

Canberra Hospital and Health Services

Clinical Procedure

Vital Signs & Early Warning Scores

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Purpose

To provide staff with clear guidelines on the measurement of vital signs and the documentation and escalation of Early Warning Scores (EWS) in the acute setting.

Each section throughout this procedure covers vital signs and EWS to aid in an improvement of patient outcomes, by detecting and acting upon early signs of physiological deterioration in patients. This will in part, be achieved through the measurement and documentation of vital signs and the implementation of the (EWS) system that:

- Improves the documentation of patient/consumers vital signs.
- Identifies trends in patient/consumer vital signs.
- Ensures timely patient/consumer review and appropriate management occurs.

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Alerts

The term Early Warning Score refers to the area specific warning score for the patient population including:

- MEWS - Adult Modified Early Warning Scores
- PEWS - Paediatric Early Warning Score
- Maternity MEWS - Maternity Modified Early Warning Score for all pregnant patients up until 6 weeks post-partum.
- NEWS – Neonatal Early Warning Score for all newborn babies up to 28 days after birth admitted within maternity.
- Specific Escalation procedures for specialised areas are included in Sections 24-26. Early Warning Scores do NOT replace calling the Medical Emergency Team (MET). If the patient meets the MET criteria a Code Blue/MET should be called.

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Scope

Each section outlines the scope pertaining to that particular observation and section.

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Section 1 – Adult Vital Signs

Scope

ACT Health clinical staff who are measuring vital signs or making assessment of adult patients in regards to possible clinical deterioration.

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This section excludes Adult Consumers in the Adult Mental Health Unit (see section 7), Paediatric patients (see section 10), Maternity patients admitted to the maternity wards (see section 15), Neonatal patients (see section 20), and Hospital in the Home (HITH) (Section 25).

Procedure

1.1. Core Vital Signs

The minimum vital signs to be recorded with each set of vital signs include:

- Respiratory Rate
- Oxygen Saturation
- Heart Rate
- Blood Pressure
- Temperature
- Sedation score

1.2. Frequency of Vital Signs

Minimum Frequency

- A full set of vital signs should be documented on all patients at the following times:
 - On admission and at time of initial assessment
 - Four hourly for patients in high dependency areas (e.g. ED, ICU – HDU, CCU & high dependency ward locations)
 - Four hourly for 48 hours on any patient admitted from the Emergency Department or transferred from a critical care area (e.g. ICU, CCU, ED, HDU) or following an inter-hospital transfer
 - Eight hourly on all patients unless otherwise specified
 - Visual observations of each patient should occur hourly at a minimum.

Increased frequency

- As prescribed by a medical officer
- If the patient’s condition deteriorates
- As per MEWS escalation plans (see section 5)
- Family member or carer concern
- Postoperatively as per Post-Operative Handover and Observations Procedure
- Post procedure as ordered
- Any staff member can increase the frequency of vital sign measurement
- In some clinical circumstances more frequent or less frequent observations will be appropriate and this should be documented in the progress notes, or on the observation chart variance to frequency
- In the event of Medical Emergency Team (MET) activation the patient will require 5 minutely vital signs until such time as the patient is stabilised and a management plan including frequency of vital signs has been documented
- Patients who present to hospital for a day procedure and/or are having frequent vital sign measurements related to their condition or treatment may not require temperature measurement with each set of vital signs. They should however have a temperature measured on initial assessment/arrival, and prior to discharge. During the period of

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increased frequency of vital signs the temperature should be recorded at minimum every four hours

- As per other clinical procedures.

Decreased Frequency

- Care type is Maintenance/Non Acute Care (NAC) (see section 1.3)
- Any decrease in frequency of vital sign monitoring must only be done on the direction of the team leader or a medical officer and must be documented in the clinical record
- In the event of a management plan to palliate it is appropriate to cease vital sign recording provided there is a clearly documented medical management plan.

A clear monitoring plan needs to be documented on each patient, including the frequency of observations, taking into account the patient’s diagnosis and proposed treatment.

ALERT:

Medical Emergency Team (MET) is comprised of qualified clinical staff activated by a call to respond to a deteriorating patient. This escalation is a single parameter track and trigger system based on set vital sign criteria or clinical staff concern.
See Code Blue Medical Emergency Procedures.

