning System (IMEWS) Version 2 National Clinical Guideline (NCG) has been updated by the Childbirth Guideline Development Group (GDG), established under the auspices of the HSE National Clinical Programme for Obstetrics and Gynaecology.

The original IMEWS was developed under the auspices of the Health Service Executive Acute Hospitals Directorate as a collaborative project between the Office of Nursing and Midwifery Director and the National Clinical Programme in Obstetrics and Gynaecology. The IMEWS clinical practice guideline was first published in 2013 and was subsequently updated, quality assured and published as a National Clinical Effectiveness Committee (NCEC) NCG No. 4 IMEWS in November 2014.

### Using this National Clinical Guideline

This NCG applies to women with a confirmed clinical pregnancy and for up to 42 days in the postnatal period, irrespective of age or reason for presentation. Exclusions are women in labour, high dependency, recovery and critical care settings. This NCG is relevant to all clinical staff in hospitals providing care to those women.

NCEC NCG No. 4 IMEWS V2 supersedes all previous versions.

### Disclaimer

NCEC NCGs do not replace professional judgment in particular cases, whereby the clinician or health professional decides that individual guideline recommendations are not appropriate in the circumstances presented by an individual patient. In circumstances whereby an individual patient declines a recommendation as a course of action in their care or treatment plan, the decision not to follow a recommendation should be recorded appropriately in the patient's healthcare record.

Users of NCEC National Clinical Guidelines must ensure they have the current version (hardcopy or softcopy) by checking the relevant section in the National Patient Safety Office on the Department of Health website: <https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/>

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### Membership of the Guideline Development Group (GDG)

The Childbirth GDG was chaired by Professor Michael Turner, Lead, Clinical Programme Obstetrics and Gynaecology. This National Clinical Guideline was supported by the Clinical Programme for Obstetrics and Gynaecology, the Institute of Obstetrics and Gynaecologists and the National Women and Infants Health Programme.

Membership nominations were sought from a variety of clinical and non-clinical backgrounds to represent stakeholders within the maternity services. GDG members included those involved in obstetrics, midwifery, anaesthetics, neonatology, clinical risk, quality assurance, Clinical Indemnity Scheme, education, the National Women and Infants Programme and two representatives of maternity service users (Table 1).

**Table 1:** Members of the Childbirth GDG

Name	Job title and affiliation
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Ms Triona Cowman	Director, Centre for Midwifery Education
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Ms Niamh McGoldrick	Service User
Mr Kilian McGrane	Director, National Women and Infants Health Programme
Ms Elaine McGrath	Service User
Dr Peter McKenna	Clinical Director, National Women and Infants Health Programme
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Ms Caroline Plascott	Childbirth GDG Coordinator
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Dr Jeremy Smith	Lead, Clinical Programme for Anaesthesia
Dr Karen Smith	General Practitioner (until May 2018)
Ms Deirdre Walsh	Clinical Indemnity Scheme, State Claims Agency

### Credits

The role of the NCEC is to prioritise, quality assure and recommend clinical guidelines to the Chief Medical Officer for endorsement by the Minister for Health. It is intended through Ministerial endorsement that full implementation of the guideline will occur through the relevant service plans.

The NCEC and the Department of Health acknowledge and recognise the Chair and members of the GDG for development of the guideline. The NCEC and Department of Health express thanks and gratitude to everyone contributing to this National Clinical Guideline, especially those who gave of their time on a voluntary basis.

### Acknowledgments

The Chair, Professor Michael Turner, acknowledges the Childbirth Guideline Development Group as contributors to the development of this National Clinical Guideline. All members approved the final clinical guideline. Ms Shelley O'Neill and Dr Barbara Clyne of HRB-CICER carried out the search for evidence, systematic review and budget impact analysis and were extremely supportive throughout the process. Ms Pauline Dempsey was integral to facilitating all links between the NCEC, Clinical Effectiveness Unit and the Childbirth GDG. Dr Karen Power wrote and prepared the final document and submitted the guideline for NCEC quality assurance.

Special thanks to the hospitals and individuals who provided feedback, who piloted the audit tools and IMEWS chart and responded to queries throughout the process. Thanks also to Ms Fiona McDaid, the Deteriorating Patient Recognition and Response Improvement Programme, the National Sepsis Team, Dr Niamh O'Rourke and Ms June Boulger for their assistance and contribution. Thanks to Mochua Print and Design for their seamless and speedy revisions of the IMEWS chart. The external review carried out by Ms Rachel Scanlan, Dr Clare Willocks and Dr Audrey Quinn is acknowledged with gratitude.



Signed by the Chair Professor Michael Turner  
February 2019

## National Clinical Guidelines

Providing standardised clinical care to patients in healthcare is challenging. This is due to a number of factors, among them diversity in environments of care and complex patient presentations. Safe, effective care and treatment are important in ensuring that patients get the best outcomes from their care.

The Department of Health is of the view that supporting evidence-based practice, through the clinical effectiveness framework, is a critical element of the health service to deliver safe and high quality care. The National Clinical Effectiveness Committee (NCEC) is a Ministerial committee set up in 2010 as a key recommendation of the report of the Commission on Patient Safety and Quality Assurance (2008). The establishment of the Commission was prompted by an increasing awareness of patient safety issues in general and high profile health service system failures at home and abroad.

The NCEC on behalf of the Department of Health has embarked on a quality assured National Clinical Guideline development process linked to service delivery priorities. Furthermore, implementing National Clinical Guidelines sets a standard nationally, to enable healthcare professionals to deliver safe and effective care and treatment while monitoring their individual, team and organisation's performance.

The aim of NCEC National Clinical Guidelines is to reduce unnecessary variations in practice and provide a robust basis for the most appropriate healthcare in particular circumstances. As a consequence of Ministerial mandate, it is expected that NCEC National Clinical Guidelines are implemented across all relevant services in the Irish healthcare setting.

The NCEC is a partnership between key stakeholders in patient safety. NCEC's mission is to provide a framework for national endorsement of clinical guidelines and clinical audit to optimise patient and service user care. The NCEC has a remit to establish and implement processes for the prioritisation and quality assurance of clinical guidelines and clinical audit so as to recommend them to the Minister for Health to become part of a suite of National Clinical Guidelines and National Clinical Audit. The aim of the suite of National Clinical Guidelines is to provide guidance and standards for improving the quality, safety and cost-effectiveness of healthcare in Ireland. The implementation of these National Clinical Guidelines will support the provision of evidence-based and consistent care across Irish healthcare services.

## NCEC Terms of Reference

1. Provide strategic leadership for the national clinical effectiveness agenda.
2. Contribute to national patient safety and quality improvement agendas.
3. Publish standards for clinical practice guidance.
4. Publish guidance for National Clinical Guidelines and National Clinical Audit.
5. Prioritise and quality assure National Clinical Guidelines and National Clinical Audit.
6. Commission National Clinical Guidelines and National Clinical Audit.
7. Align National Clinical Guidelines and National Clinical Audit with implementation levers.
8. Report periodically on the implementation and impact of National Clinical Guidelines and the performance of National Clinical Audit.
9. Establish sub-committees for NCEC workstreams.
10. Publish an annual report.



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## Glossary of terms and abbreviations

**Clinical Audit** – a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated changes are implemented at an individual team, or service level, and further monitoring is used to confirm improvement in healthcare.

**Clinical Escalation** – describes a process whereby a change in the woman's physiological status or a clinical concern that need not be specified, prompts a team response such that a clinician with appropriate competencies and diagnostic skills attends the woman in an appropriate time-frame and manages the physiological problem or clinical cause for concern.

**Clinical Guideline** – systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific circumstances.

**Clinician** – a health professional, such as a doctor, midwife or nurse, involved in clinical practice.

**Local Governance Group** – a multidisciplinary group established to oversee ongoing implementation and evaluation of IMEWS. This group may contain, but is not limited to, obstetric, medical, midwifery, nursing, quality and risk, education or practice development and hospital management representatives.

**National Clinical Guidelines** – a suite of guidelines that meet specific prioritisation and quality assurance criteria and that have been recommended by the National Clinical Effectiveness Committee. Clinical guidelines endorsed by the Minister will be titled 'National Clinical Guidelines'.

**Parameter** – limit or boundary which defines the scope of a particular process or activity. For the purposes of IMEWS this refers to the boundaries for vital signs within which the vital sign is normal or triggers yellow or pink.

**Senior medical personnel** – a medical professional of registrar level or higher.

**Track and Trigger** – a 'track and trigger' tool refers to an observation chart that is used to record vital signs or observations so that trends can be 'tracked' visually and which incorporates a threshold (a 'trigger' zone) beyond which a standard set of actions is required by health professionals if a patient's observations breach this threshold.

**Vital signs** – clinical measurements that indicate the state of a patient's essential body functions.

## Abbreviations

<b>AVPU</b>	Alert, Voice, Pain, Unresponsive
<b>BIA</b>	Budget Impact Analysis
<b>BIU</b>	Business Information Unit
<b>BP</b>	Blood Pressure
<b>CEO</b>	Chief Executive Officer
<b>CMACE</b>	Centre for Maternal and Child Enquiries
<b>CME</b>	Centre for Midwifery Education
<b>EMEWS</b>	Emergency Medicine Early Warning System
<b>EWS</b>	Early Warning System/Score
<b>FAQ</b>	Frequently Asked Questions
<b>GDG</b>	Guideline Development Group
<b>GRADE</b>	Grading of Recommendations Assessment, Development and Evaluation
<b>HDU</b>	High Dependency Unit
<b>HIQA</b>	Health Information and Quality Authority
<b>HRB-CICER</b>	Health Research Board Collaboration in Ireland for Clinical Effectiveness Reviews
<b>HSE</b>	Health Service Executive
<b>ICT</b>	Information and Communications Technology
<b>ICU</b>	Intensive Care Unit
<b>IMEWS</b>	Irish Maternity Early Warning System
<b>ISBAR</b>	Identity, Situation, Background, Assessment and Recommendation
<b>KPI</b>	Key Performance Indicator
<b>LOS</b>	Length of stay
<b>MDE</b>	Maternal Death Enquiry
<b>MMR</b>	Maternal Mortality Rate
<b>MN-CMS</b>	Maternal and Newborn Clinical Management System
<b>NCEC</b>	National Clinical Effectiveness Committee
<b>NCG</b>	National Clinical Guideline
<b>NEWS</b>	National Early Warning Score
<b>NMBI</b>	Nursing and Midwifery Board of Ireland
<b>NMPDU</b>	Nursing Midwifery Planning and Development Units
<b>NPEC</b>	National Perinatal Epidemiology Centre
<b>NSP</b>	National Service Plan
<b>NWIHP</b>	National Women and Infants Health Programme
<b>ONMSD</b>	Office of the Nursing and Midwifery Services Director
<b>PEWS</b>	Paediatric Early Warning System
<b>QC-M</b>	Quality Care-Metrics
<b>QI</b>	Quality Improvement
<b>SAFE</b>	Situation Awareness for Everyone
<b>SMM</b>	Severe Maternal Morbidity
<b>TYC</b>	Test Your Care
<b>WHO</b>	World Health Organization

## 1

## National Clinical Guideline recommendations

## 1.1 Summary of recommendations

## Measurement and documentation of vital signs

**Recommendation 1**

The Irish Maternity Early Warning System (IMEWS) should be used for the hospital care of a woman with a confirmed clinical pregnancy and for up to 42 days in the postnatal period irrespective of age or reason for presentation to hospital. Exclusions are women in labour, high dependency, recovery and critical care settings.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives, Nurses and Masters or Hospital Chief Executive Officers (CEO)**

**Recommendation 2**

IMEWS should be used to complement clinical care and it is not designed to replace clinical judgment. Clinical concern about an individual woman warrants an escalation to medical staff irrespective of the presence or absence of IMEWS triggers. The level and speed of escalation should reflect the degree of clinical concern.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 3**

If a woman or a visitor expresses concern about her wellbeing, this should be listened to carefully as it may reflect the early onset of a critical illness. The woman should have her vital signs checked.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 4**

The standard IMEWS vital signs must be recorded as a baseline on admission. These are: respiratory rate, temperature, maternal heart rate, systolic blood pressure, diastolic blood pressure and neurological response. The subsequent frequency of observations should be determined by the baseline recordings and the woman's individual clinical circumstances.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Conditional**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 5**

The standard IMEWS vital signs must be completed contemporaneously and recorded for every set of vital signs unless otherwise clinically indicated (See Recommendation 10).

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 6**

The technique of measuring, recording and monitoring of vital signs should be undertaken in line with recognised, evidence-based practice.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Escalation of care and clinical communication****Recommendation 7**

The ISBAR (patient deterioration) and ISBAR<sub>3</sub> (clinical handover) communication tools should be used when communicating clinical information. When a situation is deemed to be critical, this must be stated at the outset of the conversation.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Nursing/Midwifery, Clinical Director), Doctors, Midwives and Nurses**

**Recommendation 8**

Following clinical review, plans must be put in place and clearly documented as part of the IMEWS response.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 9**

The IMEWS escalation guide should be used to identify the clinical escalation steps and response that should be taken in the event of any IMEWS triggers.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

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**Recommendation 10**

Variances to IMEWS parameters or the escalation guide may be made by senior medical personnel and should be based on clinical assessment. Parameter changes should be recorded and re-evaluated at a minimum 24 hourly and at each admission.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Conditional**

Responsible for implementation: **Doctors**

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## Governance

**Recommendation 11**

The Master or CEO, Clinical Director and Director of Midwifery/Nursing of each hospital and the Chief Executive Officer of the hospital groups are accountable for the local operation of the IMEWS. The HSE NWIHP should ensure that there is a governance structure in place nationally for the implementation and, if necessary, the revision of IMEWS.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

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**Recommendation 12**

A local governance group should oversee the implementation and ongoing review of IMEWS recognition and response systems locally.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

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**Recommendation 13**

A local governance group should identify and support named individuals to oversee local IMEWS implementation.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

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**Recommendation 14**

A local governance group should support additional safety practices (e.g. incorporating briefings, safety pause and huddles) and implementation of relevant guidelines (e.g. NCEC National Clinical Guideline No. 5: Communication (Clinical Handover) in Maternity Services) to enhance the IMEWS and lead to a greater situational awareness among clinicians and multidisciplinary teams.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Conditional**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

## Education, Audit and Evaluation

**Recommendation 15**

Clinical staff in both maternity and general hospitals should receive education and training in IMEWS. They should know how to call for emergency assistance if they have any concerns about a woman, and know who they should call under these circumstances. This information should be provided at the start of employment and as part of regular refresher education and training.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses in conjunction with the Hospital Group IMEWS Coordinator (Recommendation 17).**

**Recommendation 16**

Audit data should be collected and reviewed locally and overseen nationally regarding the implementation and effectiveness of IMEWS.

Quality of Evidence: ⊕○○○

Strength of Recommendation: **Strong**

Responsible for implementation: **The local governance group (Recommendations 12) in consultation with the local IMEWS coordinator (Recommendation 13) and Hospital Group IMEWS coordinator and the NWIHP.**

**Recommendation 17**

The management of IMEWS (in both maternity and acute hospitals) should be delegated to specifically appointed healthcare professionals in each hospital network. This 'Hospital Group IMEWS Coordinator' should preferably have midwifery experience and job responsibilities should include education and audit for IMEWS.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Strong**

Responsible for implementation: **NWIHP**

### Recommendation 18

IMEWS should be supported through the application of quality improvement methods, such as engagement strategies, testing and measurement to ensure successful implementation, sustainability and future progress.

Quality of Evidence: **No included studies**

Strength of Recommendation: **Conditional**

Responsible for implementation: **Local governance group (Recommendation 12), Doctors, Midwives and Nurses**

Summary legend (See Tables 4 and 5 for further information)

Symbol	Quality rating
⊕⊕⊕⊕	High
⊕⊕⊕○	Moderate
⊕⊕○○	Low
⊕○○○	Very low

## 2

## Development of the National Clinical Guideline

### 2.1 Background

Recommendations have been made in several national and international reports for the use of an obstetric early warning track and trigger system (Centre for Maternal and Child Enquiries (CMACE), 2011; Health Information and Quality Authority, 2013; Health Service Executive, 2013).

Anatomical and physiological changes occur during pregnancy that require a different approach to clinical care than in a non-pregnant adult. Maternal heart rate, red blood cells and cardiac output increase to compensate for blood flow to the uterus and placenta. Respiratory rate and plasma volume are increased, renal clearance is increased and metabolism is altered (Soma-Pillay et al., 2016; Tan and Tan, 2013).

Critical illness in pregnancy may be due to conditions specific to or exacerbated by pregnancy, or coincidental conditions. The conditions specific to pregnancy include (but not limited to) obstetric haemorrhage, pre-eclampsia/eclampsia, pulmonary embolism (venous and amniotic fluid), chorioamnionitis/endometritis, uterine rupture, placenta accreta and acute fatty liver (Neligan and Laffey, 2011).

The Confidential Maternal Death Enquiry (MDE) Ireland 2009-2015 reported a total of 54 maternal deaths occurring during pregnancy or up to 42 days postpartum (O'Hare et al., 2017) (Table 2). Causes of death are classified as direct, indirect and coincidental with direct being comparable to those conditions specific to pregnancy (plus suicide). The maternal mortality rate (MMR) for the triennium 2013-2015 was 6.5 per 100,000 maternities (95% CI 3.1 – 11.2) in Ireland. Measuring outcome based on a decreased maternal mortality is challenging as the rates are too low for statistical significance, therefore, a more suitable outcome measure is severe maternal morbidity (SMM) (Brown, 2018).

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 SMM for 2015 in 18 of the 19 maternity units, the rate of SMM was 6.4 per 1,000 maternities (Manning et al., 2018). While the rate has been increasing year on year between 2011-2015, as the National Perinatal Epidemiological Centre (NPEC) report highlights, the rate in Ireland is favourable when compared to methodologically similar national audits. The increase in SMM rates may also reflect improved case ascertainment. The commonest cause was haemorrhage consistently accounting for almost half of all SMM cases (Table 3).

Early warning systems (EWS) (or scores) are used by hospital teams to recognise early signs of critical illness and trigger more frequent bedside monitoring and escalation of care. EWS have the potential to reduce the progression of illness or severity of outcome but the evidence base is limited. Retrospective reviews of Intensive Care Unit (ICU) admissions have reported a potential reduction of the severity of maternal morbidity by 7.2% at a single large tertiary hospital in New Zealand and up to 62% in a case-control study of 100 women in the USA (Austin et al., 2014; Hedriana et al., 2015). Other studies suggest potential reductions in cardiac arrests and unplanned ICU admissions (Centre for Reviews and Dissemination, 2014).