1.3. Maintenance/Non Acute Care (NAC) Care Type

- A maintenance/NAC care type is an admission where the primary treatment goal is to support the patient. For example patients awaiting transfer to a non-acute unit such as community aged care facility or respite care.
- Minimum frequency for NAC admission status patients is daily. These patients will remain on this regimen with the exception of:
 - Acute deterioration or condition requiring care type status change
 - Vital sign recording total MEWS ≥ 4 –increase frequency of vital signs per the MEWS ≥ 4 Escalation.
 - Prior to administration of medications that will directly affect the vital signs (see section 1.4)
 - Other specification documented by a medical officer in the patient record or other specification documented in local procedure or guideline.
- For admission to Brian Hennessy Rehabilitation Centre the minimum is weekly unless otherwise ordered in the medical management plan.

1.4. Vital Signs in relation to Medication Administration

- As per relevant policy, procedure and guideline documents (e.g. Blood transfusion, Patient Controlled Analgesia (PCA) Management, Epidural Infusion and Patient Controlled Epidural Analgesia (PCEA) Management, Intrathecal Epidural Morphine Opioids and Intravenous (IV) Opioid Infusions)
- Observations to be attended prior to administration of a medication in the following instances:
 - Immediately prior to any IV administration of medications where the side effects can result in bradypnoea, tachycardia or bradycardia, hypertension or hypotension or a

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reduced level of consciousness. This includes but is not limited to opioids and cardiac medications.

- For medications that may affect sedation the sedation score should be assessed and medical review of the patient should occur if the sedation score is Moderate prior to administration.
- For all other routes and other IV medications if observations have not been recorded within the previous 4 hours or if a concern has been identified at the previous set of vital signs.

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Section 2 – Adult Modified Early Warning Scores (MEWS)

2.1. Modified Early Warning Score

A Modified Early Warning Score (MEWS) refers to a track and trigger system where vital signs are recorded at the bedside and a score is allocated to the vital signs that are outside of the normal range. The individual vital sign scores are added to a total MEWS and can then indicate the severity of abnormal vital signs to assist in the identification of deteriorating patients. An increasing MEWS can then trigger, (if high enough), an escalation pathway for clinical review and management of the patient (section 4 & 5).

- A MEWS is to be calculated each time a set of vital signs is performed.
- If there is a high frequency of recorded vital signs (i.e. every 5-10 mins) the total MEWS is to be calculated every 30 minutes as a minimum.
- A MEWS of ≥ 4 requires actions to be taken as outlined in Section 5.

ALERT:

MEWS does NOT replace calling the Medical Emergency Team (MET).
If the patient meets the 4/MET criteria a Code Blue/MET should be called.

- The vital signs are to be documented on the relevant observation chart and each vital sign is allocated an early warning score.
- Each vital sign is to be documented graphically as this provides a visual cue to changes in the patient's condition.
- If the vital sign is outside the range of the graph then the numerical value should be recorded.

If an observation is attempted and no reading is able to be obtained, this needs to be documented on the MEWS chart. For example: 'BP unrecordable' is written in the BP section.

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ALERT:

- An unrecordable reading in any vital sign requires urgent review and MET/Code Blue should be considered.
- Oxygen should be prescribed by a medical officer.
- If oxygen is applied or the amount of oxygen increased, a medical officer must be notified to review even if the MEWS is less than 4.

2.2. Blood Pressure

The **Blood Pressure (BP)** score is determined by comparing the current systolic reading and the patient's usual Systolic Blood Pressure (UBP) and the greater the difference the greater the score. The patient's UBP is to be recorded on the observation chart in the space provided (see section 4).

2.3. Usual Systolic Blood Pressure (UBP)

The nursing staff may determine and document the UBP. If a UBP for the patient is unable to be determined then a target BP should be determined in consultation with medical staff.

ALERT:

A manual reading should be obtained if the automated blood pressure reading is outside the patient's usual range (high or low) or if the patient has an irregular heart rate. If the electronic reading does not measure on the second attempt use a manual cuff. Unrecordable manual BP requires urgent review and MET/Code Blue should be considered.

The UBP blood pressure is a guide and can be approximated from:

- Preadmission clinic.
- The discharge BP from previous hospital admission.
- Information from the patient and family, or a general practitioner.
- If no recorded history of UBP is obtainable then commence with a UBP of 130 mmHg and review by a medical officer within 4 hours of admission.
- There may be times when the UBP may change for a patient during the admission (e.g. started on an antihypertensive). If this occurs the time and date of the change and the reason for the change should be documented in the clinical record.

2.4. Variance to MEWS/MET

The Vital Sign normal ranges may be altered to allow for the usual vital signs relating to an individual patient's pre-existing conditions (e.g. chronic obstructive pulmonary disease). This is to be documented in the space provided on the front of the observation chart by a senior medical officer (Consultant or Registrar) and a valid until date, be documented.