**Table 2:** Causes of Maternal Deaths in Ireland 2009 – 2015 (O'Hare et al., 2017)

Cause of Maternal Death	2009-2011	2012-2014	2013-2015	2009-2015
<b>Direct Maternal Deaths</b>	<b>8</b>	<b>10</b>	<b>4</b>	<b>19</b>
Thrombosis and thromboembolism	3	2	1	5
Pre-eclampsia and eclampsia	1	1	1	2
Genital Tract Sepsis*	–	1	–	1
Amniotic fluid embolism	1	2	1	3
Early pregnancy deaths	–	–	1	1
Haemorrhage	1	1	–	2
Anaesthesia	–	–	–	–
Psychiatric causes-suicides	2	3	–	5
<b>Indirect Maternal Deaths</b>	<b>11</b>	<b>10</b>	<b>9</b>	<b>25</b>
Cardiac Disease	4	7	6	14
Other Indirect causes†	4	1	–	5
Indirect neurological conditions**	3	2	3	6
<b>Coincidental Maternal Deaths</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>9</b>

\*Genital tract sepsis deaths only, including early pregnancy deaths as the result of genital tract sepsis. Other deaths from infectious causes are classified under other indirect causes

†Includes 2 deaths attributed to H1N1 influenza

\*\* Includes 2 cases of Epilepsy related mortality

**Table 3:** Incidence of specific severe maternal morbidities (SMMs) in Ireland, 2011-2016 (Manning et al., 2018)

	2011-2015		2016	
	n(%)	Rate (95% CI)	n(%)	Rate (95% CI)
Major obstetric haemorrhage	850(52.7)	2.67(2.49-2.86)	215(53.0)	3.39(2.92-3.85)
ICU/coronary care unit admission	725(45)	2.28(2.11-2.45)	160(39.4)	2.54(2.14-2.95)
Renal or liver dysfunction	152(9.4)	0.48(0.4-0.56)	34(8.4)	0.54(0.36-0.73)
Septicaemic shock	76(4.7)	0.24(0.18-0.2)	28(6.9)	0.45(0.28-0.61)
Peripartum hysterectomy	102(6.3)	0.32(0.26-0.38)	27(6.7)	0.43(0.26-0.59)
Pulmonary embolism	79(4.9)	0.25(0.19-0.3)	24(5.9)	0.38(0.23-0.54)
Acute respiratory dysfunction	37(2.3)	0.15(0.1-0.2)	14(3.4)	0.22(0.1-0.34)
Eclampsia	51(1.2)	0.16(0.12-0.21)	14(3.4)	0.22(0.1-0.34)
Pulmonary oedema	44(2.7)	0.14(0.1-0.18)	12(3.0)	0.19(0.08-0.3)
Uterine rupture	45(2.8)	0.14(0.1-0.18)	8(2.0)	0.13(0.04-0.22)
Interventional radiology	33(2)	0.10(0.07-0.14)	5(1.2)	0.08(0.01-0.15)
Anaesthetic problem	20(1.2)	0.06(0.03-0.09)	5(1.2)	0.08(0.01-0.15)
Cerebrovascular event	21(1.3)	0.07(0.04-0.09)	4(1.0)	0.06(0-0.13)
Cardiac arrest	18(1.1)	0.06(0.03-0.08)	2(0.5)	0.03(0-0.08)
Status epilepticus	7(0.4)	0.02(0.01-0.04)	2(0.5)	0.03(0-0.08)
Coma	0(0)	0(0-0)	0(0)	0(0-0)
<b>Total women affected</b>	<b>1612</b>	<b>5.07(4.82-5.32)</b>	<b>406</b>	<b>6.46(5.85-7.12)</b>

Note: n represents number of women affected by the specific morbidity; more than one morbidity may apply per woman  
% is based on the total number of women affected; rate is per 1,000 maternities, 95% CI=95% confidence interval;  
ICU=intensive care unit; Uterine rupture was not recorded by the audit in 2011 unless associated with MOH.

## 2.2 Clinical and financial impact of the IMEWS

To the best of our knowledge, the IMEWS is the first obstetric early warning system to be implemented on a national scale worldwide (Maguire et al., 2014).

A systematic literature review was commissioned both in the original IMEWS publication 2014 and for this update. They identified that a maternity EWS appears to improve recording of vital signs (Maguire et al., 2015a). Relatively little high quality evidence emerged on developing and testing the predictive ability of maternity early warning scores or systems (MEWS). The literature is, in the main, related to selected high-risk populations using mortality or severe morbidity outcomes.

Included studies found a wide variation in predictive components depending on the MEWS used. This limits the extent of evidence available to inform decisions on implementation of MEWS routinely on an unselected maternity population. The paucity of literature is attributable largely to the fact that obstetric EWS have only been introduced recently in a small number of well resourced countries. The content and grade of recommendations for the IMEWS National Clinical Guideline, therefore, reflects primarily the expert consensus opinion of the Childbirth Guideline Development Group alongside the available evidence.

A retrospective observational study evaluating the first year post IMEWS implementation, demonstrated that IMEWS triggered clinical review in 73.8% of pregnant women admitted to a high dependency unit (HDU). This suggests the benefits of IMEWS with a caution that an EWS alone cannot replace clinical judgement (Maguire et al., 2015b).

Many recommendations in this guideline represent existing good practice and are, therefore, cost neutral. Implementation is addressed in the budget impact analysis (BIA) through approximate training, materials and audit costing. It is not possible to estimate savings related to improved outcomes until a national evaluation of IMEWS takes place, to include economic impact. It is also important to note that inadequate monitoring and maternal care may increase financial costs associated with adverse outcomes and, in some cases, legal claims. The State Claims Agency published a five year review in 2015 which stated that “*Total transactional expenditure on Maternity services related claims in 2014 (of which 98% were clinical) was €58 million*” (State Claims Agency, 2015). Furthermore, this sum was 54% of all clinical care related claims in the same year. The BIA for IMEWS implementation is summarised in Appendix 6.

## 2.3 Rationale for this National Clinical Guideline

The physiological changes in pregnancy and the presence antenatally of a second patient, necessitates adjustments to therapeutic and supportive strategies (Neligan and Laffey, 2011). The Irish Maternity Early Warning System (IMEWS) clinical practice guideline was originally developed in 2013 to create an EWS customised for pregnancy to detect critical illness and improve outcomes with early intervention.

Since then, a retrospective before-after study on 81 cases of maternal bacteraemia has shown improvement in the quality and standardisation of observations (Maguire et al., 2015a). Moreover, the IMEWS chart has vital signs and parameters set that are customised for pregnant and postpartum women. This customisation is based on the known physiological changes and results in higher sensitivity and specificity for the detection of illness.

The IMEWS is a multifaceted approach to standardise care, consistency of practice, the improvement of clinical outcomes and the safety of pregnant and postpartum women. It is based upon the implementation of several complementary safety interventions, including the national IMEWS chart and escalation guideline, effective communication using the national standard ISBAR communication

tool for patient deterioration, timely midwifery/nursing and medical input, and clear documentation of management plans.

In response to the HIQA Galway Report (2013), the National Clinical Effectiveness Committee (NCEC) was requested by the Minister for Health to commission and quality-assure a number of National Clinical Guidelines (Health Information and Quality Authority, 2013). The IMEWS was one of these guidelines. In collaboration with the HSE Clinical Strategy and Programmes and Quality and Patient Safety divisions the clinical practice guideline IMEWS was developed and in November 2014, was published as NCEC NCG No. 4 IMEWS.

A workshop was held in Dublin in November 2017 for IMEWS users to capture what has worked to date and what needed improvement. Seventy-five delegates attended and eight key themes were identified as requiring attention for this IMEWS update including; education, governance, physiological parameter adjustment, application in the general hospital setting, clinical judgement, chart standardisation, escalation and audit and communication. Overall positive feedback was received in relation the IMEWS chart. Further information can be found in the summary report available on request from the National Women and Infants Health Programme (NWIHP).

A further workshop focussed on IMEWS education and audit was held in collaboration with the Trinity College Dublin School of Nursing and Midwifery on March 8<sup>th</sup> 2018. Thirty three representatives from sixteen hospitals attended including two acute hospitals: Beaumont Hospital and St Vincent University Hospital. This session was informative in understanding the variability and gaps in both education and audit. These discussions helped inform the revision of IMEWS.

## 2.4 Aim and objectives

The IMEWS aims to ensure safe, timely, standardised and appropriate hospital monitoring and escalation of clinical care for pregnant and postpartum women (up to 42 days postpartum).

## 2.5 Guideline scope

This NCG applies to women with a confirmed clinical pregnancy and for up to 42 days in the postnatal period, irrespective of age or reason for presentation. Exclusions are women in labour, high dependency, recovery and critical care settings. This NCG is relevant to all clinical staff in hospitals providing care to those women.

The IMEWS is designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow guideline recommendations if it is deemed to be in the best interests of the woman and is in line with best practice. Clinical decisions and therapeutic options should be discussed with a senior clinician on a case-by-case basis as necessary and documented in the clinical notes.

## 2.6 Conflict of interest statement

The guideline development process followed the conflict of interest policy set out by the NCEC. All members of the Childbirth GDG and the NCEC QA appraisal team were required to complete a Conflict of Interest declaration which was managed by the Project Manager and the CEU respectively. There were no conflicts of interest stated.

## 2.7 Sources of funding

No external funding was received for this project. The systematic review and budget impact analysis (BIA) was funded by the Department of Health.

## 2.8 Guideline methodology

Reproduced below is an extract of the *Clinical effectiveness and cost-effectiveness of maternity early warning system: systematic review update*. The full systematic review was written by the Health Research Board Collaboration in Ireland for Clinical Effectiveness Reviews (HRB-CICER). The search strategy and the summary are in Appendices 2 and 3 respectively. See Annex 1 for the full systematic review.

### Step 1: Formulate the key questions

This update included the same three key healthcare questions as outlined in the original IMEWS guideline V1.0 with the addition of 'clinical audit' for question 1. See Appendix 4 for the full PICO tables.

1. What early warning systems or track and trigger systems (including escalation protocols and communication tools such as ISBAR [Identify, Situation, Background, Assessment and Recommendation]) are currently in use internationally in pregnant women or women who delivered in the previous 42 days, for the detection of deterioration/timely identification of deterioration in maternity patients? What is the level of clinical validation of these scoring systems including escalation protocols, *clinical audit* and communication tools?
2. What education programmes have been established to train healthcare professionals in the delivery of MEWS? What level of evaluation has been used for these education programmes?
3. What are the findings from the economic literature of cost effectiveness, cost impact and resources involved with early warning or track and trigger systems in the detection of deterioration/timely identification of deterioration in pregnant women or women who delivered in the previous 42 days, including implementation costs?

These key questions were broken down into six discrete, yet complementary objectives:

1. To describe the education programmes, including their evaluation that has been established to train healthcare professionals, and other non-professional staff, in the delivery of MEWS;
2. To identify and quality assess clinical guidelines on the use of early warning or track and trigger systems in pregnant women or women who gave birth in the previous 42 days, for the detection of deterioration/timely identification of deterioration;
3. To evaluate the clinical effectiveness of early warning or track and trigger systems on pregnancy, labour and birth, postpartum (up to 42 days) and neonatal outcomes;
4. To describe the development and validation of such early warning or track and trigger systems;
5. To evaluate the cost effectiveness, cost impact and resources involved with such early warning or track and trigger systems;
6. To identify and describe clinical audits of any early warning system.

## Step 2: Search methodology

Comprehensive search strategies for clinical guidelines, studies and evaluations, grey literature, health economics, clinical audits and validation studies were used to conduct electronic searches for the objectives outlined in Step 1. Only information available in English was included (Appendix 2).

Objectives one to five and the corresponding review questions were consistent with those set out in the previous search conducted to identify any new evidence, in relation to objectives one to five, that became available since the previous review (April 2014).

Objective six was not specifically addressed in the previous review, therefore a new search was performed for this objective to identify and describe clinical audits of any early warning system.

## Step 3: Screen and appraise the evidence

Two reviewers independently assessed the quality or risk of bias of included full text studies, using standardised critical appraisal instruments, with any disagreements resolved through discussion. Identified conference abstracts were not assessed as, in general, they lacked sufficient information to inform a judgement. As a result all conference abstracts were categorised as unclear risk of bias.

## Step 4: Develop and grade the recommendations

A GRADE approach outlined in Table 4 was used to assess the quality of evidence and strength of the recommendation for each main outcome across all available studies for each question assessed (Step 1). The completed GRADE evidence to decision (EtD) framework is available in Annex 3.

**Table 4:** Grading of the quality of evidence for recommendations

Symbol	Quality rating	Interpretation
⊕⊕⊕⊕	High	Very confident that the true effect lies close to that of the estimate of the effect
⊕⊕⊕○	Moderate	Moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
⊕⊕○○	Low	Our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect
⊕○○○	Very low	Very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect

The strength of the recommendation is decided following a process of considered judgement by the Childbirth GDG that takes into account the problem priority, potential benefits and harms of the options, resource use, equity, acceptability, feasibility and the available evidence as described (Table 5).

**Table 5:** Factors that strengthen a recommendation

Factors that can strengthen a recommendation	Questions to consider
Benefits & harms of the options	Certainty of this evidence? Is there important uncertainty about how much people value the main outcomes? Are the desirable anticipated effects large? Are the undesirable anticipated effects small? Are the desirable effects large relative to the undesirable effects?
Costs (resource allocation)	Are the resources required small? Is the incremental small relative to the net benefit?
Equity	What would be the impact on health inequities?
Acceptability	Is the option acceptable to key stakeholders?
Feasibility	Is the option feasible to implement?

A **strong** recommendation reflects the Childbirth GDG's consensus that the potential positive outcome is highly valued, benefits will outweigh the harms and the cost implications are justified.

A **conditional** recommendation reflects the Childbirth GDG's consensus that the balance between benefit and harm is uncertain or the feasibility of implementation is uncertain or likely to be difficult.

Good practice points that denote recommended best practice based on clinical expertise of the Childbirth GDG are also included. In addition, the Childbirth GDG has offered practical guidance where it is felt that this may aid implementation.

All recommendations are of equal importance and should be implemented without preference or bias. The recommendations are presented under the following themes:

1. Measurement and documentation of vital signs

2. Escalation of care and clinical communication

3. Governance

4. Education, Audit and Evaluation

## 2.9 Consultation summary

The Childbirth GDG ensured that all stakeholders had an opportunity to contribute to the development of IMEWS. Three hospitals, Cork University Maternity Hospital, Coombe University Women and Infants Hospital and St Luke's General Hospital Kilkenny, piloted and reviewed the audit tools. All hospitals were invited to review the chart. Those who provided feedback included: University Hospital Galway, University Maternity Hospital Limerick, Wexford General Hospital, Cavan General Hospital and the Clinical Programme for Sepsis.

The final guideline was sent to the following for review and feedback:

- Masters/Clinical Directors, Directors of Midwifery for the 19 maternity hospitals/units
- Chief Directors of Midwifery/Nursing for the six hospital groups
- Designated IMEWS contacts in all 19 maternity hospitals/units
- ONMSD and NMPDU, HSE
- Clinical Programme Anaesthesia
- Clinical Programme Sepsis
- Deteriorating Patient Recognition and Response Improvement Programme



Fourteen of nineteen maternity hospitals/units provided overall feedback on the guideline. Feedback was also received by the ONMSD, NMPDU, members of the Clinical Programme for Sepsis and individual anaesthesiologists (See full list in Appendix 5). All feedback was reviewed and discussed by the Childbirth GDG in June and September 2018 and amendments were made when agreed by the Group.

## 2.10 International external review

International external review was completed by three experts in their respective fields of midwifery, obstetrics and anaesthesia:

1. Ms Rachel Scanlan RM MSc, Practice and Standards Professional Advisor, The Royal College of Midwives UK
2. Dr Clare Willocks, Consultant Obstetrician and Gynaecologist, and National Obstetric Lead, Maternity & Children Quality Improvement Collaborative, Healthcare Improvement Scotland
3. Dr Audrey Quinn, Consultant Neuro- and Obstetric Anaesthetist, James Cook University Hospital, Middlesbrough, Honorary Associate Clinical Professor Leeds University

The GDG is very grateful to these reviewers and appreciates the time commitment and expertise that was involved in their review. Reviewers were requested to consider the guideline in accordance with the questions recommended by the National Quality Assurance Criteria for Clinical Guidelines Version 2 (HIQA/NCEC, 2015). The external reviewers were also asked to provide any additional feedback they had. All feedback received was reviewed and incorporated where appropriate. Overall, the external reviewers concluded that this National Clinical Guideline was a major achievement.

The IMEWS patient information leaflet was drafted and proofed in partnership with service users and the National Adult Literacy Association. The IMEWS leaflet was circulated to ten women who had a recent experience of maternity services for their feedback and input. For IMEWS 2.0, minor details including the contact details were updated (See Appendix 11).

## 2.11 Implementation

A comprehensive implementation plan for this guideline is outlined in Appendix 7. The NCEC NCG No. 4 IMEWS V2 should be reviewed by each hospital's senior management team, in conjunction with the relevant local implementation leads and project groups, to appropriately plan implementation of the recommendations. This will ensure that the hospital care of pregnant and postpartum women is optimised.

It is recommended that hospitals use quality improvement (QI) methodology when implementing the IMEWS. Such methods enhance stakeholder engagement and support local adoption through the use of testing, measurement and feedback of key interventions. Recognition must also be given to the complex task of improving patient safety climate (beliefs and attitudes) and culture (actions) that successful implementation of the IMEWS depends upon.

It is recommended that **local governance groups** (Recommendation 12) are established to oversee ongoing implementation and evaluation. This group may contain, but is not limited to, obstetric, medical, midwifery, nursing, quality and risk, education or practice development and hospital management representatives. There should be a designated/named local IMEWS midwife or nurse and consultant doctor coordinator as part of this governance group, to coordinate implementation and evaluation. These coordinators will work alongside the **Hospital Group IMEWS Coordinator** (Recommendation 17) and will report directly to the local governance group. IMEWS coordinators within general hospital settings should have regular communication with their counterparts in the maternity units within their hospital group and with the Hospital Group IMEWS Coordinator.

Some of the potential enablers and barriers for implementation of IMEWS are listed in Table 6. These are similar to NCEC NCG No. 12 PEWS and other international early warning score (EWS) evaluations. This is not an exhaustive list. Local issues should be identified and managed by each hospital/unit.

**Table 6.** Summary of enablers and barriers to the implementation of IMEWS

Enablers	Barriers
<ul style="list-style-type: none"> <li>Committed staff at senior level</li> <li>Good local leadership</li> <li>Champions</li> <li>Clearly defined roles and responsibilities</li> <li>Effective governance</li> <li>Effective multidisciplinary team work</li> <li>Effective communication</li> <li>Complementary safety initiatives such as briefings, huddles and safety pauses</li> <li>Arrangements in place for the safe and timely transfer of patients to a higher level of care</li> <li>Ongoing targeted training and reinforcement of learning</li> <li>Regular audit and evaluation, with the results informing quality improvement plan</li> </ul>	<ul style="list-style-type: none"> <li>Staff resistant to change</li> <li>Lack of clearly defined roles and responsibilities</li> <li>Lack of governance within the organisation</li> <li>Lack of resources e.g. staff, equipment</li> <li>Lack of clear, standardised communication</li> <li>Lack of education, training and resources for staff on IMEWS, and the early detection and management of a pregnant or postpartum woman</li> <li>Lack of audit and evaluation supports, e.g. Information and communications technology (ICT) and other resources</li> </ul>

Barriers to implementation should be identified and addressed by the local governance group as part of organisational quality improvement. Attention to the enablers listed above for implementation planning and strategy may aid the implementation process within that hospital setting.

For full implementation of this guideline, it is essential that *all healthcare professionals* responsible for the care of pregnant and postpartum women understand and appreciate that they are responsible for improving maternity care. This must be supported by clear lines of accountability which include systems that can detect and correct lapses in appropriate care in a timely basis as outlined in this guideline.

Funding for guideline implementation is subject to service planning and estimates process. However, many recommendations in this NCG represent a reiteration of previous good practice and existing IMEWS implementation, and are thus cost-neutral as outlined in the BIA (BIA summary in Appendix 6 Part B, full BIA report available in Annex 2).

#### Senior Managers responsibilities:

- Provide a local governance structure to support the implementation and ongoing evaluation of the NCEC NCG No. 4 IMEWS V2.
- Assign personnel with responsibility, accountability and autonomy to implement the NCEC NCG No. 4 IMEWS V2.
- Provide managers with support to implement the NCEC NCG No. 4 IMEWS V2 and ensure that clinical staff undertake IMEWS training as appropriate
- Ensure local policies and procedures are in place to support implementation.
- Monitor implementation of the NCEC NCG No. 4 IMEWS V2, support ongoing evaluation and any actions required as a result.
- Link the implementation team/group with corporate governance.



**Clinicians responsibilities:**

- Comply with the NCEC NCG No. 4 IMEWS V2 and related policies, procedures and protocols.
- Adhere to relevant code of conduct and scope of practice guidelines appropriate to role and responsibilities.
- Maintain competency in the assessment and management of the woman.
- Be aware of the role of appropriate delegation in using the NCEC NCG No. 4 IMEWS V2.

**The following tools are provided as supports for implementation:**

- An IMEWS e-learning programme is available on HSELand.
- Implementation guidance is in appendix 7.
- FAQs and physiological parameter changes in pregnancy overview summary sheet are available in appendix 8.
- Audit and monitoring tools are available in appendix 9.
- Good practice points for the recordings of all vital signs are in appendix 12.
- ISBAR sample communication tools are available in appendix 13.
- An IMEWS information leaflet for women is available in appendix 11 and the safety pause information sheet is available in appendix 14.