This variation will result in an alteration to that individual's MEWS or to the MET criteria triggers.

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ALERT:

A variance should **not** be used in **acute** conditions. Physiological changes in these cases are indications of failure of oxygen delivery and escalation of treatment should apply.

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Section 3 – Adult Frequency of Observations for a Deteriorating Patient

2.5. Total MEWS ≥ 4

Observation Frequency

If the Total MEWS is ≥ 4 , the frequency of vital signs is escalated to a minimum of:

- Half hourly for the first hour (or more frequently if the patient's condition dictates).
- Then if the MEWS decreases to <4 :
 - Hourly for the next four hours,
 - fourth hourly for the next 24 hours,
 - unless otherwise specified.

If the Total MEWS is ≥ 4 , the patient also requires review by the Team Leader and the appropriate Medical Officer, as per the Escalation Process (section 5).

Escort Requirements

If the total MEWS is ≥ 4 , the following guide is to be used if the patient requires escort out of the clinical area:

- MEWS ≥ 4 Registered Nurse, who is appropriately skilled.
- MEWS ≥ 6 Registered Nurse & Intern/Resident Medical Officer (RMO).
- MEWS ≥ 8 Registered Nurse & Registrar.

ALERT:

If the Total MEWS is ≥ 4 the nurse **MUST** also notify the Team Leader or CNC to review the patient.

2.6. Post Code Blue/MET frequency

If the patient has had a Code Blue/MET call and remains on the general ward, the frequency of vital signs required is a minimum of:

- Half hourly for the first hour (or more frequently if the patient's condition dictates). Then if the MEWS decreases to <4 :
 - Hourly for the next four hours,
 - fourth hourly for the next 24 hours,
 - unless otherwise specified.

If the MEWS does not decrease below 4 then half hourly vital signs need to be continued and further review and escalation is required.

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ALERT:
 The MEWS chart is a tool and should be used in conjunction with sound clinical judgement. There will be patients who will not score a MEWS ≥ 4 . However, review by a medical officer will be in the best interest of the patient.

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Section 4 – Adult Modified Early Warning Scores & MET criteria

Table 1: Parameters for MEWS Calculation

MEWS	4/MET	3	2	1	0	1	2	3	4/MET
Respiratory Rate	≤ 4	5-8			9-20	21-24	25-30	31-35	≥ 36
Oxygen Saturation	≤ 84	85-89	90-92	93-94	≥ 95				
Temperature		≤ 34.0	34.1-35.0	35.1-36.0	36.1-37.9	38.0-38.5	≥ 38.6		
Heart Rate	≤ 39			40-49	50-99	100-109	110-129	130-139	≥ 140
Sedation Score					Awake		Mild	Moderate	Severe

Table 2: Systolic Blood Pressure Scoring

Usual / Target SBP:												
Circle the column showing the patient's usual systolic BP												
	190	180	170	160	150	140	130	120	110	100	90	80
Write ≥ 200	0	0	1	1	2	2	2	3	3	4	5	5
190-199	0	0	0	1	1	1	2	2	3	3	4	4
180-189	0	0	0	0	0	1	1	2	2	3	3	4
170-179	1	0	0	0	0	1	1	2	2	3	3	3
160-169	1	1	0	0	0	0	0	1	1	2	2	2
150-159	1	1	1	0	0	0	0	0	1	1	2	2
140-149	2	1	1	1	0	0	0	0	0	1	1	1
130-139	2	2	1	1	0	0	0	0	0	0	0	0
120-129	2	2	2	1	1	0	0	0	0	0	0	0
110-119	3	2	2	2	1	1	0	0	0	0	0	0
100-109	3	3	3	2	2	2	1	1	0	0	0	0
90-99	4	3	3	3	2	2	2	2	1	1	0	0
80-89										1	0	
70-79	4/MET											
60-69												
50-59												
40-49												
30-39												
Write ≤ 29												

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Section 5 – Adult Escalation Process

Table 2: MEWS Escalation

MEWS Escalation Table				
MEWS	Notify	Escalate	Observations	Intra Hospital Escort
MEWS 4-5	<ul style="list-style-type: none"> Team Leader RMO to review within 30 minutes 	After 60 minutes if nil review or nil improvement escalate per MEWS 6-7	Vital Signs: <ul style="list-style-type: none"> ½ hourly for 1 hour Commence Fluid Balance Chart If patient improves, decrease frequency of vital signs to: <ul style="list-style-type: none"> Hourly for 4 hours 4 hourly for 24 hours 	RN/RM
MEWS 6-7	<ul style="list-style-type: none"> Team Leader Registrar to review within 30 minutes 	After 60 minutes if nil review or nil improvement escalate per MEWS ≥8		RN/RM and RMO
MEWS ≥8	<ul style="list-style-type: none"> Team Leader Registrar to review immediately Consultant 	Consider MET if nil review or nil improvement		RN/RM and Registrar

Figure 2: MET Criteria Escalation process

MET Criteria

Dial “8” or use Code Blue Button

- Any observation in the 4/MET zone
- Airway threat
- Respiratory or cardiac arrest
- Sudden drop in level of consciousness
- Repeated or prolonged seizures
- Any patient you are worried about that does not fit the above criteria

MEWS does NOT replace calling the Medical Emergency Team (MET). If the patient meets the 4/MET criteria a MET/Code Blue should be called.

Note:

Please note there are area specific escalation pathways for some units in relation to escalation. Ensure those pathways are followed in the event of a high MEWS. These pathways will be documented locally. See Section 25 or 26 or 27 for specific pathways for HITH, PACU, and GEHU.

Any escalation should be documented on the patient’s record and/or the observation chart.

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Section 6 – MEWS Escalation Communication Process

The “**ISBAR**” communication tool is an easy, structured and useful tool to help communicate concern to relevant clinicians. This is recommended in communicating MEWS escalation for the deteriorating patient.

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IDENTIFY: Identify yourself, who you are talking to and who you are talking about.

SITUATION: What is the current situation, concerns, observations and MEWS?

BACKGROUND: What is the relevant background? This helps set the scene to interpret the situation above correctly.

ASSESSMENT: What do you think the problem is?

RECOMMENDATION: What do you need them to do? What do you recommend should be done to correct the current situation?

Note:

The 'ISBAR' communication tool is also recommended for clinical handover.

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Section 7 – Vital Signs Adult Mental Health Unit

Scope

This section relates to clinical staff working in the Adult Mental Health Unit (AMHU).

This section applies to mental health consumers admitted to AMHU only.

For all other mental health consumers, including Mental Health Assessment Unit (MHAU), please see section 1 Adult Vital Signs.

For Brian Hennessey Rehabilitation Centre see section 1.3 Maintenance/Non Acute Care Admissions.

7.1. Core Vital Signs

The minimum vital signs to be recorded with **each** set of vital signs include:

- Respiratory Rate
- Oxygen Saturations (SpO₂)
- Heart Rate
- Blood Pressure (BP)
- Temperature
- Sedation Score

7.2. Frequency of Vital Signs

Minimum Frequency

- A full set of vital signs should be documented on all consumers at the following times:
- On admission and at time of initial assessment.

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- Minimum of 12 hourly observations on all consumers unless otherwise specified, and in addition as prescribed by a Medical Officer.
- See section 1.2.

Increased frequency

- If the consumer's condition deteriorates.
- As prescribed by a Medical Officer.
- Prior to administration of medications that will directly affect vital signs e.g. Clozapine, cardiac medications, Olanzapine - pamoate monohydrate (Relprev) (See section 1.4 Medication Administration).
- Certain consumers will require more frequent observations during their period of deterioration. These include:
 - Consumers requiring sedation for a procedure.
 - Consumers having a MET call. These consumers will require five minutely vital signs to be attended until such time that the consumer is stabilised and a medical management plan, including required frequency of vital signs has been documented.

If the consumer has had a MET call and remains in the AMHU, the frequency of vital signs required is a minimum of:

- Half hourly for the first hour.
- Hourly for the next four hours once the MEWS has decreased <4.
- Fourth Hourly for the next 24 hours.
- Unless otherwise specified.
- As per MEWS escalation plans (see section 5).
- See section 1.2.
- Any staff member can increase the frequency of vital sign monitoring.
- In some clinical circumstances more frequent or less frequent observations will be appropriate and this should be documented in the progress notes or as identified on front of the MEWS chart.

Decreased Frequency

- Admission status is Non Acute Care (NAC) (see section 1.3).
- Any decrease in frequency of vital sign monitoring must only be done on the direction of the team leader or a medical officer and must be documented in the clinical record.

A clear monitoring plan needs to be documented on each consumer including the frequency of observation, taking into account the consumer's diagnosis and proposed treatment.