## 2.12 Monitoring and audit

Monitoring and audit are an important part of the implementation of IMEWS (See Recommendations 16 & 17). *“A ward-based self-assessment audit programme for IMEWS must be introduced in all hospitals with results and findings made available to nursing/midwifery staff”* was a recommendation from an audit of compliance conducted by the Quality and Patient Safety Division in 2014 (Kirwan et al., 2014). See Appendix 9 for the full requirements for monitoring and audit.

National standardised audit will be completed in two ways:

- 1) **IMEWS chart completion** - the audit process for compliance may be coordinated in each maternity unit through the Test Your Care ([www.testyourcarehse.com](http://www.testyourcarehse.com)), Nursing and Midwifery Quality Care-Metrics. This is typically required on a monthly basis. The option of *Test Your Care* is available to every Director of Midwifery and Nursing in Ireland. This should be considered to support standardisation, quality care, improvement and sustainability. If this option is not available, sample audit forms are available in Appendix 9.
  - Maternity hospital/units – a monthly minimum of 10 charts per clinical area/ward in your maternity hospital/unit to cover both antenatal and postnatal women.
  - Acute hospitals – an annual minimum of 10 charts or, all charts if less than 10 pregnant or postpartum women present to the hospital.
- 2) **Escalation and Response** - used on women that required escalation of care or/and where there was a requirement for transfers to higher level of care.
  - Maternity hospitals/units – a minimum of 15 episodes per clinical area/ward are completed on a quarterly basis to cover both antenatal and postnatal women.
  - Acute hospitals – an annual minimum of 10 charts or, all charts if less than 10 pregnant or postpartum women present to, or require escalation within the hospital.

Collection of this data is a requirement within the HSE Key Performance Indicator suite for IMEWS. The recommended standard required is 100% compliance (detail available in Appendix 9). Where the compliance is less than 80%, local action plans need to be put in place e.g. increase frequency of audits, training and identification of problem areas.

The local IMEWS Coordinators (Recommendation 13) and the Hospital Group IMEWS Coordinator (Recommendation 17) will hold responsibility for the completion of audits. Feedback should be provided to the local governance group and should be undertaken from a multidisciplinary perspective where appropriate. Results and learning points can be used in the ongoing education delivered by the Hospital Group Coordinator and in the local quality improvement initiatives. The IMEWS chart completion audit tool may be used to promote frontline ownership and may facilitate, for example, learning discussions at handover, ward rounds or education sessions.

#### Outcome metrics

Measuring outcomes are particularly important to demonstrate the effectiveness or otherwise of the intervention for patients. These include:

- Number of times IMEWS is escalated annually.
- Basic patient outcome measures (e.g. hospital length of stay (LOS), transfer to High Dependency Unit (HDU), Intensive Care Unit (ICU), ICU length of stay, unexpected death).
- Number of cases of serious adverse clinical outcomes when the IMEWS was and was not triggered appropriately.
- Clinical outcomes of adverse outcomes when IMEWS was triggered.

It is anticipated that those units with access to the Maternal and Newborn Clinical Management System (MN-CMS) can collect this data. Once all units have electronic health records, a national data collection system will be considered.

#### Key Performance Indicators

The Business Information Unit (BIU), HSE, collects and collates the information required to report performance as set out in the National Service Plan (NSP) and operational plans. Two Key Performance Indicators (KPIs) measured since 2014 on IMEWS and reported quarterly are “% of maternity units/hospitals with full implementation of IMEWS” and “% of hospitals with full implementation of IMEWS”. We define implementation for both of these KPIs in Appendix 9 where all criteria need to be met for IMEWS to be considered fully implemented.

### **2.13 Plan to update this National Clinical Guideline**

It was agreed by the Childbirth GDG that the IMEWS guideline should be reviewed on a three-yearly basis and updated in line with NCEC procedures. Therefore, this guideline will be reviewed again in 2022 by the NWIHP.

### **2.14 Harmonisation of IMEWS and other Early Warning Systems and National Clinical Guidelines**

The IMEWS is aligned, where appropriate, to the other National EWS. The NCEC NCG No. 1 National Early Warning System (NEWS) is used for non-pregnant adults including those in gynaecological services. The NCEC NCG No. 12 Paediatric Early Warning System (PEWS) is used for children in paediatric inpatient settings. The NCEC NCG No. 18 Emergency Medicine Early Warning System (EMEWS) is for all adult patients presenting to the emergency department in the post-triage phase until discharge or admission. A diagrammatic explanation for the assignment of and interface between EWSs is outlined in Appendix 15.

Governance at individual hospital level should reside with the local governance group that works with IMEWS and other EWS as appropriate. This group may be an “Early Warning Systems” or “Management of the Deteriorating Patient” committee or its equivalent. The hospital’s committee should liaise closely

with its equivalent at Hospital Group level and the National “Deteriorating Patient Recognition and Response Improvement Programme” established by the HSE in 2017.

Other NCEC guidelines that include information relating specifically to pregnancy or postpartum care are the NCEC NCG No 5. Communication (Clinical Handover) in Maternity Services, NCEC NCG No. 6 Sepsis Management and NCEC NCG No 13. Diagnosis, Staging and Treatment of Patients with Gestational Trophoblastic Disease.

All other National Clinical Practice Guidelines from the Clinical Programme for Obstetrics and Gynaecology are in harmonisation with IMEWS and should be adhered to and integrated into practice within each hospital/unit. A list of these practice guidelines is available here: <https://tiny.cc/NWIHP>.

## 3

## National Clinical Guideline Recommendations

## 3.1 Healthcare questions and evidence statements

## Theme 1: Measurement and documentation of vital signs

<b>Healthcare question 1</b>	What early warning systems or trigger systems (including escalation protocols and communication tools such as ISBAR) are currently in use internationally in pregnant women or women who delivered in the previous 42 days, for the detection of deterioration/timely identification of deterioration in maternity patients? What is the level of clinical validation of these scoring systems including escalation protocols, clinical audit and communication tools?
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## Evidence statement

**Research evidence on clinical effectiveness of maternity early warning systems**

Two studies provided effectiveness data. The previous review conducted to support the development of the IMEWS guideline (April 2014) identified one effectiveness study, a before and after study which found the implementation of a Physiological Observation Track and Trigger System (POTTS) in a medium sized maternity unit (approx. 4,000 births per annum) in Ireland was associated with improved observation documentation and a higher level of medical involvement (Daly et al., 2011).

The current review update identified one further study (Shields et al., 2016). This was a controlled before and after study conducted in 29 maternity centres in the USA in patients admitted to the ICU, a high risk population. Maternal morbidity outcomes were compared before and after the introduction of a clinical pathway-specific Maternal Early Warning Trigger (MEWT) tool in six intervention hospitals. Outcomes from the six intervention hospitals were also compared to outcomes in 23 control hospitals in the after phase.

The tool addressed four areas of maternal morbidity: sepsis, cardiopulmonary dysfunction, preeclampsia-hypertension, and haemorrhage. The reported results indicate that severe maternal morbidity (using the Centers for Disease Control and Prevention definition) was significantly reduced (-18.4%,  $P=0.01$ ) when comparing before implementation and after implementation rates. Comparing the six intervention hospitals to the 23 control hospitals (after only) also showed a reduction in severe maternal morbidity ( $P<0.01$ ) after implementation.

As the study identified in the previous review was a conference abstract, quality appraisal could not be performed. The study identified in this update had a high risk of selection bias due to its study design (non-randomised controlled before and after study). Participants and personnel were not blinded in this study resulting in a high risk of performance bias. In relation to how missing study data were handled, the risk of bias was unclear because inadequate information was reported.

The evidence was downgraded to very low quality for this study outcome (maternal morbidity) for the following reasons: study limitations (allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, and other biases), and limited data (one small study, few events for the outcomes, no confidence intervals).

**Recommendation 1**

The Irish Maternity Early Warning System (IMEWS) should be used for the hospital care of a woman with a confirmed clinical pregnancy and up to 42 days in the postnatal period irrespective of age or reason for presentation to hospital. Exclusions are women in labour, high dependency, recovery and critical care settings.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives, Nurses and Master or Hospital Chief Executive Officer (CEO)**

**Good practice point**

- The last set of vital signs for women after labour, in high dependency, recovery or critical care settings should be documented on an IMEWS chart and escalated if necessary before transfer to the postnatal ward.

**Recommendation 2**

IMEWS should be used to complement clinical care and it is not designed to replace clinical judgment. Clinical concern about an individual woman warrants an escalation to medical staff irrespective of the presence or absence of IMEWS triggers. The level of escalation should reflect the degree of clinical concern.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Good practice points**

- If concerned about a change in a woman clinically, escalate care regardless of triggers.
- All triggers should be added up and documented at the bottom of the IMEWS chart each time vital signs are recorded.
- If the woman scores any yellow or pink scores, the escalation process should be initiated (See Recommendation 9).
- The initials of the person that has completed and recorded the vital signs should be clearly written in the initials box on the IMEWS chart.

**Recommendation 3**

If the woman or a visitor expresses concern about her wellbeing, this should be listened to carefully as it may reflect the early onset of a critical illness. The woman should have her vital signs checked.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Good practice points**

- The healthcare professional should never underestimate the concern of the woman or a visitor to the woman.
- Communication between all multidisciplinary team members is essential for the effective interpretation of clinical concern. Healthcare professionals should be familiar with the NCEC NCG No. 5 Communication (Clinical Handover) in Maternity Services.
- Healthcare professionals should use their judgement when determining the level of response required to the concern expressed and act accordingly.

**Recommendation 4**

The standard IMEWS vital signs must be recorded as a baseline on admission. These are: respiratory rate, temperature, maternal heart rate, systolic blood pressure, diastolic blood pressure and neurological response. The subsequent frequency of observations should be determined by the baseline recordings and the woman's individual clinical circumstances.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Conditional**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 5**

The standard IMEWS vital signs must be completed contemporaneously and recorded for every set of vital signs unless otherwise clinically indicated (Recommendation 10).

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Recommendation 6**

The technique of measuring, recording and monitoring of vital signs should be undertaken in line with recognised, evidence-based practice.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Good practice points for Recommendations 4-6**

- All standard IMEWS vital signs should be recorded at every set of recordings unless senior medical input has indicated otherwise (Recommendation 10). Always be mindful that having a heightened awareness for one diagnosis does not preclude another. All vital signs are important alongside the clinical context.
- A minimum frequency of observations for women antenatally is 12 hourly. For women postnatally, observations should be taken within 12 hours following arrival on a postnatal ward and then daily as a minimum subsequently. An increase in the frequency of observations may be determined by the doctor.
- Staff should be trained in the correct technique for measuring and recording vital signs.
- If the woman scores any yellow or pink scores, the escalation process should be initiated.
- The IMEWS chart should NOT be used for women in labour, high dependency, recovery and critical care settings. Vital signs for women in labour should be recorded on the partogram or iVIEW for those hospitals/units using the MN-CMS. The first set of observations for each of these areas should be documented on the IMEWS chart and acted on appropriately before transfer to the postnatal ward.
- Please see Appendix 12 for good practice points for the recording of all observations and completing the IMEWS chart

## Theme 2: Escalation of care and clinical communication

<b>Healthcare question 1</b>	What early warning systems or trigger systems (including escalation protocols and communication tools such as ISBAR) are currently in use internationally in pregnant women or women who delivered in the previous 42 days, for the detection of deterioration/timely identification of deterioration in maternity patients? What is the level of clinical validation of these scoring systems including escalation protocols, audit and communication tools?
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### Evidence statement

There were no included studies in the systematic review as the criteria for inclusion were controlled studies and no controlled studies were found. However, there are many peer reviewed articles citing the positive use of structured communication tools, which have been shown to improve staff members perception of communication, job satisfaction, teamwork and safety climate (Beckett and Kipnis, 2009; De Meester et al., 2013; Randmaa et al., 2014; Ting et al., 2017).

ISBAR is the structured communication tool identified for use in the NCEC NCG No. 5 Communication (Clinical Handover) in the Maternity Services and is recommended by the WHO Collaborating Centre for Patient Safety Solutions (WHO Collaborating Centre for Patient Safety Solutions, 2007). See Appendix 13 for the ISBAR tool for patient deterioration and ISBAR<sub>3</sub> for shift handover and inter-department handover.

The NCEC NCG No. 5 cites the following risks associated with clinical handover whether as part of shift or interdepartmental clinical handover or communication of information when escalation of care is required:

- Delay in critical referrals leading to adverse incidents.
- Delay in treatments leading to increased risk of infection and/or exacerbation of infection or illness, which may lead to poor patient outcomes, death or prolonged hospital stays.
- Competence of staff.
- Lack of continuity of care.
- Waste of valuable time when inaccurate and/or incomplete information is provided.
- Inappropriate treatment being provided for patients.

If any of the above risks are present, strategies need to be put in place with timelines to address those risks.

### Recommendation 7

The ISBAR (patient deterioration) and ISBAR<sub>3</sub> (clinical handover) communication tools should be used when communicating clinical information. When a situation is deemed to be critical, this must be clearly stated at the outset of the conversation.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Nursing/ Midwifery, Clinical Director), Doctors, Midwives and Nurses.**



**Good practice points**

- 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 doctor. The designation of who should be called for each trigger (as outlined on the IMEWS escalation guide) should be agreed locally by the senior midwifery and medical 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 anaesthesiologist, haematologist or microbiologist either from within or from outside the maternity unit. Consideration should also be given to contacting neonatology/paediatrics in relation to the baby's wellbeing. Once the patient is clinically stable, it may be necessary to transfer the patient to a HDU or ICU. If this is anticipated, early communications with the HDU/ICU is important. Follow local care pathway for admission.
- 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 sample ISBAR sticker to communicate escalation of care is available in Appendix 13.
- Healthcare professionals should be familiar with the NCEC NCG No. 5 for Communication (Clinical Handover) in Maternity Services.

**Recommendation 8**

Following clinical review, plans must be put in place and clearly documented as part of the IMEWS response.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Good practice points**

- Clinicians should consider the woman's comorbidities and individual risk factors in deciding their monitoring plan.
- A minimum frequency of observations for women antenatally is 12 hourly. A minimum frequency for women postnatally is 12 hours after arrival in the postnatal ward and then 24 hourly as a minimum subsequently. An increase in the frequency of observations may be determined by a doctor.
- A minimum frequency of 4-hourly observations applies to all women under review for infection or hypertension. All standard vital signs should be recorded for these observations.
- Local policies and case-by-case clinical decisions on the frequency of monitoring should be adhered to.
- There are existing guidance documents in place to facilitate high quality and standardised documentation including;
  - o HSE, Standards and Recommended Practices for Health Records Management QPSD-D-006-3 V3.0, 2011
  - o Nursing and Midwifery Board of Ireland, Recording Clinical Practice Professional Guidance, 2015

**Recommendation 9**

The IMEWS escalation guide should be used to identify the clinical escalation steps and response that should be taken in the event of any IMEWS triggers.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Doctors, Midwives and Nurses**

**Good practice points**

- If, at any time, there is a new clinical concern, escalate immediately regardless of the IMEWS.
- The escalation guide describes clear pathways for the notification to the midwife/nurse in charge and obstetrician. The IMEWS escalation guide is printed on the front side of the IMEWS chart.
- All local policies for escalation should comply with the IMEWS escalation guide and should outline who to contact and how to contact them. Where escalation occurs based on clinical concern, please follow local escalation guidelines.

**Recommendation 10**

Variances to IMEWS parameters or the escalation guide may be made by senior medical personnel and should be based on clinical assessment. Parameter changes should be recorded and re-evaluated at a minimum 24 hourly and at each admission.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Conditional**

Responsible for implementation: **Doctors**

**Good practice points**

- The designation of “senior medical personnel” should be agreed locally by senior management.
- All variations, including clinical rationale, planned review and timings for review, must be clearly documented in the woman’s healthcare record.
- Parameter amendment should be made only for women with known or pre-existing conditions affecting their baseline physiological parameters.

### Theme 3: Governance

#### Evidence statement

Published evidence specific to the governance structures and organisational supports required for the effective implementation of obstetric EWS is limited. However implementation requiring a change of practice requires strong foundations including governance, leadership, staff engagement, education and capability in improvement methodology. These supports generate the planning, motivation and culture change necessary to embed new and complex practices.

The National Standards for Better Safer Maternity Care set out *“Formalized governance arrangements ensure that there are clear lines of accountability at individual, team and service levels. Therefore, healthcare professionals, managerial staff and everyone working in the maternity service are aware of their responsibilities and accountability. There must also be arrangements in place to plan and manage service change and transition effectively and safely”* (p108, Health Information and Quality Authority, 2016).

A suite of ten principles for good clinical governance based on national standards and legislation, for the Irish health context, have been developed by the Quality and Patient Safety Directorate (Figure 1), intended as a guide for the development of clinical governance (Health Service Executive, 2012). These principles should be examined in the context of the clinical governance document.



**Figure 1:** Guiding principles for clinical governance

**Recommendation 11**

The Master or CEO, Clinical Director and Director of Midwifery/Nursing of each hospital and the Chief Executive Officer of the hospital groups are accountable for the local operation of the IMEWS. The HSE NWIHP should ensure that there is a governance structure in place nationally for the implementation and, if necessary, the revision of IMEWS.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

**Recommendation 12**

A local governance group should oversee the implementation and ongoing review of IMEWS recognition and response systems locally.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

**Good practice points**

- The governance for IMEWS implementation may be incorporated into existing early warning system governance structures, and should
  - o Have appropriate responsibilities delegated and be accountable for its decisions and actions
  - o Monitor the effectiveness of interventions and training
  - o Have a role in reviewing performance data and audits
  - o Provide advice about the allocation of resources
- An Initials/Signature Bank should be maintained in each hospital according to local guidelines.

**Recommendation 13**

The local governance group should identify and support named individuals to oversee local IMEWS implementation.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

**Good practice points**

- IMEWS midwifery/nursing and medical consultant leads for each site should be identified
- IMEWS champions should be named at ward level to facilitate questions/queries from colleagues or women and continue to promote compliance with completion of the observation charts and the escalation guide

**Recommendation 14**

A local governance group should support additional safety practices (e.g. incorporating briefings, safety pause and huddles) and implementation of relevant guidelines (e.g. NCEC National Clinical Guideline No. 5: Communication (Clinical handover) in Maternity Services) to enhance the IMEWS and lead to a greater situational awareness among clinicians and multidisciplinary teams.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Conditional**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.**

**Good practice points**

- The use of huddles/safety pauses may assist with managing an environment where multiple women require simultaneous escalation
- Shared learning and a need for quality improvement capability will be required by all early warning system and safety intervention teams
- Healthcare professionals involved in the use of IMEWS should also be familiar with other relevant clinical practice guidelines for maternity including but not limited to:
  - o Guidelines for the clinically ill woman in obstetrics
  - o Preterm Prelabour Rupture of Membranes
  - o Venous Thromboprophylaxis in Pregnancy
  - o The Management of Hypertension in Pregnancy
  - o Bacterial Infections Specific to Pregnancy
  - o Diagnosis and management of pre-eclampsia and eclampsia

All clinical practice guidelines are available through the NWIHP section of the HSE website <http://tiny.cc/NWIHP>

## Theme 4: Education, Audit and Evaluation

<b>Healthcare question 2</b>	What education programmes have been established to train healthcare professionals in the delivery of MEWS? What level of evaluation has been used for these education programmes?
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### Evidence statement

This current review did not identify any evaluations of education programmes in the delivery of early warning scores or systems. The previous review found that education and training appeared to assist in improving compliance rates with maternal early warning systems, and that compliance diminished over time (Allman et al., 2010; Helme et al., 2012; Maguire et al., 2015a; O'Connor and Reid, 2010; Ram et al., 2013).

Recommendations from the included clinical audit literature (18 obstetric audits) include education and training for midwifery and obstetric staff (references listed in Annex 1: systematic review). What form this education should take, how often it should be conducted, who should deliver and attend is not clear from the literature.

The original education programme was delivered in 2013/2014 to all healthcare staff. This was shared by the IMEWS development group members that travelled to different sites nationally alongside the Centre for Midwifery Education (CME) in Dublin which used a train-the-trainer model. This was considered a success as all 19 units were capable of effectively implementing IMEWS. However, this model has difficulties in both a lack of national standardisation and uncertainty about who should deliver training. High turnover of staff results in the loss of the training knowledge and robust sustained education and training has diminished over time.

The workshop held in November 2017 on IMEWS strongly highlighted the desire amongst the frontline healthcare staff for dedicated support for both education/training and audit.

### Recommendation 15

Clinical staff in both maternity and general hospitals should receive education and training in IMEWS. They should know how to call for emergency assistance if they have any concerns about a woman, and know who they should call under these circumstances. This information should be provided at the start of employment and as part of regular refresher education and training.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses in conjunction with the Hospital Group IMEWS Coordinator (Recommendation 17).**

**Practical guidance for implementation**

- Training for the implementation of the IMEWS education programme will be delivered in two ways. The first is an e-learning programme hosted on HSEland ([www.hseland.ie](http://www.hseland.ie)) and the second is through local, clinically-based ward training sessions.
- The e-learning module is a 60-minute course that will provide all the required learning points to successfully use the IMEWS chart including formative assessments and a case study. A certificate of completion will be available.
- The clinically-based ward training sessions are a means to continuous ongoing multidisciplinary training in a real-life situation where questions and answers can be facilitated.
- Frequency of the online education programme and ward-based training sessions will at the discretion of the local governance group and hospital management.
- This guideline alongside the supporting tools and e-learning links will be located on the clinical guideline section of the National Women and Infants Health Programme website (<http://tiny.cc/NWIHP>) and at the NCEC, Department of Health ([http://tiny.cc/NCEC\\_NCGs](http://tiny.cc/NCEC_NCGs)).

**Good practice points**

- A record of attendance and completion of training for all relevant clinical staff should be maintained locally.
- All healthcare providers using IMEWS should be familiar with relevant guidelines associated with IMEWS that are linked from the e-learning programme but not included in the 60-minute timeframe for training.
- Hospital group midwife/nurse in charge of education and audit for IMEWS should link in with the local IMEWS coordinators to facilitate open communication, organisation and quality improvement requirements.
- All medical, midwifery and nursing staff should be able to:
  - o Systematically assess a patient
  - o Appropriately complete the IMEWS observational chart
  - o Understand and interpret abnormal physiological parameters and other abnormal observations
  - o Initiate appropriate early interventions for patients who are deteriorating
  - o Respond with life-sustaining measures in the event of severe or rapid deterioration pending the arrival of emergency assistance
  - o Communicate information about clinical concern in a structured and effective way to the doctor or team responsible, to clinicians providing emergency assistance and to women, families and carers
  - o Undertake tasks required to properly respond to women who require escalation of care such as developing a clinical management plan, writing plans and actions in the healthcare record and organising appropriate follow up.



<b>Healthcare question 1</b>	What early warning systems or trigger systems (including escalation protocols and communication tools such as ISBAR) are currently in use internationally in pregnant women or women who delivered in the previous 42 days, for the detection of deterioration/timely identification of deterioration in maternity patients? What is the level of clinical validation of these scoring systems including escalation protocols, audit and communication tools?
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## Evidence statement

The systematic review did not identify a standard set of criteria for audit. The 18 obstetric clinical audits included in the review highlight that compliance rates with early warning scores and with documentation and escalation policies is often inadequate (references listed in the annex for the systematic review). Routine audit was suggested by a number of included audits as a way of increasing compliance and accuracy. The remaining clinical audits in paediatric, general and emergency department populations reported similar rates of inadequate compliance and also suggested regular audit as a mechanism to increase compliance.

Taking steps to conduct audit at all levels of healthcare are required under the “National Standards for Safer Better Healthcare” (Health Information and Quality Authority, 2012) and supports are outlined in “A Practical Guide to Clinical Audit” (Quality and Patient Safety Directorate, 2013).

### Recommendation 16

Audit data should be collected and reviewed locally and overseen nationally regarding the implementation and effectiveness of IMEWS.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **The local hospital management (Recommendation 13) in consultation with the local IMEWS and Hospital Group IMEWS Coordinator (Recommendations 14 and 17) and the NWIHP.**

### Good practice points

- Where necessary, IMEWS audits should inform the continuous quality improvement process.
- Audits should span all areas where IMEWS is used.
- Those units using electronic records (MN-CMS) may have the means to collect a further subset of data that should be collated nationally but may be facilitated by the Hospital Group Education and Audit Coordinator (Recommendation 17). These may include:
  - Number of times IMEWS is triggered annually
  - Basic patient outcome measures (e.g. hospital length of stay (LOS), transfer to HDU, ICU, ICU length of stay, unexpected death)
  - Number of cases of serious adverse clinical outcomes when the IMEWS was not triggered
  - Clinical outcomes of adverse outcomes when IMEWS was triggered.



**Practical guidance for implementation**

- In order to successfully complete the required KPI for the Business Information Unit (BIU)(See Appendix 9). The following audits should be conducted:
  - a) **the chart completion audit** should be undertaken monthly with a minimum of 10 charts per clinical area/ward for your maternity hospital/unit OR 10 charts annually for pregnant or postpartum women in the general hospitals without maternity units
  - b) **the escalation and response audit** should be undertaken quarterly with a minimum of 15 escalation episodes per clinical area/ward for your maternity hospital/unit OR 10 episodes annually for pregnant or postpartum women in the general hospitals without maternity units.
- The recommended standard required for process audits is 100% compliance. Where compliance is <80%, local actions plans should be put in place e.g. increase the frequency of audits, training and identifying problem areas.
- Audit results should be discussed at the local governance group meetings and any other appropriate hospital forum as required.
- A review of the audit tools should be done annually, led by the NWIHP and facilitated by the hospital groups IMEWS Education and Audit Coordinators.

**Recommendation 17**

The management of IMEWS (in both maternity and acute hospitals) should be delegated to specifically appointed healthcare professionals in each hospital network. This 'Hospital Group IMEWS Coordinator' should preferably have midwifery experience and job responsibilities should include education and audit for IMEWS.

Quality/level of evidence: ⊕○○○

Strength of recommendation: **Strong**

Responsible for implementation: **The National Women and Infants Health Programme (NWIHP)**

**Practical guidance for implementation**

- Frontline ownership of education, audit and monitoring should be in place to promote good practice, facilitate effectiveness, local improvements, responsibility and ownership. However, group level support facilitates shared learning and joint initiatives for improvement. Group level support will also be helpful to the general hospitals.
- Staff dedicated to IMEWS will allow for clear governance and accountability. The selection of a coordinator is important as successful implementation is reflective of the quality of training provided.

**Recommendation 18**

IMEWS should be supported through the application of quality improvement methods, such as engagement strategies, testing and measurement to ensure successful implementation, sustainability and future progress.

Quality/level of evidence: **No included studies**

Strength of recommendation: **Conditional**

Responsible for implementation: **Local hospital management (Recommendation 13), Doctors, Midwives and Nurses**

**Good practice points**

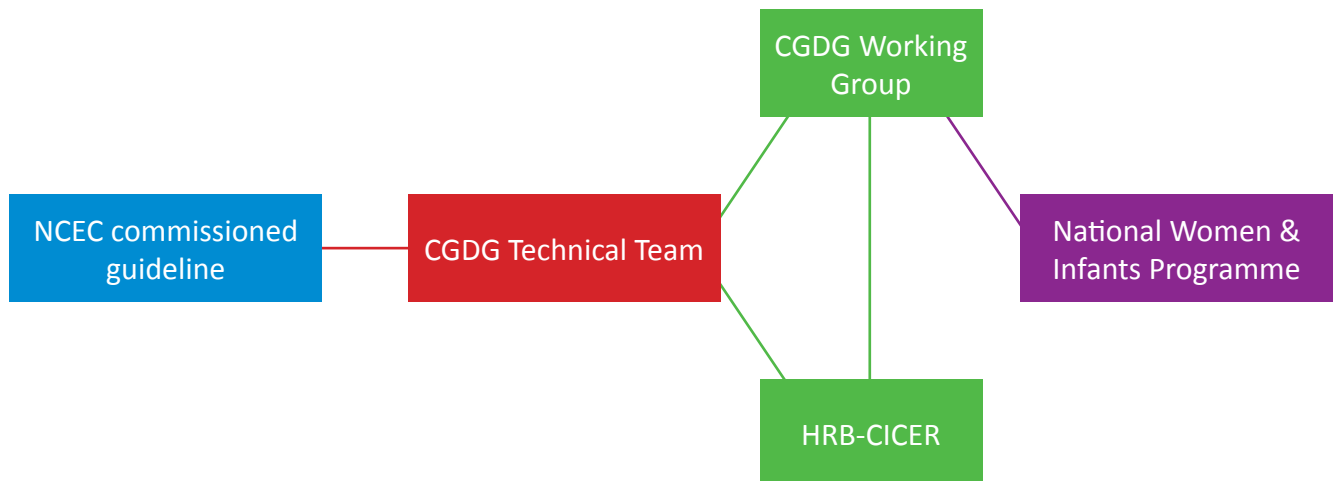
- Quality improvement methodology facilitates successful implementation by:
  - Adapting effective interventions for new contexts
  - Helping to formulate theories of change
  - Identifying, understanding and mobilising stakeholders
  - Providing clarity of goals
  - Breaking down large tasks to key components
  - Using measurement to drive change
  - Testing ways to perform key processes reliably
  - Supporting innovation and frontline ownership.
- Shared learning and a need for quality improvement capability will be required by all early warning system and safety intervention teams.
- Healthcare providers should be familiar with the “Framework for Improving Quality in our Health Service, 2017”.

## 4

## Appendices

## Appendix 1: Childbirth GDG terms of reference

**Governance Overview & Terms of Reference  
Childbirth Guideline Development Group (CGDG)**



CICER Collaboration in Ireland for Clinical Effectiveness Reviews

CGDG Childbirth Guideline Development Group

HRB Health Research Board

NCEC National Clinical Effectiveness Committee

### CGDG Technical Team Membership

Chair	Professor Michael Turner
Project Manager	Dr Karen Power
Guideline co-ordinator	Ms Caroline Plascott
HRB-CICER representatives	Ms Shelley O'Neill, Dr Barbara Clyne
Quality Assurance	Dr Léan McMahon

### CGDG Technical Team Terms of Reference

1. Appoint membership to the CGDG Working Group
2. Approve Terms of Reference and Governance structures for the project
3. Work consistently to facilitate collaboration and communications between NCEC, HRB-CICER and CGDG
4. Review and approve the final output document prepared by the working group
5. Get endorsement from HSE Corporate as per NCEC guidelines
6. Keep the CGDG working group within agreed timeframe to the best ability

**CGDG Working Group Terms of Reference**

1. Develop a National Clinical Guideline on “Clinical Risk in Pregnancy” using evidence-based approach where possible.
2. Review and revise other NCEC commissioned childbirth related guidelines where appropriate.
3. Use the findings from the literature search and economic assessment provided by HRB-CICER to develop and agree recommendations appropriately.
4. Provide feedback on relevant areas of expertise when required
5. Work within required time frame of 2 years

**Quorum**

The CGDG Working Group must have at least one third of its membership present in person or via teleconference (exclusive of the Project Team members).

**Meetings**

Meetings will take place bimonthly in Dublin. Teleconferencing facilities will be provided and notification of attendance by teleconference and apologies should be sent prior to the meeting.

**Conflict of Interest**

Each participant on the group will be asked to sign a form declaring any conflict of interest. Any conflict of interest that arises during the term of membership must be disclosed as soon as possible.

**Meeting documentation**

Meeting minutes will be taken by the project manager or nominated person and will be sent alongside the agenda and any other supporting documentation via email in advance of the next meeting.

## Appendix 2: Search strategy and results

The search strategy for objectives 1 to 5 (Appendix 3) identified 440 potentially relevant references through searching listed databases and grey literature. After the exclusion of duplicates, 293 records were screened, with a further 229 references excluded based on titles and abstracts. A total of 64 full-text articles were assessed for eligibility. Of these, 52 references were excluded according to the inclusion and exclusion criteria. The reasons for exclusion were: not about MEWS (18); commentary/review papers (16); descriptive studies (16); no control group for effectiveness studies (1); outcome (1). This resulted in 12 studies being included in the review update. Table A1 represents the study flowcharts following the PRISMA guidelines for these objectives.

The search strategy for objective 6 (Appendix 3) identified 2,667 potentially relevant references through searching listed databases and grey literature. After the exclusion of duplicates, 2,363 records were screened, with a further 2,259 references excluded based on titles and abstracts. A total of 104 full-text articles were assessed for eligibility. Of these, 43 references were excluded according to the inclusion and exclusion criteria. The reasons for exclusion were: not an audit (26); not early warning system (9); opinion/commentary (5); registered study only (1); duplicate (1); outcome not relevant (1). This resulted in 61 studies being included in the narrative summary. Table A2 represents the study flowcharts following the PRISMA guidelines for this objective.

See sample search strategies below.

**Table A1:** Sample search strategy for objectives 1 to 5

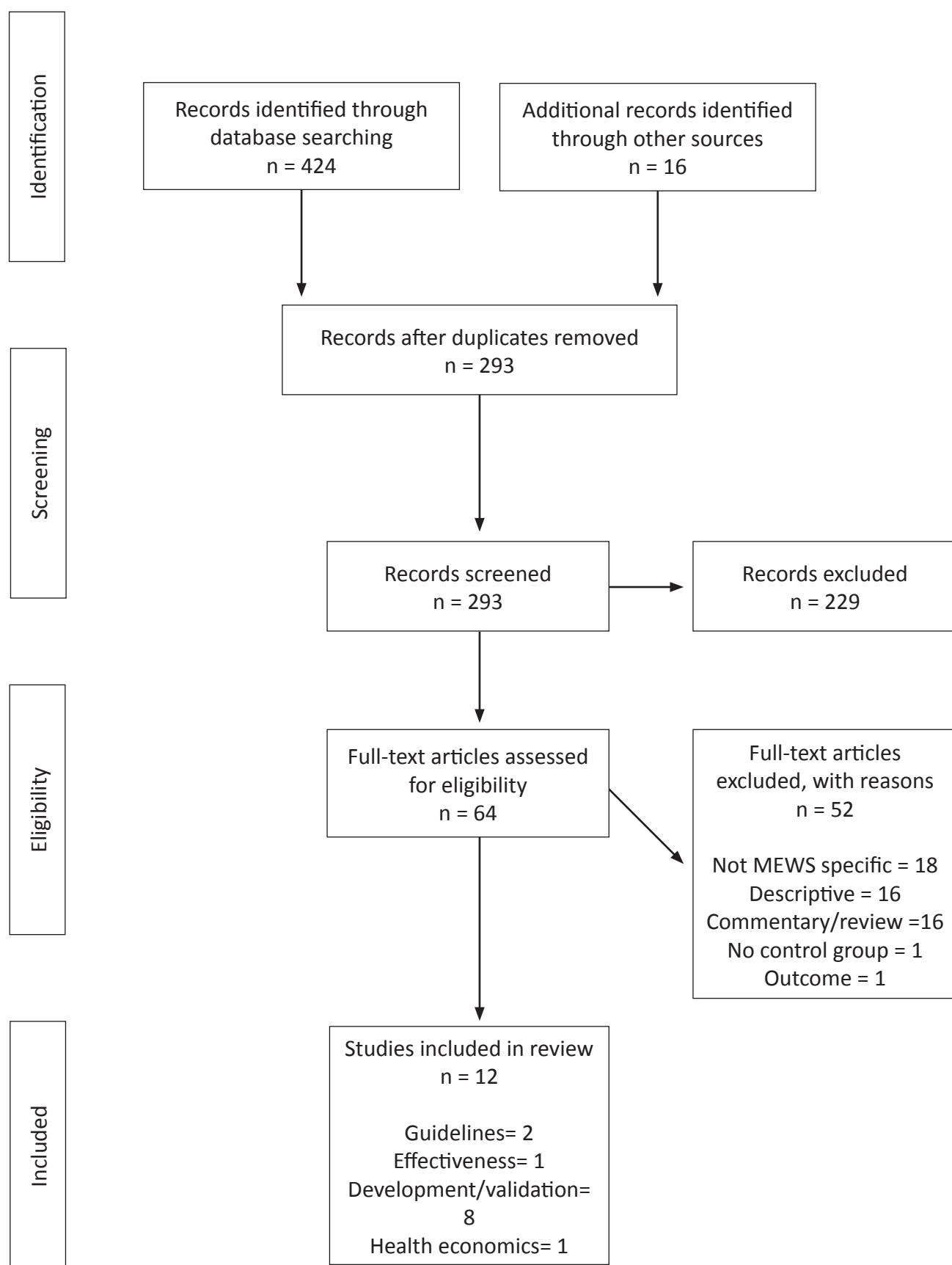
	<b>MEDLINE (via Ovid) 05.10.17</b>	<b>N=72</b>
1.	exp Pregnancy/	878,141
2.	exp Pregnancy Complications/	416,452
3.	exp Obstetric Surgical Procedures/	129,948
4.	exp Prenatal Care/	25,032
5.	exp Postpartum Period/	60,591
6.	Hospitals, Maternity/	2,897
7.	exp Maternal Health Services/	44,455
8.	Nurse Midwives/ or Midwifery/	41,780
9.	exp Obstetrics/	22,437
10.	(antenatal or prenatal or perinatal or puerperal or puerperium or postnatal or postpartum or peripartum or post-natal or post-partum or ante-natal or ante-partum or obstetric*).tw.	342,808
11.	or/1-10	1,105,254
12.	(mews or meows or moews or IMEWS).tw.	151
13.	(early adj warnin g).mp.	3,901
14.	(warning adj systems).mp.	655
15.	(warning adj system).mp.	1,230
16.	(warning adj score*).mp.	436

17.	(track adj2 trigger).tw.	73
18.	(trigger* adj4 score*).tw.	107
19.	(escalation adj protocol*).mp	128
20.	(escalation adj policy).mp.	7
21.	(escalation adj policies).mp.	4
22.	POTTS.ti,ab.	1,453
23.	or/12-22	6,212
24.	11 and 23	196
25.	Limit 24 to yr=2014-2017	72

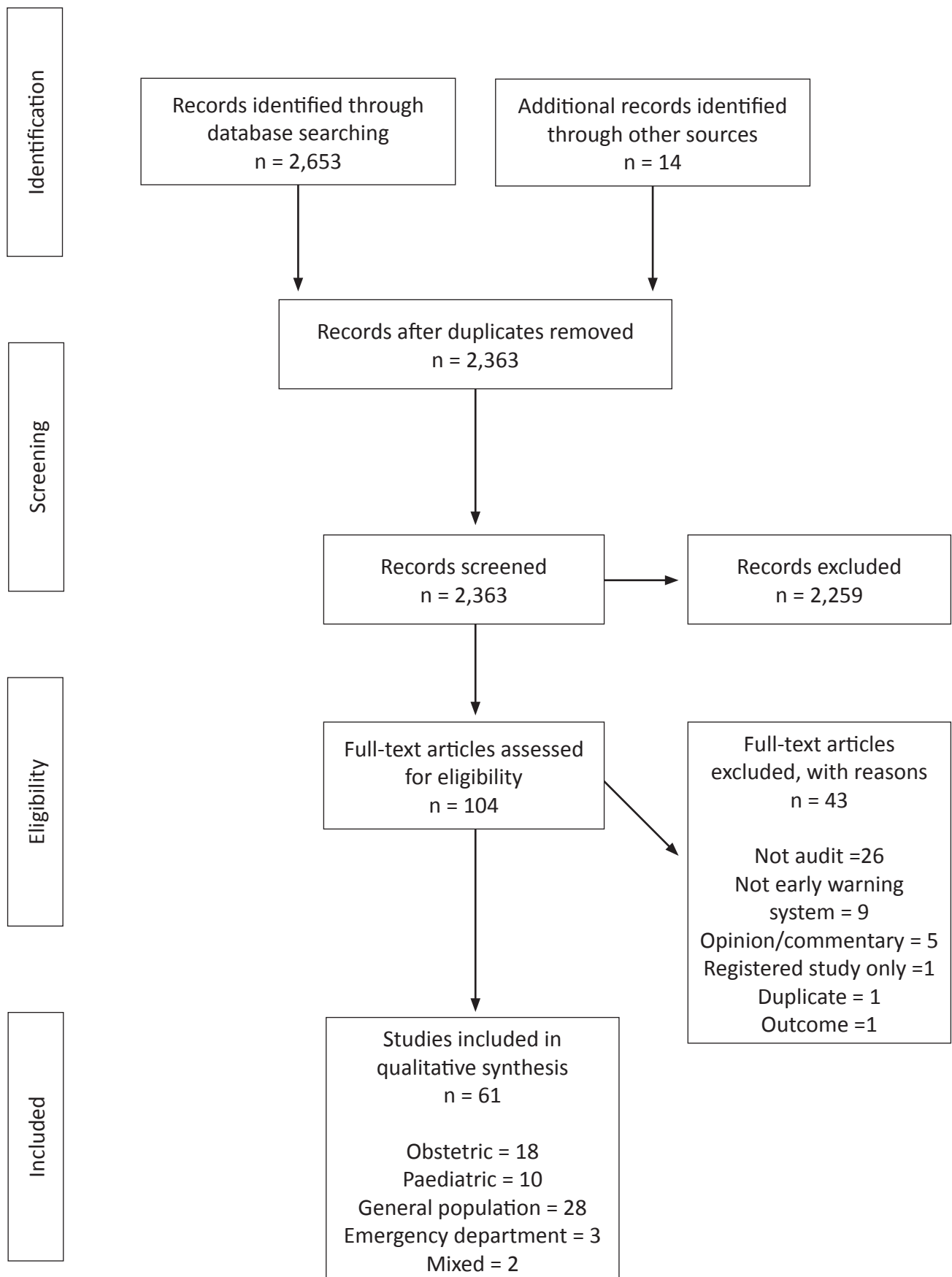
**Table A2:** Sample search strategy for objective 6