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Section 8 – Adult Modified Early Warning Score (MEWS) - AMHU

8.1. Modified Early Warning Score

- A MEWS is to be calculated each time a set of vital signs is performed.

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- A MEWS of ≥ 4 requires actions to be actioned, as outlined in section 5.

ALERT:

MEWS does NOT replace calling the Medical Emergency Team (MET).
If the patient meets the 4/MET criteria a MET/Code Blue should be called.

- The vital signs are to be documented on the relevant observation chart.
- Each vital sign is to be documented graphically as this provides a visual cue to changes in the consumer’s condition.
- If the vital sign is outside the range of the graph then the numerical value should also be recorded.
- Each vital sign is allocated an Early Warning Score.

Following documentation of the complete set of vital signs a total MEWS is calculated by adding the individual scores (Section 4).

If an observation is attempted and no reading is able to be obtained, this needs to be documented on the MEWS chart. E.g. ‘BP unrecordable’ is written in the BP section.

ALERT:

An unrecordable reading requires urgent review and MET/Code Blue should be considered.
Oxygen should be prescribed by a medical officer.
If oxygen is applied or the amount of oxygen increased, the medical officer must be notified to review even if the MEWS is less than 4.

8.2. Blood Pressure

The **blood pressure (BP)** score is determined by comparing the current systolic reading and the consumer’s usual systolic blood pressure (UBP) and the greater the difference the greater the score. The consumer’s UBP is to be recorded on the observation chart in the space provided (Section 4).

8.3. Usual Systolic Blood Pressure (UBP)

The nursing staff may determine and document the UBP. If a UBP for the consumer is unable to be determined then a target BP should be determined in consultation with the medical staff.

The UBP is a guide and can be approximated from:

- The discharge BP from previous hospital admission
- Information from the consumer and family, or a general practitioner
- A stable reading where 4-5 readings are similar and the other vital signs are normal.
- If no recorded history of usual BP obtainable then commence with a UBP of 130 mmHg and review by a medical officer within 4 hours of admission.
- There may be times when the UBP may change for a consumer during the admission (e.g. started on an antihypertensive). If this occurs the time and date of the change and the

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reason for the change should be documented in the clinical record and the consumer should be reviewed at 72 hours.

ALERT:

A manual reading should be obtained if the automated blood pressure reading is outside the consumer's usual range (high or low) or if the consumer has an irregular heart rate. If the electronic reading does not measure on the second attempt use a manual cuff. Unrecordable manual BP requires urgent review and MET/Code Blue should be considered.

8.4. Variance to MEWS/MET

- The MEWS may be altered to allow for the usual vital signs relating to an individual consumer's pre-existing conditions (e.g. chronic lung disease). This is to be documented in the space provided on the observation charts by a senior medical officer (Consultant or Registrar) and a valid until date, be documented. (See section 2.4)

ALERT:

A variance should **not** be used in **acute** conditions. Physiological changes in these cases are indications of failure of Oxygen delivery and escalation of treatment should apply.

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Section 9 – Frequency of Observations for the Deteriorating Consumer

9.1. Total MEWS \geq 4**Observation Frequency**

If the total MEWS is \geq 4, the frequency of vital signs is escalated to a minimum of:

- Half hourly for the first hour (or more frequently if the consumer's condition dictates).
- Then if the MEWS decreases to $<$ 4:
 - Hourly for the next four hours.
 - Fourth Hourly for the next 24 hours.
 - Unless otherwise specified.

If the total MEWS is \geq 4, the consumer also requires review by the Team Leader and the appropriate Medical Officer as per the Escalation Process (section 5).

ALERT:

At the time of reaching a trigger/score the nurse **MUST** also notify the shift Team Leader or CNC to review the consumer.

Post Code Blue/MET frequency

If the consumer has had a Code Blue/MET call and remains in AMHU, the frequency of vital signs required is a minimum of:

- Half hourly for the first hour (or more frequently if the consumer's condition dictates).

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- Then if the MEWS decreases to <4:
 - Hourly for the next four hours.
 - Fourth Hourly for the next 24 hours.
 - Unless otherwise specified.

If the MEWS does not decrease below 4 then half hourly vital signs need to be continued and further review and escalation is required.

If the MEWS is elevated ≥ 4 , the following guide is to be used if the consumer requires escort out of the clinical area.

- MEWS ≥ 4 Registered Nurse, who is appropriately skilled.
- MEWS ≥ 6 Registered Nurse & Intern/Resident Medical Officer (RMO).
- MEWS ≥ 8 Registered Nurse & Registrar.