	<b>Medline (ovid) 10.10.17</b>	<b>N= 363</b>
1.	Audit.af	41,468
2.	exp Clinical audit/	21,895
3.	Exp medical audit/	17,200
4.	exp Quality Assurance, Health Care/	311,257
5.	exp Quality Improvement/	17,030
6.	exp quality control/	47,539
7.	(Quality adj administration).mp.	22
8.	Key performance indicat*.tw.	388
9.	(performance adj indicat*).tw.	3,119
10.	KPI*.tw.	463
11.	OR/1-10	386,361
12.	(clinical adj deteriorat*).ab,ti.	3675
13.	(detect* adj deteriorat*).ab,ti.	115
14.	(risk adj assessment).tw	42,442
15.	(early adj warning).mp.	3,901
16.	(warning adj system*).mp.	655
17.	(warning adj score*).mp.	1,770
18.	(track adj2 trigger).tw.	73
19.	(trigger* adj4 score*).tw.	107
20.	(escalation adj protocol*).mp	128
21.	(escalation adj polic*).mp.	11
22.	emergency response system.tw.	99
23.	Patient at Risk score.ab,ti.	3

24.	"Physiological Scoring System*".ab,ti.	28
25.	Vital Sign Score.ab,ti.	8
26.	(Manchester Protocol or Manchester system or Manchester Triage).ti,ab.	156
27.	BioSign.ab,ti.	10
28.	VitalPAC.ab,ti.	17
29.	Between the flags.ab,ti.	12
30.	Worthing.ab,ti.	44
31.	(Pediatric Early Warning Score or neonatal Early Warning Score).ab,ti.	23
32.	(mews or meows or IMEWS or PEWS).ab,ti.	198
33.	sbar.mp.	148
34.	OR/12-33	8830
35.	11 AND 34	363

**Figure A1:** PRISMA Flow chart of included and excluded studies: Objectives 1-5



**Figure A2:** PRISMA Flow chart of included and excluded studies: Objective 6

## Appendix 3: Commissioned systematic review summary

HRB-CICER was commissioned to undertake this systematic review. The full review is in Annex 1.

### Background and objectives

Maternity early warning systems or physiological track and trigger systems are bedside tools that are used for monitoring the condition of hospitalised pregnant and postnatal women, to facilitate early detection and management of clinical deterioration. In 2013, the Irish Maternity Early Warning System (IMEWS), developed for the early detection of life threatening illness in pregnancy and the postnatal period in hospitalised patients, was introduced into Irish hospitals. It was updated in 2014 as part of the development of National Clinical Guideline (No 4). The IMEWS is a paper chart completed using clinical case notes. Vital signs (respiration rate, oxygen saturation, temperature, heart rate, blood pressure, urine, neurological response) recorded on charts are colour coded according to their value, using predefined thresholds for abnormalities. If a patient breaks or triggers these thresholds, an escalation of care should be initiated. National Clinical Guideline (No 4) was based on a systematic review of the underpinning clinical effectiveness and cost-effectiveness literature up to April 2014. The IMEWS guideline is now being reviewed and updated. The purpose of this systematic literature review was to update the available clinical effectiveness and cost-effectiveness literature, so that any changes in the totality of the evidence on early warning systems for use in maternity care can inform updates to this National Clinical Guideline. This involved two systematic reviews:

1. An update of the previous systematic review of clinical effectiveness and cost-effectiveness conducted to support the development of the IMEWS guideline.
2. A new systematic review search to identify clinical audits of early warning systems.

### Methods

To update the previous systematic review of the literature conducted to support the development of the IMEWS guideline:

- A comprehensive search of PubMed, EMBASE, CINAHL, the Cochrane Library, MIDIRS, ASSI, HMIC and Global Index Medicus and a comprehensive grey literature search was conducted from April 2014 to October 2017, using combinations of keywords and medical subject headings (MeSH) terms
- Studies were assessed against inclusion and exclusion criteria and the following categories of studies and reports conducted in obstetric care settings were included: guidelines, effectiveness studies, development and validation studies, and health economic studies
- Two review authors independently assessed studies for inclusion, conducted data extraction, assessed risk of bias, and checked for accuracy
- The quality of the evidence was assessed using the Cochrane GRADE approach
- A narrative summary of included studies was conducted.

To identify clinical audits of early warning systems (not just maternity early warning systems) in any hospital care setting including obstetric, paediatrics, general inpatients and emergency departments:

- A comprehensive search of PubMed, EMBASE, CINAHL, the Cochrane Library, MIDIRS, ASSI, HMIC and Global Index Medicus and a comprehensive grey literature search was conducted from database inception to October 2017, using combinations of keywords and medical subject headings (MeSH) terms
- Studies were assessed against inclusion and exclusion criteria
- Two review authors independently assessed studies for inclusion, conducted data extraction, assessed study quality, and checked for accuracy
- A narrative summary of included studies was conducted.

**Results: Review update**

From 293 studies assessed for eligibility, one effectiveness study, eight development and/or validation studies, and one health economics study were identified. Two references to the current IMEWS guideline were also identified and were not included in the analysis.

One controlled before and after study found severe maternal morbidity was significantly reduced after the introduction of a clinical pathway-specific Maternal Early Warning Trigger, however, this was only one study with a high risk of bias.

Eight studies on the development/validation of maternity early warning systems were identified. The majority of studies were conducted in high-risk populations and reported mortality or severe morbidity outcomes but there was generally a high risk of bias in these studies. There was wide variation reported in parameters depending on the maternal early warning system used, with only respiratory rate and blood pressure being common to all systems.

We identified only one conference abstract that provided cost-effectiveness data (based on the identified controlled before and after study) which found that the use of a maternal early warning trigger tool reduced severe maternal morbidity which resulted in significant cost savings.

**Results: Clinical audits**

From 2,363 studies assessed for eligibility we identified 61 clinical audit studies. Eighteen of these were specifically related to obstetric patients, ten to paediatric patients, 28 related to general patient populations, three to emergency department populations and two studies evaluated a number of different early warning scores across patient populations. The 18 obstetric clinical audits included in this review highlight that compliance rates with early warning scores and with documentation and escalation policies is often poor. Education and training, routine audit, implementation of software systems and having clear escalation protocols were suggested as ways of increasing compliance and accuracy. The remaining clinical audits in paediatric, general and emergency department populations reported similar rates of poor compliance and also suggested education and training and routine audit as mechanisms to increase compliance.

**Conclusions**

A number of maternal early warning systems have been developed. Studies have examined both the performance of these systems and their effectiveness in terms of clinical outcomes. However, the conduct and reporting of these studies is generally poor with high risk of bias and clinical audits tend to be inadequately described. Overall, the results of this systematic review demonstrate the literature in this area has not evolved substantially from the last review conducted to support the development of the IMEWS guideline, and there is limited new evidence to inform changes to the previous recommendations.

Future research should focus on improving reporting, development and validation studies and conducting high quality effectiveness studies and health economic studies allowing for the conduct of more robust analysis to inform decision making.

## Appendix 4: PICO for the healthcare questions

The healthcare questions for this review were as follows:

1. What early warning systems or track and trigger systems (including escalation protocols and communication tools such as ISBAR (Identify, Situation, Background, Assessment and Recommendation)) are currently in use internationally in pregnant women or women who delivered in the previous 42 days, for the detection of deterioration/timely identification of deterioration in maternity patients? What is the level of clinical validation of these scoring systems including escalation protocols, clinical audit and communication tools?
2. What education programmes have been established to train healthcare professionals in the delivery of MEWS? What level of evaluation has been used for these education programmes?
3. What are the findings from the economic literature of cost effectiveness, cost impact and resources involved with early warning or track and trigger systems in the detection of deterioration/timely identification of deterioration in pregnant women or women who delivered in the previous 42 days, including implementation costs?

To answer the review questions, six discrete, yet complementary, objectives were defined:

<b>Objective 1</b>	To describe the education programmes, including their evaluation, that have been established to train healthcare professionals and other non-professional staff in the delivery of MEWS
<b>P (Population)</b>	Healthcare professionals using early warning systems, track and trigger systems, escalation protocols or communication tools in maternity care settings
<b>I (Intervention)</b>	Education programmes focused on: <ul style="list-style-type: none"> <li>- early warning systems or track and trigger systems, which rely on periodic observation of selected basic physiological signs with predetermined calling or response criteria for escalating care to facilitate prompt recognition of clinical deterioration</li> <li>- escalation protocols or communication tools used in combination with, or as an adjunct to, early warning systems or track and trigger systems</li> </ul>
<b>C (Comparison)</b>	Usual care, alternative intervention
<b>O (Outcome)</b>	Use of/compliance with early warning systems, track and trigger systems and escalation protocols
<b>Study design</b>	Studies with a controlled design, that is, RCTs, non-RCTs, controlled before-and-after studies and interrupted time series designs

<b>Objective 2</b>	To identify and quality assess clinical guidelines on the use of early warning or track and trigger systems in pregnant women or women who gave birth in the previous 42 days for the detection of deterioration/timely identification of deterioration
<b>P (Population)</b>	Women who were clinically pregnant or who delivered at any gestation within the previous 42 days
<b>I (Intervention)</b>	Clinical guidelines (regional, national, international)
<b>O (Outcome)</b>	Number and type of clinical guidelines (regional, national, international). Key recommendations of guideline.
<b>Study design</b>	Regional, national and international reports on guidelines on early warning systems, track and trigger systems and escalation protocols or communication tools

<b>Objective 3</b>	To evaluate the clinical effectiveness of early warning or track and trigger systems on pregnancy, labour and birth, postpartum (up to 42 days) and neonatal outcomes
<b>P (Population)</b>	Women who were clinically pregnant or who delivered at any gestation within the previous 42 days
<b>I (Intervention)</b>	<ul style="list-style-type: none"> <li>• Early warning systems or track and trigger systems, which rely on periodic observation of selected basic physiological signs with predetermined calling or response criteria for escalating care to facilitate prompt recognition of clinical deterioration</li> <li>• Escalation protocols or communication tools used in combination with, or as an adjunct to, early warning systems or track and trigger systems</li> </ul>
<b>C (Comparison)</b>	Non-use of systems or use of alternative systems of physiological monitoring
<b>O (Outcome)</b>	Pregnancy, labour and birth, and postpartum outcomes: <ul style="list-style-type: none"> <li>• Maternal death</li> <li>• Maternal critical illness (maternal collapse – cardiac or respiratory arrest, haemorrhage, sepsis, eclampsia, etc.)</li> <li>• ICU admission</li> <li>• Length of hospital stay (days)</li> </ul>
<b>Study design</b>	Studies with a controlled design i.e. RCTs, non-RCTs, controlled before-and-after studies, interrupted time series designs

<b>Objective 4</b>	To describe the development and validation of such early warning or track and trigger systems
<b>P (Population)</b>	Women who were clinically pregnant or who delivered at any gestation within the previous 42 days
<b>I (Intervention)</b>	<ul style="list-style-type: none"> <li>• Early warning systems or track and trigger systems, which rely on periodic observation of selected basic physiological signs with predetermined calling or response criteria for escalating care to facilitate prompt recognition of clinical deterioration</li> <li>• Escalation protocols or communication tools used in combination with, or as an adjunct to, early warning systems or track and trigger systems</li> </ul>
<b>O (Outcome)</b>	<ul style="list-style-type: none"> <li>• Sensitivity and specificity of early warning system or track and trigger system for adverse outcome/critical illness criterion</li> <li>• Positive predictive value and negative predictive value of early warning system or track and trigger system for adverse outcome/critical illness criterion</li> </ul>
<b>Study design</b>	<p>Development studies: focused on the development of early warning or track and trigger systems. Studies were recorded as 'development' studies if reference ranges, parameters, cut-offs, and/or design of scoring systems were identified based on the outcomes of the study sample (for example, through the use of receiver operating characteristics [ROC] curves).</p> <p>Validation studies: focused on the predictive ability of early warning or track and trigger systems in a new sample of women (i.e. a sample that differs from the sample used to develop the system).</p>

<b>Objective 5</b>	To evaluate the cost effectiveness, cost impact and resources involved with early warning or track and trigger systems
<b>P (Population)</b>	Women who were clinically pregnant or who delivered at any gestation within the previous 42 days
<b>I (Intervention)</b>	<ul style="list-style-type: none"> <li>• Early warning systems or track and trigger systems, which rely on periodic observation of selected basic physiological signs with predetermined calling or response criteria for escalating care to facilitate prompt recognition of clinical deterioration</li> <li>• Escalation protocols or communication tools used in combination with, or as an adjunct to, early warning systems or track and trigger systems</li> </ul>
<b>C (Comparison)</b>	One or more standard treatments
<b>O (Outcome)</b>	Healthcare resource use and expenditure including costs associated with direct medical resource use (staff time, education input, additional referrals), indirect costs (associated with lost or reduced productivity) and other non-medical costs (such as patient out of pocket expenses) associated with early warning system or track and trigger system use; cost savings, cost effectiveness measures e.g. Incremental cost-effectiveness ratio (ICERs), Quality-adjusted life years (QALYs)
<b>Study design</b>	Full economic evaluation studies (cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis), cost analysis and comparative resource use studies. These could include RCTs or any study that met the eligibility criteria for the review of intervention effects.

<b>Objective 6</b>	To identify and describe clinical audits of any early warning system
<b>P (Population)</b>	Healthcare professionals using early warning systems, track and trigger systems, escalation protocols or communication tools in any hospital care setting including obstetric, paediatrics, general inpatients and emergency departments
<b>I (Intervention)</b>	Early warning systems or track and trigger systems, which rely on periodic observation of selected basic physiological signs with predetermined calling or response criteria for escalating care to facilitate prompt recognition of clinical deterioration
<b>O (Outcome)</b>	Use of and compliance with early warning systems, trigger systems and escalation protocols or communication tools nationally and internationally
<b>Study design</b>	Clinical audits: process that aims to improve patient care and outcomes by systematic and structured review and evaluation of clinical care against explicit clinical standards (National Clinical Effectiveness Committee, 2015)

## Appendix 5: Consultation report

As part of the consultation process, the draft guideline was circulated for review to this list of groups, committees and organisations. The review request was circulated on the 14th August 2018 with a deadline of 28th August 2018.

<b>Clinical leaders and healthcare managers</b>	Masters/Clinical Directors for all 19 maternity hospitals/units Directors of Midwifery for all 19 maternity hospitals/units Clinical Directors of the six hospital groups Chief DON/M's of the six hospital groups Designated IMEWS contacts in all 19 maternity hospitals/units Designated IMEWS contacts for the general hospitals
<b>National Groups</b>	Office of Nursing and Midwifery Services Director Nursing Midwifery Planning & Development Deteriorating Patient Recognition & Response Improvement Programme Clinical Programme Anaesthesia Clinical Programme Sepsis
<b>International Review</b>	<ol style="list-style-type: none"> <li>1. Ms Rachel Scanlan, RM, MSc, Practice and Standards Professional Advisor, The Royal College of Midwives UK</li> <li>2. Dr Clare Willocks, Consultant Obstetrician and Gynaecologist, and National Obstetric Lead, Maternity &amp; Children Quality Improvement Collaborative, Healthcare Improvement Scotland</li> <li>3. Dr Audrey Quinn, Consultant Neuro- and Obstetric Anaesthetist, James Cook University Hospital, Middlesbrough, Honorary Associate Clinical Professor Leeds University</li> </ol>



## Appendix 6: Economic assessment

### Part A: Economic evidence summary

*Report completed by HRB-CICER*

#### Introduction and Methods

A systematic economic literature search for evidence of cost effectiveness was undertaken in conjunction with the clinical literature review, as described in Appendix 3. A comprehensive search was conducted from April 2014 to October 2017. The full list of literature sources searched is listed in Appendix 2 and included relevant databases such as Medline, NHS Economic Evaluation Database, Health Technology Assessment Database and Cochrane Database of Systematic Reviews.

#### Summary and Results

The systematic review conducted to support the original guideline found no studies reporting on any aspect of economic analysis for inclusion. Only one health economics study was identified for this update. This study was available in abstract form only and was therefore not quality assessed. It was not possible to assess the transferability of the findings to the Irish context, however it did highlight the potential for significant cost savings through improved patient outcomes.

The authors confirmed that this study was based on data from the only clinical effectiveness study (Shields et al., 2016) identified in the clinical literature review. The study assessed the cost-effectiveness of the MEWT in the reduction of severe maternal morbidity and maternal mortality during delivery hospitalizations using a decision-analytic model. In a theoretical cohort of 4 million women, the MEWT tool led to a 14.6% reduction in maternal mortality, 20% reduction in overall rates of severe maternal morbidity, 33% reduction in hysterectomy, and an 80% reduction in eclampsia. Improvement in these outcomes translated to an additional 40,000 maternal QALYs and cost savings of nearly \$US 330 million for the cohort of 4 million women.

### Part B: Budget impact analysis summary

The full budget impact analysis (BIA) is presented in Annex 2 ([http://tiny.cc/NCEC\\_NCGs](http://tiny.cc/NCEC_NCGs)). There are two key changes that will occur as a result of implementation of the guideline recommendations and these were considered within the BIA. Firstly, the CGDG is recommending the creation of six new posts, one per hospital group (excluding the Children's Hospital Group). It is planned that these staff will assume responsibilities for providing education (that is education apart from e-learning) and training on IMEWS to staff members in the maternity and acute hospitals within their hospital group. These staff will also oversee regular local audits of IMEWS. The cost of employing six additional staff was estimated at a cost of €2.2 million over a five year period. Secondly, the CGDG is recommending an e-learning training model. Development of the e-learning module cost €26,775. There are a number of approaches that can be adopted with regard to staff education in IMEWS including:

- Scenario 1 educating all clinical staff (doctors, nurses, midwives) involved in providing maternity care only.
- Scenario 2 educating all clinical staff (doctors, nurses, midwives) in maternity hospitals and in general hospitals with maternity units.
- Scenario 3 educating all clinical staff (doctors, nurses, midwives) across all hospitals.

This range of scenarios which reflect the models of current practice, were considered within the BIA. The opportunity cost for staff education including the e-learning module was estimated at €369,845 (Scenario 1), €1.5 million (Scenario 2) and €3.0 million (Scenario 3) over a five year period.

Overall, the cost of employing six additional staff and changing to an e-learning model is estimated to lead to a BIA of between €2.6 million and €5.2 million over a five-year time horizon depending on the scenario chosen for staff education. It is to be hoped that investment in standardised training and audits nationally will lead to a reduction in adverse pregnancy outcomes associated with critical illness. This, in turn, should decrease critical care and medical negligence costs.