ALERTS:

The MEWS chart is a tool and should be used in conjunction with sound clinical judgement. There will be consumers who will not score a MEWS ≥ 4 ; however, review by a medical officer is in the best interest of the consumers.

Any escalation should be documented on the observation chart and/or the consumer's record.

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Section 10 – Paediatric Vital Signs

Scope

This section pertains to nurses and medical staff working in clinical areas with paediatric patients.

For neonates in maternity, Neonatal Early Warning Score (NEWS) charts are to be used (See section 20). Neonates in maternity are excluded from use of Paediatric Early Warning Score (PEWS) charts.

10.1. Core Vital Signs

The minimum vital signs to be recorded with each set of vital signs include:

- Respiratory Rate
- Effort of Breathing
- Oxygen Saturation
- Heart Rate
- Blood Pressure
- Temperature
- Level of Consciousness

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10.2. Frequency of Vital Signs

Minimum Frequency

A full set of vital signs should be documented on all paediatric patients at the following times:

- On admission and at time of initial assessment, and
- every four hours
- unless otherwise specified by a medical officer.

Increased Frequency

- If the patient's condition deteriorates.
- As prescribed by a Medical Officer.
- If receiving oxygen or is febrile, vital signs are to be attended hourly.
- As per PEWS escalation plan (See section 14).
- Family member or carer concern.
- Postoperatively as per relevant Procedure:
 - On immediate return to ward perform a full set of vital signs.
 - Then all vital signs half hourly for four hours and hourly for four hours. Blood Pressure (BP) is recorded in the initial set and then excluded unless the medical condition requires or PEWS is ≥ 6 or as directed by a medical officer.
 - Temperature is recorded every four hours if within normal range.
 - Adolescent patients require a full set of vital signs on return toward, then half hourly vital signs for two hours and hourly for four hours.
 - Infants under six months of age should receive overnight continuous pulse oximetry.
 - Day Patients who have had a day procedure under a gas anaesthetic require a minimum of three sets of half hourly vital signs. Those who have received IV narcotic analgesia or sedation in addition to the gas anaesthetic require five sets of half hourly vital signs.
- Visual observations of each patient should occur at a minimum every hour.
- As per other Procedures (i.e. blood transfusion, Patient Controlled Analgesia (PCA) Management, IV opioid infusions).
- Observations to be attended prior to administration of a medication (not listed above).
Monitoring in these instances should occur:
 - Immediately prior to any IV administration of medications where the side effects can result in tachy/bradypnoea, tachy/bradycardia, hyper/hypotension or a reduced level of consciousness this includes but is not limited to opiates and cardiac medications.
 - For all other routes and other IV medications if observations have not been recorded within the previous four hours or if a concern has been identified at the previous set of vital signs.
 - For opioids level of consciousness should be assessed and medical review of the patient should occur if the level of consciousness is reduced (only Responds to Pain) prior to administration.
- Any staff member can increase the frequency of vital signs.
- In some clinical circumstances more frequent or less frequent vital signs will be appropriate and this should be documented in the monitoring plan.

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Decreased Frequency

- Any decrease in frequency of vital signs must only be done on the direction and documentation of the team leader or a medical officer.

10.3. Blood Pressure

All children must have their blood pressure (BP) measured with an appropriate sized cuff:

- On admission.
- When the PEWS is ≥ 6 .
- Pre-operatively.
- On return to ward Post-operatively.

Blood pressure should be measured four hourly for a child/adolescent of any age who presents with any of the following conditions:

- Clinical signs of deterioration and/or shock.
- Requiring intravenous therapy bolus (≥ 10 mls/kg).
- Renal or cardiac disease.
- Diabetic ketoacidosis or adrenal disorders.
- Neurological presentations such as head injury, encephalopathy, suspected raised intracranial pressure, and focal neurological signs.
- Suspected sepsis.
- Significant trauma including burns (≥ 10 %).
- Suspected poisoning/ingestion.

Note:

Recording of the blood pressure may be more frequent if prescribed by a medical officer or if the child/adolescent is unwell.

ALERT: BP Cuff Size

- The cuff **bladder width** should be approximately 40% of the circumference of the arm. This can be measured by holding the blood pressure cuff lengthwise and measuring the bladder width at a point midway between the olecranon (bony extremity of the shoulder girdle) and acromion (tip of the elbow). (Note that most blood pressure cuffs have a horizontal double sided arrow near the bladder which can also be used to measure bladder width on the patient).
- Cuff **bladder length** should cover 80% to 100% of the circumference of the arm
- The **cuff width** should cover 70% of the distance between the acromion and the olecranon.
- Cuff sizes differ among manufacturers (i.e. all "child size" cuffs are not made with the same dimensions), and choosing the wrong cuff size can lead to either obtaining a falsely elevated or underestimated BP reading (seen with a cuff that is too small or too large, respectively).

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10.4. Level of Consciousness

Level of consciousness should be documented with each set of observations this is achieved using the AVPU scale:

- A – Awake and alert or asleep with no clinical indication to wake for assessment
- V – Responds to voice
- P – Responds to pain
- U – Unconscious

In a **normally sleeping** patient level of consciousness can be documented as Alert where there is no clinical indication to wake the patient. The patient should be woken in the following circumstances:

- On admission to a unit.
- During post-operative period.
- Signs of clinical deterioration.
- Patients admitted with a neurological presentation or as indicated by section 8.3.
- In sleeping patients on frequent observations (i.e. a patient receiving oxygen therapy) level of consciousness needs to be measured minimum four hourly.

10.5. Age Specific Charts

The vital signs and PEWS are to be recorded on age specific observation charts, using corrected age for premature babies up until the age of 12 months:

- < 3 months observation chart.
- 3 – < 12 months observation chart.
- 1 – 4 years observation chart.
- 5 – 11 years observation chart.
- 12 to 17 years observation chart.

ALERT: High Care Observation chart

- The High Care Observation chart may be used in the High Care Ward for High Care patients requiring a high level of observation and monitoring. There are five age specific High Care Observation charts which cover the age ranges as described in 10.5.
- When using the high care observation chart additional observations are required, including air entry, skin colour and use of non-invasive ventilation.
- These patients require a minimum of hourly observations recorded unless;
- Documented otherwise by a medical officer, or
- The patient has a PEWS of ≥ 4 and requires an increase in observation frequency (minimum half hourly) until the PEWS decreases to less than 4.

10.6. Adolescent Patient

If an adolescent patient is admitted to an adult ward the Adult Vital Signs Procedure (section 1) and Adult Observation Chart may be used.

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10.7. Outpatients

All children who present for a planned outpatient appointment should have their vital signs recorded per the business rules of each clinic. If the child has any individual vital signs that measure outside the normal range then a full set of vital signs should be recorded. All children who have an unplanned assessment in the paediatric outpatient unit should have a full set of vital signs.

10.8. Monitoring Plan

A clear monitoring plan needs to be documented on each patient including the frequency of observations, taking into account the patient's diagnosis and proposed treatment.

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Section 11 – Paediatric Early Warning Scores

11.1. Paediatric Early Warning Score (PEWS)

Paediatric Early Warning Score (PEWS) refers to a track and trigger system where vital signs are recorded at the bedside and a score is allocated to the vital signs that are outside the normal range. The individual scores are summed to a total PEWS, which can indicate the severity of abnormal vital signs to assist in the identification of deteriorating patients. An increasing PEWS can trigger, (if high enough), the escalation pathway for clinical review and management of the patient (section 13 & 14).

- Each individual observation is scored according to the criteria in section 13 (Tables 4 – 10).
- The age specific observation charts include colour coding to determine the score for each parameter.
- Each vital sign is to be documented graphically to provide a visual cue of changes in the patient condition.
- If the vital sign is outside the range of the graph then the numerical value should be recorded.
- Each vital sign is allocated an Early Warning Score.
- The total PEWS is calculated by adding up the documented scores for each individual observation, and the total is then documented on the observation chart.
- A PEWS of ≥ 4 requires action to be taken per section 14.
- Central Capillary Refill is to be recorded (number of seconds for refill) with each set of vital signs in a child with a PEWS ≥ 6 , however this does not contribute a PEWS.
- If an observation is attempted and no reading is obtained due to child distress, this needs to be documented on the PEWS chart. E.g. “unable to perform due to child distress” is written in the relevant section.

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ALERT:

The vital signs should be recorded where possible when the child is at rest and not when they are distressed.

An immediate medical review is indicated for an unrecordable blood pressure as this is a very late sign of deterioration.

- PEWS does NOT replace calling the Medical Emergency Team (MET). If the patient meets the MET criteria a Code Blue/MET should be called as per Code Blue Medical Emergency Procedures.
- A Neonatal Code Blue should be called if the child is ≤ 10 months or ≤ 10 kilograms.