**Table A3:** Budget Impact Analysis - IMEWS

		Description	Assumptions	Cost Estimate
A	Education & Training	<ul style="list-style-type: none"> <li>Six new posts required for a 'Hospital Group IMEWS Coordinator' in each hospital network.</li> <li>Education and training records are maintained in each hospital/unit.</li> <li>An e-learning programme available on HSELand will replace train-the-trainer model.</li> <li>Local clinically-based training sessions focusing on IMEWS completion, compliance and escalation will complement the IMEWS e-learning programme.</li> </ul>	<ul style="list-style-type: none"> <li>Staff require education and training on IMEWS within the services based on three different scenarios as outlined in Appendix 6 Part B.</li> </ul>	Between €2.6 – 5.2 million
B	Audit & Evaluation	The IMEWS should be audited as per Appendix 9 in the IMEWS V2 National Clinical Guideline. Audit results, conducted via the national standardised audit tool should feedback to hospital governance group for review and any necessary quality improvements should be delivered.	A Hospital Group IMEWS Coordinator (as above) assisted by the local hospital named IMEWS coordinator will be in place to oversee the national standardised IMEWS completion audit tool monthly and the escalation/response audit as part of the BIU implementation metrics.	[Included above]
C	Equipment, Materials and Consumables	IMEWS chart templates will be provided to each unit in electronic format. There will be a cost implication for colour printing of these materials, which is dependent on the individual printer used and volume printed as the unit cost will reduce as the number ordered increases. It is recommended that printing is organised at a hospital group level as this will result in economies of scale.	<p>Those units using the MN-CMS will not have printing charges unless there is unplanned downtime whereby sites will be required to revert to paper charts.</p> <p>These resource requirements will be covered by existing resources.</p>	N/A
D	Electronic records (MN-CMS)	Updates to the chart will have to be translated into the Maternal & Newborn Clinical Management System.	This will affect approximately 4 hospitals immediately (CUMH - Cork, UHK - Kerry, NMH and Rotunda - Dublin) and will need to be updated as a priority at the time of publication to ensure all hospitals are using the same IMEWS V2.	N/A

## Appendix 7: Implementation plan

Guideline Recommendation or number(s)	Implementation barriers/enablers	Action / intervention/ task to implement recommendation	Lead responsibility for delivery of the action/intervention	Timeframe for completion		Expected outcome/ Verification / outcome measurement
				Year 1	Year 2	
1. Irish Maternity Early Warning System (IMEWS) should be used for the hospital care of a woman with a confirmed clinical pregnancy and up to 42 days in the postnatal period irrespective of age or reason for presentation. Exclusions are women in labour, high dependency, recovery and critical care settings.	<u>Enablers</u> <ul style="list-style-type: none"> <li>Committed staff at senior level</li> <li>Good local leadership</li> <li>Champions</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>Staff resistant to change</li> <li>Lack of governance within the organisation</li> </ul>	<p>Dissemination of the guideline and education resources through the senior management team (Master or CEO, Clinical Director and Director of Midwifery/Nursing)</p> <p>Local management team meetings to align IMEWS with local policies.</p> <p>All new junior clinical staff involved with IMEWS (doctors, midwives and nurses) need to go through the local education and training programme that will include e-learning and ongoing ward based training.</p> <p>All clinical staff involved with IMEWS (doctors, midwives and nurses) will partake in the ongoing ward based education and training programme.</p>	Doctors, Midwives, Nurses and Masters or Hospital CEOs	X		<u>Outcomes</u> <ul style="list-style-type: none"> <li>Full adoption and use of IMEWS for all relevant women</li> <li>Appropriate use of the IMEWS chart</li> <li>Appropriate communication tools are used</li> <li>Early detection of maternal illness, a timely response and appropriate escalation of care</li> <li>Reduced HDU/ICU admission, morbidity and mortality</li> <li>Positive clinical outcomes and women-centred care</li> </ul>
2-6* (full recommendations below)  9. The IMEWS escalation guide should be used to identify the clinical escalation steps and response that should be taken in the event of any IMEWS triggers.	<u>Enablers</u> <ul style="list-style-type: none"> <li>Effective multidisciplinary team work</li> <li>Committed staff</li> <li>Clearly defined roles and responsibilities</li> <li>Arrangements in place for the safe and timely transfer of patients to a higher level of care</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>Staff resistant to change</li> <li>Lack of clearly defined roles and responsibilities</li> <li>Lack of clear, standardised communication</li> </ul>	<p>All new junior clinical staff involved with IMEWS (doctors, midwives and nurses) need to go through the local education and training programme that will include e-learning and ongoing ward based training.</p> <p>All clinical staff involved with IMEWS (doctors, midwives and nurses) will partake in the ongoing ward based education and training programme.</p>	Doctors, Midwives, Nurses	X		

Guideline Recommendation or number(s)	Implementation barriers/enablers	Action / intervention/ task to implement recommendation	Lead responsibility for delivery of the action/intervention	Timeframe for completion		Expected outcome/ Verification / outcome measurement
				Year 1	Year 2	
7. The ISBAR (patient deterioration) and ISBAR <sub>3</sub> (clinical handover) communication tools should be used when communicating clinical information. When a situation is deemed to be critical, this must be clearly stated at the outset of the conversation.	<u>Enablers</u> <ul style="list-style-type: none"> <li>Effective multidisciplinary team work</li> <li>Committed staff</li> <li>Clearly defined roles and responsibilities</li> <li>Effective communication</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>Staff resistant to change</li> <li>Lack of clearly defined roles and responsibilities</li> <li>Lack of clear, standardised communication</li> </ul>		Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director), Doctors, Midwives and Nurses	X		<u>Verification</u> <ul style="list-style-type: none"> <li>Record of staff training</li> <li>Monitoring of HDU/ICU admission rates</li> <li>Audits as per appendix 10 of both compliance to the IMEWS chart and escalation/response</li> <li>Full adoption of IMEWS guideline</li> </ul>
8. Following clinical review, plans must be put in place and clearly documented as part of the IMEWS response.	<u>Enablers</u> <ul style="list-style-type: none"> <li>Good local leadership</li> <li>Clearly defined roles and responsibilities</li> <li>Effective communication</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>Poor local leadership</li> <li>Unclear roles and responsibilities</li> <li>Ineffective communication</li> </ul>	Clinical staff involved in IMEWS (doctors, midwives and nurses) will need to have induction and refresher education and training as appropriate, coordinated by the local IMEWS coordinators (Recommendation 17).  Local hospital agreement/protocol on the classification of 'senior medical personnel' for escalation	Doctors, Midwives, Nurses	X		<u>Outcomes</u> <ul style="list-style-type: none"> <li>Thorough clinical notes for the woman and the healthcare staff for future reference and to optimise teamwork</li> <li>Management plans documented</li> </ul> <u>Verification</u> Chart review/audit as per appendix 10
10. Variances to IMEWS parameters or the escalation guide may be made by senior medical personnel in certain permitted circumstances and should be based on clinical assessment. Parameter changes should be recorded and re-evaluated at a minimum of 24 hourly and at each admission.			Doctors	X		<u>Outcomes</u> Positive clinical outcomes and women-centred care <u>Verification</u> <ul style="list-style-type: none"> <li>Chart review/audit as per appendix 10</li> <li>Senior medical personnel agreed locally</li> </ul>

Guideline Recommendation or number(s)	Implementation barriers/enablers	Action / intervention/ task to implement recommendation	Lead responsibility for delivery of the action/intervention	Timeframe for completion		Expected outcome/ Verification / outcome measurement
				Year 1	Year 2	
11. The Master or CEO, Clinical Director and Director of Midwifery/Nursing of each hospital and the Chief Executive Officer of the hospital groups are accountable for the local operation of the Irish Maternity Early Warning System (IMEWS). The HSE NWIHP should ensure that there is a governance structure in place nationally for the implementation and if necessary, the revision of IMEWS.	<u>Enablers</u> <ul style="list-style-type: none"> <li>Effective governance</li> <li>Effective communication</li> <li>Effective multidisciplinary team work</li> <li>Ongoing training and education</li> <li>Regular audit and evaluation</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>Ineffective governance</li> <li>Lack of standardised communication</li> </ul>	Local management team meetings. Integration with the hospital group education coordinators. Oversight of IMEWS implementation by the NWIHP	Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and the National Women and Infants Health Programme (NWIHP)	X		<u>Outcomes</u> <ul style="list-style-type: none"> <li>Clear accountability for the monitoring and implementation of IMEWS</li> <li>Improvements in the use of IMEWS</li> </ul> <u>Verification</u> Clear governance structure in place and documented
12. The local governance group should oversee the implementation and ongoing review of IMEWS recognition and response systems locally.		Regular local management team meetings  Named individual from existing staff to coordinate IMEWS locally	Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.	X		<u>Outcome</u> Clear local governance and coordination structures <u>Verification</u> A governance team with accountability for local implementation of IMEWS A named local IMEWS coordinator in every hospital A named local consultant IMEWS lead in every hospital
13. The local governance group should identify and support named individuals to oversee local IMEWS implementation.						
14. A local governance group should support additional safety practices (e.g. incorporating briefings, safety pause and huddles) and implementation of relevant guidelines (e.g. NCG No. 5: Clinical Handover in Maternity Services) to enhance the IMEWS and lead to a greater situational awareness among clinicians and multidisciplinary teams.		Local additional safety practices (eg. Toolbox sessions, huddles, familiarity with other relevant guidelines) are provided by the clinical practice development teams and others as appropriate	Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses.	X		<u>Outcomes</u> Improved healthcare provision and situational awareness <u>Verification</u> On site regular additional safety practices that can be verified by senior management

Guideline Recommendation or number(s)	Implementation barriers/enablers	Action / intervention/ task to implement recommendation	Lead responsibility for delivery of the action/intervention	Timeframe for completion		Expected outcome/ Verification / outcome measurement
				Year 1	Year 2	
15. Clinical staff in both maternity and general hospitals should receive education and training in IMEWS. They should know how to call for emergency assistance if they have any concerns about a woman, and know who they should call under these circumstances. This information should be provided at the start of employment and as part of regular refresher education and training.	<p><u>Enablers</u></p> <ul style="list-style-type: none"> <li>Committed staff members</li> <li>Strong leadership</li> <li>Developed process for emergency situations</li> <li>Action plans for education and re-education where required</li> </ul> <p><u>Barriers</u></p> <ul style="list-style-type: none"> <li>Under resourced units</li> <li>Time poor workforce</li> </ul>	<p>All new junior clinical staff involved with IMEWS (doctors, midwives and nurses) need to go through the local education and training programme that will include e-learning and ongoing ward based training.</p> <p>All clinical staff involved with IMEWS (doctors, midwives and nurses) will partake in the regular refresher e-learning training and ongoing ward based education and training.</p>	Senior Management Team (e.g. Master or CEO, Director of Midwifery/Nursing, Clinical Director) and Doctors, Midwives and Nurses in conjunction with the Hospital Group IMEWS Education and Audit coordinator (Recommendation 17).	X		<p><u>Outcome</u></p> <ul style="list-style-type: none"> <li>Clinical staff have IMEWS education as appropriate</li> <li>Increase in staff knowledge &amp; skills</li> <li>Women centred-care and an increase awareness of physiology and illness in pregnancy and postpartum</li> </ul> <p><u>Verification</u></p> <ul style="list-style-type: none"> <li>E-learning programme developed and used, alongside ongoing training via existing toolbox or skills and drills on the clinical wards</li> <li>Records of staff trained</li> </ul>
16. Audit data should be collected and reviewed locally and overseen nationally regarding the implementation and effectiveness of IMEWS.	<p><u>Enablers</u></p> <ul style="list-style-type: none"> <li>Sufficient staff numbers</li> <li>Supportive ICT systems</li> </ul> <p><u>Barriers</u></p> <ul style="list-style-type: none"> <li>Under resourced units</li> <li>Lack of ICT supports</li> </ul>	Audit data collected and reviewed locally and overseen nationally as per appendix 10; document IMEWS chart completion audits monthly and escalation/response audits quarterly.	The local governance group (Recommendations 12) in consultation with the local IMEWS coordinator (Recommendation 13) and Hospital Group IMEWS coordinator and the NWIHP.		X	<p><u>Outcome</u></p> <p>Improved compliance and an understanding of any failings of the IMEWS or the implementation of IMEWS</p> <p><u>Verification</u></p> <p>Audit reports</p>



Guideline Recommendation or number(s)	Implementation barriers/enablers	Action / intervention/ task to implement recommendation	Lead responsibility for delivery of the action/intervention	Timeframe for completion		Expected outcome/ Verification / outcome measurement
				Year 1	Year 2	
17. The management of IMEWS (in both maternity and acute hospitals) should be delegated to specifically appointed healthcare professionals in each hospital network. This 'Hospital Group IMEWS Coordinator' should preferably have midwifery experience and job responsibilities should include education and audit for IMEWS.	<u>Enablers</u> <ul style="list-style-type: none"> <li>• Successful recruitment</li> <li>• Supportive staff</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>• Lack of funding</li> <li>• Uncooperative staff</li> </ul>	Six Hospital Group level staff members to be recruited to hold responsibility for education and local audits - costs have been included in BIA and will be submitted in the service plan.	NWIHP		X	<u>Outcomes</u> <ul style="list-style-type: none"> <li>• Increase in uptake of education</li> <li>• Regular audits</li> <li>• Improved data collection and understanding of the implementation of IMEWS</li> </ul> <u>Verification</u> <ul style="list-style-type: none"> <li>• Staff recruited</li> <li>• Record of IMEWS education and training</li> <li>• Record of regular IMEWS audit</li> </ul>
18. IMEWS should be supported through the application of quality improvement methods, such as engagement strategies, testing and measurement to ensure successful implementation, sustainability and future progress.	<u>Enablers</u> <ul style="list-style-type: none"> <li>• Strong local leadership</li> <li>• Effective multidisciplinary team work</li> <li>• Effective communication</li> </ul> <u>Barriers</u> <ul style="list-style-type: none"> <li>• Uncommitted staff</li> <li>• Ill defined quality improvement systems</li> </ul>	Integration with local quality improvement processes such as six sigma, lean management, clinical Microsystems, Model for Improvement (Institute for Healthcare Improvement (IHI))	The local governance group (Recommendation 12), Doctors, Midwives and Nurses	X		<u>Outcomes</u> <ul style="list-style-type: none"> <li>• Integration, maximum exposure and improved communication and learning around IMEWS</li> </ul> <u>Verification</u> <ul style="list-style-type: none"> <li>• Improvements or gaps in IMEWS implementation are managed appropriately and verified by the local management team</li> </ul>

- \*2. IMEWS should be used to complement clinical care and it is not designed to replace clinical judgment. Clinical concern about an individual woman warrants an escalation to medical staff irrespective of the presence or absence of IMEWS triggers. The level and speed of escalation should reflect the degree of clinical concern.
3. If a woman or a visitor express concern about her wellbeing, this should be listened to carefully as it may reflect the early onset of a critical illness. The woman should have her vital signs checked.
4. The standard IMEWS vital signs must be recorded as a baseline on admission. These are: respiratory rate, temperature, maternal heart rate, systolic blood pressure, diastolic blood pressure and neurological response. The subsequent frequency of observations should be determined by the baseline recordings and the woman's individual clinical circumstances.
5. The standard IMEWS vital signs must be completed contemporaneously and recorded for every set of vital signs unless otherwise clinically indicated. (See Recommendation 10).
6. The technique of measuring, recording and monitoring of vital signs should be undertaken in line with recognised, evidence-based practice.

**Implementation team:**

The National Women and Infants Health Programme (NWIHP) was part of the guideline development team and will ensure that 6 new posts, one for each hospital group will be filled. These new posts will coordinate and ensure delivery of IMEWS education and audit for all hospitals in their hospital group.

The Master or Chief Executive Officer (CEO), Director of Midwifery/Nursing and Clinical Director are ultimately responsible for the local implementation of the IMEWS. This will be facilitated through a local governance group with the most appropriate stakeholders (doctors, midwives, nurses, clinical practice development, etc.) involved in daily clinical practice. A named local coordinator and IMEWS consultant lead will also be part of this group and will be responsible for liaising with the hospital group IMEWS coordinator to ensure appropriate delivery of education and audit and wider implementation. Representatives of the Directors of Midwifery were part of the guideline development group.

**Implementation tools:**

An IMEWS e-learning programme is available on HSE Land

The following tools are included in the IMEWS guideline and are also available online at <https://health.gov.ie/national-patient-safety-office/ncac/national-clinical-guidelines/>;

- Frequently Asked Questions (FAQs) and physiological parameter changes in pregnancy overview summary sheet are available in Appendix 8
- Audit and monitoring tools are available as Appendix 9
- Good practice points for the recordings of all vital signs are in Appendix 12
- ISBAR sample communication tools are available in Appendix 13
- A patient information leaflet is available in appendix 11 and the safety pause information sheet is available in Appendix 14.

**Dissemination and communication plan:**

The guideline update, the new IMEWS V2.0 chart and links to the education and training material will be disseminated to:

- the Masters or CEOs, Directors of Midwifery and Clinical Directors of the 19 maternity units,
- the six hospital group clinical directors and Directors of Midwifery/Nursing
- the Director of the Acute Hospital Services for dissemination throughout all acute hospitals,
- the Deteriorating Patient Recognition and Response Improvement Programme
- the DoH, NWIHP, HSE, RCPI and other interested parties and professional bodies.

Staff education should begin immediately as all relevant clinical staff will have access to the e-learning programme.

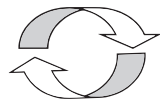
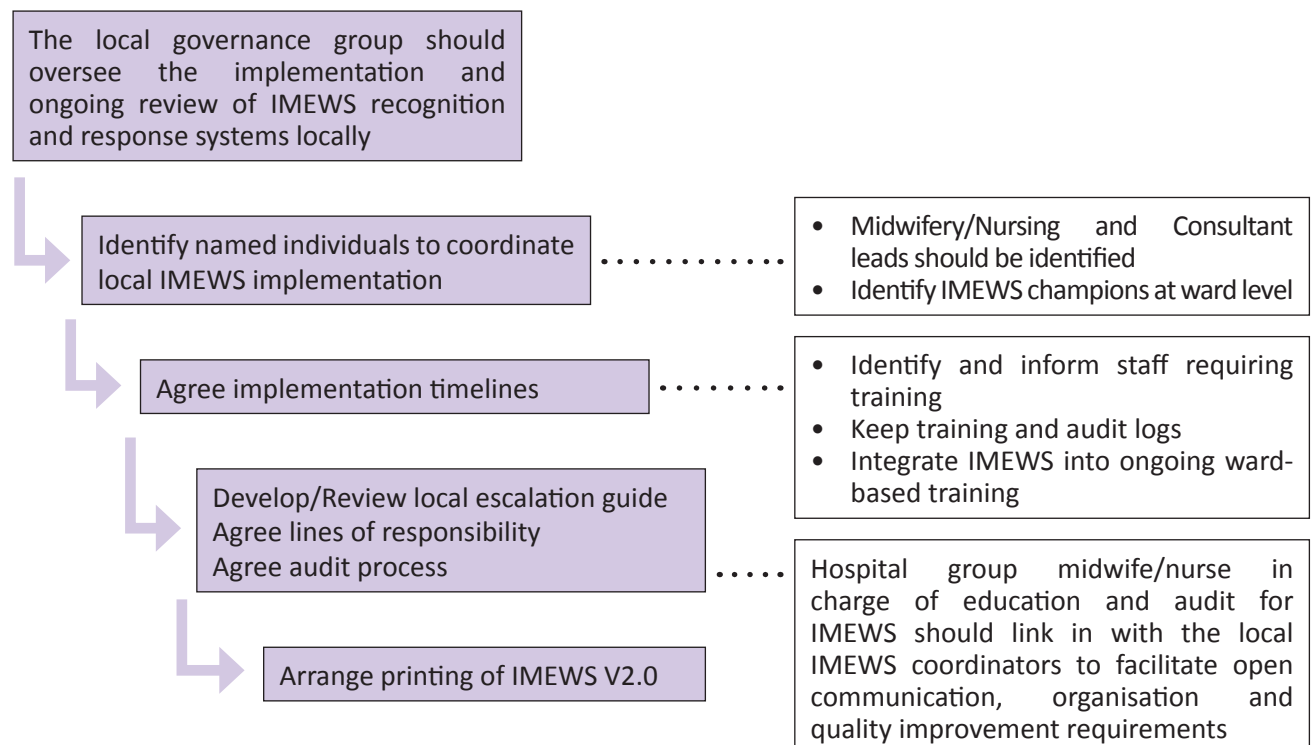


## IMEWS Implementation Guidance

### Governance

It is essential to establish the governance structure for IMEWS in each hospital (maternity and non-maternity). The governance for IMEWS implementation may be incorporated into existing early warning system governance structures, and should

- Have appropriate responsibilities delegated and be accountable for its decisions and actions
- Monitor the effectiveness of interventions and training
- Have a role in reviewing performance data and audits
- Provide advice about the allocation of resources.



### Continuous improvement

- IMEWS should be supported through the application of quality improvement methods and situational awareness improvement strategies such as huddles, briefings and safety pauses.
- Frontline ownership of audit and monitoring to promote good practice.
- Leads, champions and trainers should meet regularly and engage with targeted training and updates for staff.
- Audits for both the completion of the IMEWS chart and the escalation and response procedure should be undertaken as per Appendix 9 in the IMEWS V2 National Clinical Guideline in order to complete the required IMEWS key performance indicator for the Business Information Unit (BIU).
- Share learning across hospitals, hospital groups and nationally.

## Appendix 8: FAQs and Physiological Changes in Pregnancy

The supporting tools and e-learning links can be found on the clinical guideline section of the National Women and Infants Health Programme website (<http://tiny.cc/NWIHP>)

### Irish Maternity Early Warning System (IMEWS) Frequently Asked Questions (FAQs)

#### Why do we need IMEWS?

- The IMEWS facilitates a unified approach to maternity care. Women should experience the same standard of care regardless of setting.
- Pregnant women are generally young, healthy and compensate easily for illness. The IMEWS is a supportive tool for *early* detection of deterioration in this population.
- A chart that offers a structured approach to vital sign monitoring will increase safety for staff and women.

#### Why do we need a different chart for maternity?

- The National Early Warning System (NEWS) is for the non-pregnant adult patient including gynaecology. The physiology of a pregnant and postpartum woman is different to the non-pregnant adult and, therefore, requires a modified early warning system and associated guideline.

#### Which women does IMEWS apply to?

- All non-labouring women with a clinically confirmed pregnancy and postpartum until 42 days regardless of their presenting condition and regardless of location or age. This includes women presenting to both a maternity unit and a general hospital for a non pregnancy-related condition.

#### What is the frequency of monitoring vital signs?

- All women should have a full set of vital signs recorded on admission and, therefore, afterwards as clinically required.
- Antenatally - a minimum frequency of 12 hourly.
- Postnatally - observations should be taken within 12 hours following arrival on a postnatal ward and then daily as a minimum.

#### How do I know to escalate care?

- Always using clinical judgement and experience and if concerned, escalate care regardless of vital signs.
- Any yellow or pink vital signs should trigger a response as per the escalation guide.

#### How do I escalate care?

- Please refer to the escalation guide on the IMEWS chart.
- Implement measures to reduce triggers if appropriate, inform the midwife in charge, contact the doctor or obstetrician as appropriate and document all communication and management plans in the notes.
- All hospitals should have in place local escalation policies on who to contact and how to contact them. All staff using IMEWS should be familiar with this.

**Can we amend the chart locally?**

- This is outlined in detail in the good practice points document for IMEWS in Appendix 12 of the IMEWS guideline.
- The pregnancy silhouette can be covered by the addressograph in cases where confidentiality of the pregnancy is requested by the woman.
- Vital sign parameters and frequency of observations should only be amended on a case by case basis by a senior clinician with all changes, reasons for change and review timeline documented in the notes.

**What percentage of staff should be trained in using IMEWS?**

- All staff using IMEWS should have training completed in order to understand how to complete an IMEWS chart and how to escalate care appropriately.
- New staff (staff in training, those new to the Irish system or returning to practice) should have training provided at the outset of employment.
- Retraining or communication of updates is important in line with updates of the national clinical guideline.
- Audit results will inform the local requirements for retraining.
- Ward-based training is encouraged to mimic real-life circumstances.

**Who are the trainers?**

- The IMEWS e-learning programme is available online on HSELand.
- Local training should be provided to supplement the e-learning programme.
- Hospital Group IMEWS Coordinators will be appointed to link in with all the hospitals in their group to support ongoing training and audit.

**Is there an audit tool?**

- Yes, the national audit tools are provided within the National Clinical Guideline. One is for IMEWS chart completion, the second is for reviewing the escalation and response to IMEWS. Appendix 9 in the guideline had a detailed description on monitoring and audit.

### Physiological Changes in Pregnancy: Review

Changes in Pregnancy		Notes
Plasma volume	Increased (50%)	To fill vascular bed and maintain blood pressure
Red Blood Cells	Increased (25-30%)	Reduces O <sub>2</sub> carrying capacity Haemodilution
Cardiac output Heart rate	Increased (40%) Increased 15-20bpm	This increase helped by ↑heart rate to maintain tissue perfusion and BP because of vasodilation
Vascular resistance	Reduces	Progesterone effects causing vasodilation, Pooling of blood, BP will reduce but increased blood volume reduces impact
Blood Pressure	↓2 <sup>nd</sup> trimester, progesterone effects =vasodilation and reduced peripheral resistance	Important for measuring blood pressure Postural hypotension Physiological changes dangerous if superimposed on existing disease where haemodynamics already compromised
Respiratory Rate	O <sub>2</sub> consumption increased (20%) due to increasing metabolic needs of mother and foetus	Altered by hormonal and biochemical changes plus the enlarging uterus. Muscles in thoracic region relax, chest broadens, tidal volume improves. Breaths deepen, ligaments between ribs relax increasing rib elasticity. Reduced airway resistance facilitates greater air flow. Increase of 50% in air vol/min. This causes mild respiratory alkalosis – essential for gas exchange across placenta. Progesterone acts as respiratory stimulant. Small degree of breathlessness in pregnancy physiological but after birth unusual. Could be presenting symptom for pulmonary oedema, pulmonary embolism, pneumonia, anaemia. >20 serious
O <sub>2</sub> saturation	96-98%, rarely 100%	98-99% O <sub>2</sub> breathed in carried by Hb in blood
Temperature	Progesterone and ↑basal metabolic rate (BMR) Increase heat generated by 30-35%	Heat loss mechanisms compensate but still increase of about 0.5°C. Increasing temp, increases O <sub>2</sub> demands and ↑HR
Urinary system changes	Increase in size in kidneys especially glomerulus. Glomerular filtration rate increases (50%) by end of first trimester Functional capacity of kidneys increase Ureters and renal pelvis dilate Can get backflow of urine from bladder to ureters Pressure effects on bladder tone. Reabsorption by nephron impaired resulting in glycosuria	To cope with increased blood flow. Progesterone effects Increased risk of infections due to pressure effects or pooling Also more likely to retain sodium Altered values and interpretation of blood results

## Appendix 9: Monitoring and audit

Regular audit of implementation and impact of this NCEC NCG is recommended to support continuous quality improvement. There are two sections to the required audit;

- 1) **Chart completion.** The audit process for chart completion may be coordinated in each maternity unit through the Test Your Care ([www.testyourcarehse.com](http://www.testyourcarehse.com)), Nursing and Midwifery Quality Care-Metrics. This is typically required on a monthly basis. If this option is not available, the sample audit charts below can be used. It is recommended that for either option, acknowledging and monitoring the compliance to documentation is completed as outlined below.

### Acknowledging and monitoring compliance

A compliance score can be calculated. The score, expressed as a percentage, is calculated by dividing the number of “yes” answers by the total of “yes” and “no” answers. “Not applicable” answers are excluded from the calculation of the percentage score.

Example: If there are 9 “yes” and 2 “no” answers, the score is calculated as follows:

9 (yes answers) divided by 11 (total of yes and no answers) multiplied by 100.

The score in this example would be **81.8%**

The recommended standard is 100% compliance. Where the compliance is less than 80% it is proposed that local action plans are put in place, e.g. increase frequency of audits and identify problem areas.

Requirement maternity hospital/units - a monthly minimum of 10 charts per clinical area/ward in your maternity hospital/unit to cover both antenatal and postnatal charts.

Requirement acute hospitals – an annual minimum of 10 charts or all charts if less than 10 pregnant or postpartum women present to the hospital.

- 2) **Escalation and Response** - used on women that required escalation of care OR/AND where there was a requirement for transfer to higher level of care.

Requirement maternity hospitals/units - a quarterly minimum of 15 episodes per clinical area/ward are completed on a quarterly basis to cover both antenatal and postnatal episodes.

Requirement acute hospitals – an annual minimum of 10 charts or all charts if less than 10 pregnant or postpartum women present to, or require escalation within the hospital.

The local and hospital group IMEWS coordinators will facilitate the completion of both the ‘chart completion’ and ‘escalation/response’ audits. Feedback should be provided to the local governance group and should be undertaken from a multidisciplinary perspective where appropriate. Results and learning points can be used in the ongoing education delivered by the Coordinator and in the local quality improvement initiatives. The chart completion audit tool may be used up to daily in a clinical area to promote frontline ownership and may facilitate learning discussions at handover, ward rounds or education sessions for example.

IMEWS Chart - Completion				1. Complete this datasheet    2. Determine areas for improvement 3. Take appropriate actions    4. Share the learning    5. Repeat		*Not applicable for MN-CMS
Section	No.	Element	Record (Yes, No, n/a)	Section comments:		
1. DOCUMENTATION STANDARDS	1	The addressograph (or details) are recorded on both sides of the chart*				
	2	The booking blood pressure, gestation at booking, booking BMI and large BP cuff are recorded				
	3	Date and time of the observations are recorded				
	4	Time is recorded using the 24 hour clock				
	5	Each entry is initiated				
2. PARAMETERS	6	Respiratory rate is recorded numerically				
	7	Respiratory rate is recorded in the appropriate box*				
	8	SpO2 (if applicable) is recorded numerically				
	9	SpO2 (if applicable) is recorded in the appropriate box*				
	10	Temperature is recorded numerically				
	11	Temperature is recorded in the appropriate box*				
	12	Maternal Heart Rate is recorded numerically				
	13	Maternal Heart Rate is recorded in appropriate box*				
	14	Systolic Blood Pressure is recorded numerically				
	15	Systolic Blood Pressure is recorded in the appropriate box*				
	16	Diastolic Blood Pressure is recorded numerically				
	17	Diastolic Blood Pressure is recorded in the appropriate box*				
	18	Urinalysis is recorded				
	19	Pain score is recorded				
	20	AVPU is recorded				
	3. SCORING	21	Total Yellow Zone is correct on every entry*			
		22	Total Pink Zone is correct on every entry*			
4. SUMMARY						

IMEWS Chart - Escalation & Response		Audit for months _____ Date _____														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Please tick ✓ for yes, X for no or n/a is not applicable Care escalated without IMEWS trigger?															
2	A full set of observations were completed within the required timeframe															
3	Midwife in charge informed															
4	There is evidence that the care was escalated to the appropriate level as per escalation guide															
5	Medical review was received															
6	The ISBAR tool was used to document the escalation of care															
7	There is evidence of an increase in the frequency of monitoring and recording of vital signs in response to the detection of observations in the yellow or red zones															
8	Measures implemented to reduce triggers as appropriate															
9	Any variances to the parameters are documented with clear management plans															
10	Medical review documented by the doctor															
11	Plan of care documented by the doctor															
12	Date and time of review documented by the doctor															

**Comments:****Action required:**

Completed by: \_\_\_\_\_

**Key Performance Indicators (KPI)**

The Business Information Unit collects quarterly KPI data on the IMEWS set out as

- 1) “% of maternity hospitals/units with implementation of IMEWS”
- 2) “% of hospitals with implementation of IMEWS” for the acute hospitals.

Implementation is now defined as follows and is adapted from the NCEC NCG No. 12 PEWS.

<b>DEFINITION OF IMPLEMENTATION 2019 – Maternity Hospitals/Units</b>		
IMEWS is considered implemented if each unit/hospital can state <b>yes</b> to <u>all</u> of the following criteria		
<b>Criteria no.</b>	<b>Criteria</b>	
1	Is there a local Governance Group in place and meetings held on a quarterly basis to review IMEWS implementation and audit data?	
2	Is there a named local coordinator for IMEWS?	
3	Is there a named local consultant lead for IMEWS?	
4	Are IMEWS training records maintained locally?	
5	Is there an ongoing IMEWS clinically-based training programme in place for relevant clinical staff in the hospital?	
6	Excluding women in labour, high dependency, recovery and critical care, are all pregnant and postpartum women monitored using IMEWS?	
7	Is the national IMEWS audit tool on completion utilised at least monthly with a minimum of 10 charts per clinical area/ward in your maternity hospital/unit?	
8	Is the national IMEWS audit tool on escalation and response utilised at least quarterly with a minimum of 15 episodes per clinical area/ward for your maternity hospital/unit?	
9	Is there evidence that if an issue is identified following audit, appropriate quality improvement plans are recorded and actioned?	
10	Has the data submitted in this report been reviewed by the Chair of the local Governance Group?	

<b>DEFINITION OF IMPLEMENTATION 2019 – Acute Hospitals</b>		
IMEWS is considered implemented if each unit/hospital can state <b>yes</b> to <u>all</u> of the following criteria		
<b>Criteria no.</b>	<b>Criteria</b>	
1	Is there a local Governance Group in place and meetings held on a quarterly basis to review IMEWS implementation and audit data?	
2	Is there a named local coordinator for IMEWS?	
3	Is there a named local consultant lead for IMEWS?	
4	Are IMEWS training records maintained locally?	
5	Excluding women in labour, high dependency, recovery and critical care, are all pregnant and postpartum women monitored using IMEWS?	
6	Are the national IMEWS audit tools on completion and on escalation and response utilised annually (at a minimum) on 10 charts for pregnant or postpartum women?	
7	Is there evidence that if an issue is identified following audit, appropriate quality improvement plans are recorded and actioned?	
8	Has the data submitted in this report been reviewed by the Chair of the local Governance Group?	



## Appendix 10: IMEWS chart V2.0

Chart correct at time of publication.

**NATIONAL  
CLINICAL  
EFFECTIVENESS  
COMMITTEE**

Hospital Name: .....

Ward: .....

Woman's Name:

Date of Birth:

Healthcare Record No:

*Addressograph*

# Irish Maternity Early Warning System (IMEWS) Escalation Guide

Chart A | Version 2.0

## IMPORTANT

- If concerned about a woman, escalate care regardless of vital signs.
- Complete a full set of vital signs and record on the IMEWS chart.
- Communicate any triggers to the midwife/nurse in charge.
- Implement the clinical management plans without delay.
- Document the management plan and communication details in the clinical notes.
- Any changes in the standard recording of the vital signs should be written by the doctor in the clinical records.

### 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 >1 PINK

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

The ISBAR communication tool should be used when communicating information in relation to deteriorating and/or critically ill women.

### ISBAR Communication Tool


**I**dentify – Yourself, the recipient, the woman

**S**ituation – Why are you calling? IMEWS triggers? Clinical Concern?

**B**ackground – What is the relevant background?

**A**ssessment – What do you think is the problem?

**R**ecommendation – What do you want them to do?

	Woman's Name:	Document Number (eg. 1, 2):	Booking BMI:
	Date of Birth:	Booking BP:	Date of Admission: DD/MM/YY
	Healthcare Record No:	Gestation at Booking (weeks):	Large BP Cuff (Y/N):
	<p style="text-align: center;"><i>Addressograph</i></p>		

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

	Date :																	
	Time :																	
Resp. Rate per min	≥25																	≥25
	20-24																	20-24
	11-19																	11-19
	≤10																	≤10
SpO <sub>2</sub> only if Resp. Rate Triggers	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 11: IMEWS 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:

Email: [yoursay@hse.ie](mailto:yoursay@hse.ie)  
[www.hse.ie](http://www.hse.ie)



Find out about (IMEWS)  
**Irish Maternity  
 Early Warning System**

*people caring for people*



An Roinn Sláinte  
 Department of Health

**NATIONAL  
 CLINICAL  
 EFFECTIVENESS  
 COMMITTEE**

**HSE**  
 Feidhmeannacht na Seirbhíse Sláinte  
 Health Service Executive



**OBSTETRICS AND  
 GYNAECOLOGY**

To ensure that any change in your condition is picked up early, maternity hospitals in Ireland have an early warning system in place called IMEWS. 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 (IMEWS).

#### ***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 IMEWS?***

IMEWS 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 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. IMEWS 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.

**IMEWS 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.

## Appendix 12: Vital sign recordings – good practice points

### Information on using IMEWS

The IMEWS observation chart is purple and contains a pregnancy silhouette to distinguish the chart from the NEWS, PEWS and EMEWS.

- Recordings should be made numerically and not with dots.
- Recordings should be made within the appropriate boxes and not across multiple boxes
- Lines may be drawn between systolic and diastolic measurements
- Lines or graphing should not be drawn across the chart except where senior medical personnel have instructed that the clinical condition indicates certain observations can be omitted. In this case, lines can be drawn through those omissions to aid with auditing.
- Respiratory rate, temperature, maternal heart rate, systolic blood pressure, diastolic blood pressure and AVPU neurological response are all 'standard' vital signs to be completed at each set of observations. SpO<sub>2</sub>, urine and pain score are 'additional' observations. These are discussed below in the order they appear on the chart.

#### Respiratory Rate (Standard)

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 time.

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 and Taylor, 2016).

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 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 20-24.

*The accepted normal parameters for respiration rate on IMEWS are 11-19 respirations/min.*

#### Oxygen Saturation (Additional)

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 SpO<sub>2</sub> result may be inaccurate or unobtainable.

Dark nail polish can significantly affect the accuracy of results (Desalu et al., 2013).

The SpO<sub>2</sub> should be documented as a percentage in the appropriate box i.e. SpO<sub>2</sub> of 94% should be documented numerically in the pink box allocated to SpO<sub>2</sub> readings of ≤95%. Likewise the SpO<sub>2</sub> of 96% should be documented numerically in the white box allocated to 96-100%.

*The accepted normal parameters for SpO<sub>2</sub> on IMEWS are 96-100%.*

### Temperature (Standard)

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 ≥38°C.

Hypothermia is a significant finding that may indicate infection and should not be ignored. Pyrexia may be masked if antipyretics have been administered.

There should be a high index of suspicion for sepsis if infection is a concern.

Follow the latest sepsis NCG (<https://health.gov.ie/national-patient-safety-office/ncec/national-clinical-guidelines/clinical-handover/>) and maternal sepsis screening form available from the HSE website (<https://www.hse.ie/eng/about/who/cspd/ncps/sepsis/resources/>).

*The accepted normal temperature parameters on IMEWS are 36.0-37.4° C.*

### Heart Rate (Standard)

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, 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 recording rate, rhythm and strength.

Persistent tachycardia over 100 bpm is an important sign that may indicate serious underlying disease and warrants investigation.

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 normal heart rate parameters on IMEWS are 60-99bpm*

**Blood Pressure (Standard)**

Blood Pressure is recorded at booking and should be filled out at the top of all IMEWS charts. If a woman is admitted to hospital prior to booking, her blood pressure on admission can be considered her booking BP.

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.

The mid-arm circumference (MAC) should be measured in all pregnant women particularly those with BMI > 29.9kg/m<sub>2</sub> at their first antenatal visit. If the MAC is > 33 cms, a large cuff should be used for BP measurements subsequently (Health Service Executive et al., 2013). 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., 2011).

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.

A straight or dotted line between the systolic and diastolic numbers should be used to display a graphic trend.

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 140/90 mmHg taken at least 4 hours apart, (National Collaborating Centre for Women's and Children's Health (UK), 2010) or
- An increase of 15 mm/Hg above the blood pressure at the first antenatal visit, or
- One reading of 160/100 mmHg or greater.

*The acceptable parameters for systolic blood pressure on IMEWS are 100-139mmHg.  
The acceptable parameters for diastolic blood pressure on IMEWS are 50-89mmHg  
i.e. 100/50mmHg to 139/89mmHg.*

**Urine (Additional after admission)**

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

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.

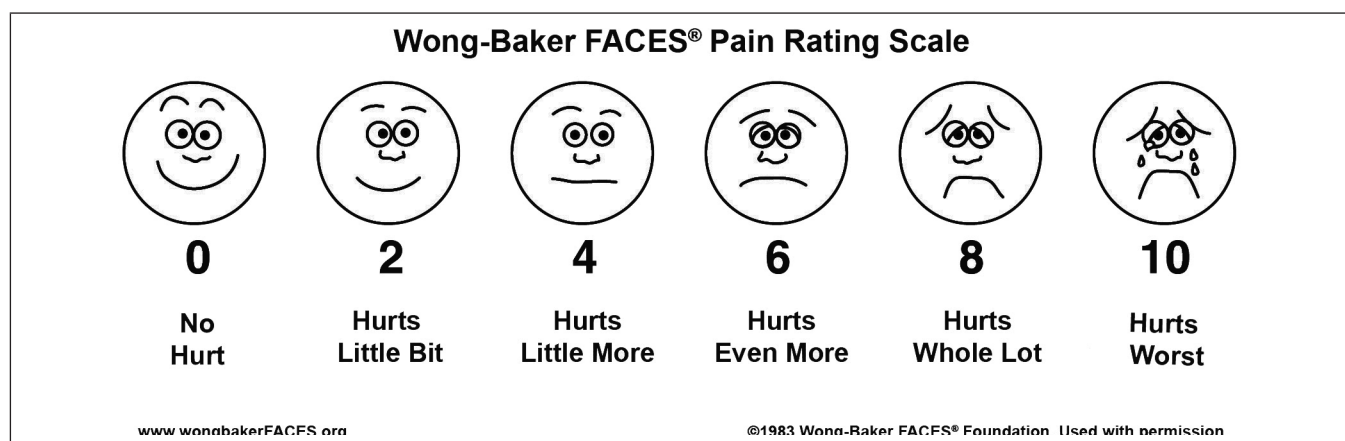
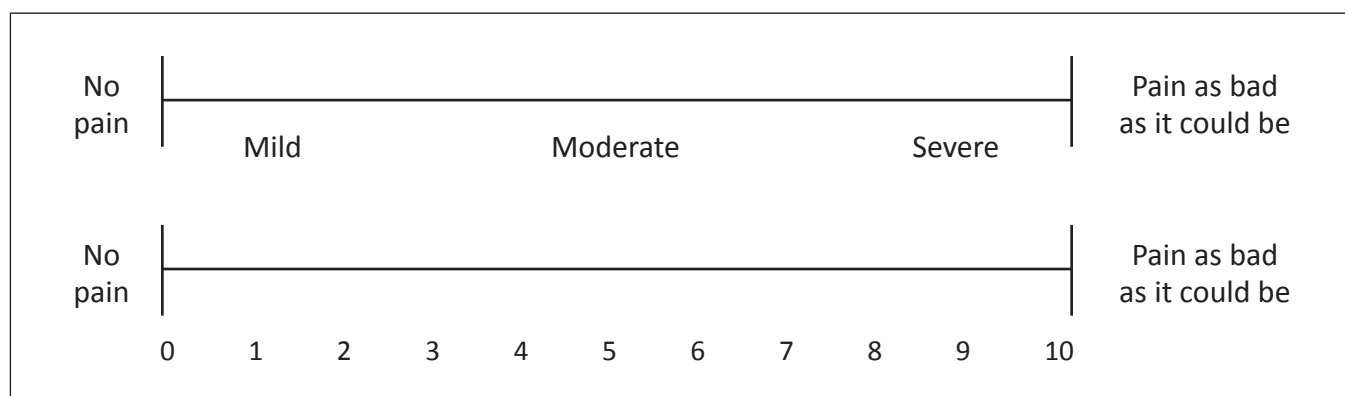
The frequency of urinalysis following admission depends on the clinical assessment and diagnosis of the woman i.e.

- 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, +, ++, +++, +++++.

**Pain Score (Additional)**

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 vital signs are being recorded on IMEWS. The following tools may also be used:





**Assessment of neurological response (AVPU) (Standard)**

Any fall in the level of consciousness (AVPU scale) should always be considered significant and acted on immediately.

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 operative recovery).

P – Responds to painful stimuli with a purposeful or non-purposeful movement.

U – Unresponsive - The woman does not respond to any stimuli.

The neurological response assessment should be documented in the appropriate box:

Alert (A): white box (acceptable neurological response parameter)

Responds to Voice (V): Pink box

Responds to Pain (P): Pink box

Unresponsive (U): Pink box.

**How to complete the paper IMEWS chart**

- 1) Place an addressograph on both sides of the chart
- 2) Complete the Document number, Booking BP, Gestation, Booking BMI, Date of admission and Cuff Size at the beginning of all new charts
- 3) Date, time and initial all entries
- 4) Complete the vital signs contemporaneously
- 5) Enter the individual observation score into the appropriate section using numbers (not dots).  
[Use a straight vertical line through vital signs not currently being monitored if there has been a change in the requested recordings as indicated and documented by a senior medical staff member e.g. higher frequency of BP recordings due to hypertensive disorders. Any variances should be documented with clear management plans including a timeline for review (Recommendation 10)].
- 6) Calculate the total number of yellow and pink triggers and record them at the bottom of the IMEWS chart
- 7) Escalate/Review as appropriate. Use the escalation guide as a prompt, the total score and clinical judgement are used to determine the appropriate response to the clinical findings including need for immediate intervention, level of escalation required and appropriate timeframe for reassessment.

**Permitted variations to the IMEWS chart**

- The local hospital logo may be added to the top left hand corner of the escalation page
- Local variations on the escalation procedure for;
  - a. Who to call in cases of a trigger(s) or clinical concern
  - b. An appropriate bleep/telephone number
- The silhouette can be covered by the addressograph in cases of required confidentiality. This would apply in particular to the acute hospitals.
- Additions to the vital signs currently monitored may be made once they do not impact, remove or replace the existing vital signs.

**How to complete the IMEWS in MN-CMS**

1. With the patient record open on the page at the top of the left menu, select iView (fourth banner down) with one left click.
2. Once the iView is open, documentation of vital signs can be recorded in the Basic Observations and iView banner. Double click this blue banner bar.

3. Enter the respiration rate, SpO<sub>2</sub>, temperature, peripheral pulse rate, systolic blood pressure, diastolic blood pressure, pain score and neurological response. These all need to be entered to calculate an IMEWS total.
4. When all the details have been entered, click 'sign' and a black tick mark will display next to the section to indicate the data has been added to the record.
5. If the observations trigger an escalation, the user will be notified with a discern notification and will be instructed to follow the IMEWS guidelines for the appropriate response.
6. Depending on the severity of the trigger, the chart will turn the vital sign that triggered a different colour. This will enable other staff to easily notice the trigger.
7. There will be no automatic reminder for staff to recheck the triggers within the designated time-frame; they must remember that they need to do this.
8. All triggers that occur for each woman will be seen on the wards Maternity Whiteboard under the IMEWS tab. These triggers will stay visible until they are acted on and removed by the clinician looking after the woman.

## Appendix 13: ISBAR sample tools

### Handover of a patient who is deteriorating

ISBAR Communication Tool SAMPLE Patient Deterioration	
<b>I</b> Identify	<b>Identify:</b> You Recipient of handover information Patient
<b>S</b> Situation	<b>Situation:</b> Why are you calling? (Identify your concerns)
<b>B</b> Background	<b>Background:</b> What is the relevant background?
<b>A</b> Assessment	<b>Assessment:</b> What do you think is the problem?
<b>R</b> Recommendation	<b>Recommendation:</b> What do you want them to do?

Reproduced and adopted with permission from Dr S. Marshall, Monash University, Australia.

### Shift handover

ISBAR <sub>3</sub> Communication (clinical handover) Tool SAMPLE Shift Handover	
<b>I</b> Identify	<b>Identify:</b> Lead handover person Individuals / Team receiving handover Patient(s)
<b>S</b> Situation	<b>Situation:</b> Location of patient(s) Brief summary of current status Is there a problem?
<b>B</b> Background	<b>Background:</b> Concise summary of reason for admission Summary of treatment to date Baseline observations (current admission) Vital Signs: BP, Pulse, Resps, S <sub>p</sub> O <sub>2</sub> , (F <sub>i</sub> O <sub>2</sub> ), Temp, AVPU. IMEWS (include previous IMEWS if appropriate) NEWS (include previous NEWS if appropriate)
<b>A</b> Assessment	<b>Assessment:</b> What is your clinical assessment of the patient at present?
<b>R<sub>3</sub></b> Recommendation Read-Back Risk	<b>Recommendation:</b> Specify your recommendations Read-Back: Recipients to confirm handover information Risk: Include the safety pause to identify possible risks

Adapted by GDG with permission from Dr S. Marshall, Monash University, Australia.

## Inter-departmental handover

ISBAR <sub>3</sub> Communication (clinical handover) Tool SAMPLE Inter-departmental Handover	
<b>I</b> Identify	<b>Identify:</b> You Recipient of handover information Patient
<b>S</b> Situation	<b>Situation:</b> Location of patient as appropriate Brief summary of patient's current status Is there a problem?
<b>B</b> Background	<b>Background:</b> Concise summary of reason for interdepartmental handover Summary of treatment to date Baseline observations (current admission) Vital Signs: BP, Pulse, Resps, S <sub>p</sub> O <sub>2</sub> , (F <sub>i</sub> O <sub>2</sub> ), Temp, AVPU. IMEWS (include previous IMEWS if appropriate) NEWS (include previous NEWS if appropriate)
<b>A</b> Assessment	<b>Assessment:</b> What is your clinical assessment of the patient at present?
<b>R<sub>3</sub></b> Recommendation Read-Back Risk	<b>Recommendation:</b> Specify your recommendations Read-Back: Recipient(s) to confirm handover information and responsibility Risk: Include the safety pause to identify possible risks

Adapted by GDG with permission from Dr S. Marshall, Monash University, Australia.

Taken from "Clinical Handover: An Inter-disciplinary Education Programme (2017)" - a quality improvement initiative supported by the Office of the Nursing and Midwifery Services Directorate (ONMSD) and the Nursing and Midwifery Planning and Development Units (NMPDUs), Dublin South, Kildare & Wicklow (DSKW) and the Midlands region.

ISBAR Template for Communication in relation to Deteriorating Patient					Version 1.0 2016
Bed No.	I = Identify	S = Situation	B = Background	A = Assessment	R = Recommendation

<b>ISBAR Communication Tool – Use with IMEWS</b>	
1. ASSESS THE WOMAN 2. READ MOST RECENT RECORDS 3. HAVE ACCESS TO THE CHART AT HAND IF POSSIBLE.	
Date of call: ...../...../..... Time of call: ..... Critical: Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>I</b> <b>Identify</b>	This is ..... Ward/Room name ..... Woman's name ..... Midwife/Nurse in charge ..... Dr Contacted .....
<b>S</b> <b>Situation</b>	Calling because IMEWS Score: ..... No. Yellow ..... No. Pink ..... or/and <input type="checkbox"/> Clinical Concern The parameter(s)/vital sign(s) that led to this score ..... Other problem as appropriate .....
<b>B</b> <b>Background</b>	Parity ..... Gestation ..... Relevant history: ..... Admitted with: .....
<b>A</b> <b>Assessment</b>	Issue prompting call ..... (Remember A, B, C, D, E)
<b>R</b> <b>Recommendations</b>	I need you to see this woman: <input type="checkbox"/> Now <input type="checkbox"/> Within 30 mins <input type="checkbox"/> Within 30-60 mins Alternative contact person if appropriate ..... What would you like done in the interim .....
Signature: ..... Printed Name: .....	

Adapted from University College Hospital Galway, University Maternity Hospital Limerick, St Luke's General Hospital Kilkenny

While the above may be useful for those using the IMEWS paper charts, whiteboards and SBAR Views may be used for MIN-CMS users.

## Appendix 14: The Safety Pause



Feidhmeannacht na Seirbhíse Sláinte  
Health Service Executive

We are all responsible... and together  
we are creating a safer healthcare system



Quality and Patient Safety Directorate

# THE SAFETY PAUSE: INFORMATION SHEET

*Helping teams provide safe quality care*

<b>Why</b>	Safety awareness helps all teams to be more proactive about the challenges faced in providing safe, high quality care for patients.
<b>Who</b>	Team lead and available multidisciplinary team members.
<b>When</b>	Any time (aim for a maximum of five minutes).
<b>How</b>	Focus on things everyone needs to know to maintain safety. Based on one question 'what patient safety issues do we need to be aware of today' - resulting in immediate actions. The four P's below provide examples to prompt the discussion (any prolonged discussion on specific issues can be deferred until after the safety pause).

<b>THE SAFETY PAUSE</b>	<b>QUESTION:</b>	<b>Examples</b>
	<b>WHAT PATIENT SAFETY ISSUES DO WE NEED TO BE AWARE OF TODAY?</b>	<ul style="list-style-type: none"> <li>■ <b>Patients:</b> are there two patients with similar names; patients with challenging behaviour; wandering patients; falls risk; self harm risk; or deteriorating patients?</li> <li>■ <b>Professionals:</b> are there agency, locum or new staff who may not be familiar with environment/procedures?</li> <li>■ <b>Processes:</b> do we have: new equipment or new medicinal products (are all staff familiar with these?); missing charts; isolation procedures required; or care bundles for the prevention and control of medical device related infections?</li> <li>■ <b>Patterns:</b> are we aware of any recent near misses or recently identified safety issues that affected patients or staff?</li> </ul>
		<b>Heads-up for today</b> <ul style="list-style-type: none"> <li>■ Challenges e.g. illness related leave, staffing levels, skill mix, demand surges.</li> <li>■ Meetings/training sessions staff need to attend e.g. mandatory training.</li> <li>■ New initiatives/information e.g. new protocols; feedback from external groups.</li> <li>■ Any other safety issues or information of interest to the team – has this been communicated to the team e.g. notice board/communication book/ patient status at a glance (PSAG) board/ other communication system etc.</li> </ul>
		<b>Patient Feedback</b> <ul style="list-style-type: none"> <li>■ Update on actions from recent patient feedback on their experience (complaints, concerns or compliments) that we need to be aware of today?</li> </ul>

<b>Follow-ups</b>	Issues raised previously (confirm included on existing risk register if appropriate), solutions introduced or being developed. For those involved in the 'productive ward' initiative this is an opportunity to review the 'safety cross' data and any improvements.
<b>Team morale</b>	Recent achievements, compliments from patients and what works well.

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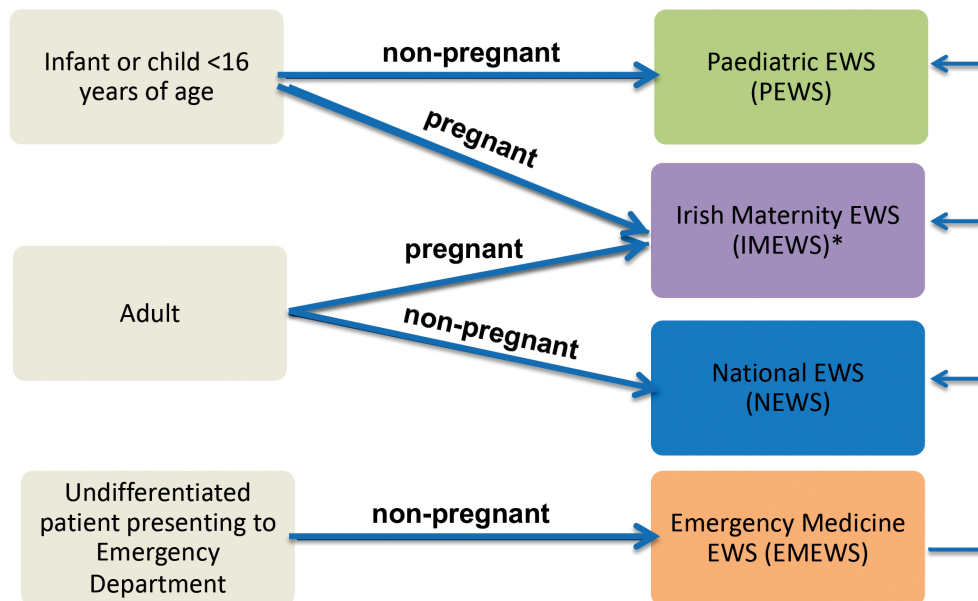
An initiative of the Quality and Patient Safety Directorate, May 2013

For further information see [www.hse.ie/go/clinicalgovernance](http://www.hse.ie/go/clinicalgovernance)

Tús Áite do  
Shábháilteacht 1 Othar  
Patient Safety 1 First

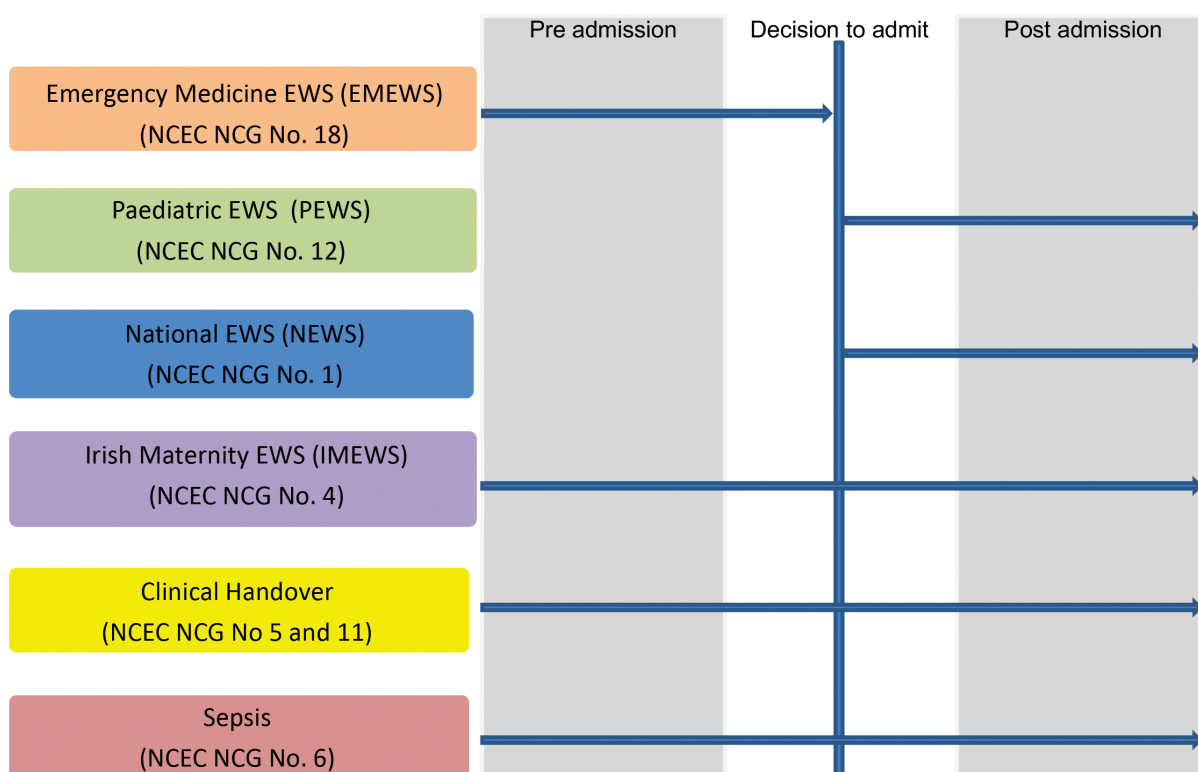
## Appendix 15: The assignment of Early Warning Systems

**Figure A3:** The assignment of Early Warning Systems



\* Pregnant or postpartum women presenting through the emergency department requiring neurological assessment will use the Glasgow Coma Scale on the EMEWS and vital sign observations on the IMEWS

**Figure A4:** The interface between IMEWS and the other NCEC National Clinical Guidelines.  
Adapted from NCEC NCG No. 18 EMEWS



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