11.2. PEWS criteria for Effort of Breathing:

Advanced Paediatric Life Support (APLS) criteria for effort of breathing:

- Stridor
- Accessory muscle use
- Recession
- Wheeze
- Nasal flaring
- Grunting
- Gasping

Effort of breathing:

Normal = nil of the APLS criteria (PEWS 0)

Mild = presence of 1 APLS criteria (PEWS 1)

Moderate = presence of 2 APLS criteria (PEWS 2)

Severe = presence of 3 or more APLS criteria (PEWS 3)

11.3. Premature babies

PEWS Calculation is based on the age of child. Corrected age should be used for premature babies up until the age of 12 months.

11.4 Alteration to calling criteria and urgent review

- Alteration to calling criteria is a system that is used for a child that has either a chronic or an acute condition that may contribute to a high PEWS.
- An alteration to calling criteria is used to specify urgent recall parameters for respiratory rate, oxygen saturation, heart rate or blood pressure.
- The total PEWS is not altered to ensure that staff can track the ongoing condition of the patient. However, the escalation point changes from usual escalation at a PEWS ≥ 4 .
- The accepted parameters for the altered vital signs are documented on the chart after consultation with the Consultant.
- The management plan for frequency of ongoing vital signs is also documented.
- If the child's observations exceed the "urgent recall parameters" of the altered vital sign or the staff caring for the patient are worried, the child must be reviewed by a Registrar within 15 minutes, or have a MET activated per the escalation process in Section 14.

Documentation of alteration to calling criteria is to include: (front of observation chart)

- Date/Time

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- Reason for alteration
- Review date/time (not exceeding 24hours)
- Observation frequency
- Any additional instructions/comments
- RMO/Registrar name/signature (in consultation with Consultant)
- Consultant name/signature

Documentation of urgent recall parameters applicable to the vital sign/s for the patient's condition are to be documented adjacent to the correlating vital sign, in the left side column:

- Urgent review if RR is < _____ or > _____
- Urgent review if SpO₂ < _____
- Urgent review if HR < _____ or > _____
- Urgent review if Systolic BP < _____ or > _____

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Section 12 - Paediatric Frequency of Observation for a Deteriorating Child

12.1. PEWS ≥ 4

If the PEWS is ≥ 4, the frequency of vital signs is escalated to a minimum of:

- Half hourly for the first hour (or more frequently if the patient's condition dictates). Then if the PEWS decreases to <4:
 - Hourly for the next four hours.
 - Fourth Hourly for the next 24 hours.
 - Unless otherwise specified.

If the total PEWS is ≥4, the patient also requires review by the Team Leader and the appropriate level Medical Officer, as per the Escalation Process (section 14).

12.3. Escort off ward area

When the patient with PEWS ≥ 4 requires movement to another clinical area, the following escort should accompany the patient:

- PEWS ≥ 4 Registered Nurse, who is appropriately skilled.
- PEWS ≥ 6 Registered Nurse & JMO.
- PEWS ≥ 8 Registered Nurse & Registrar.

Consideration needs to be given to the requirement for off ward procedures and discussion initiated with treating team Consultant.

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Section 13 – Paediatric Early Warning Scores & MET criteria calculations

Table 4: Parameters for Respiratory Rate Calculations

Respiratory Rate	< 3 Months	3 - < 12 Months	1 – 4 Years	5 – 11 Years	12 – 17 Years
≥ 81	4/MET	4/MET	4/MET	4/MET	4/MET
75-80	3	4/MET	4/MET	4/MET	4/MET
70-74	3	4/MET	4/MET	4/MET	4/MET
65-69	2	4/MET	4/MET	4/MET	4/MET
60-64	1	4/MET	4/MET	4/MET	4/MET
55-59	0	3	4/MET	4/MET	4/MET
50-54	0	2	4/MET	4/MET	4/MET
45-49	0	1	3	4/MET	4/MET
40-44	0	0	2	3	4/MET
35-39	0	0	1	2	4/MET
30-34	0	0	0	1	2
25-29	1	0	0	0	1
20-24	4/MET	1	0	0	1
15-19	4/MET	2	1	1	0
10-14	4/MET	4/MET	2	2	0
5-9	4/MET	4/MET	4/MET	4/MET	3
0-4	4/MET	4/MET	4/MET	4/MET	4/MET

Table 5: Parameters Heart Rate Calculations

Heart Rate	< 3 Months	3 - < 12 Months	1 – 4 Years	5-11 Years	12- 17 Years
≥200	4/MET	4/MET	4/MET	4/MET	4/MET
190-199	4/MET	4/MET	4/MET	4/MET	4/MET
180-189	3	4/MET	4/MET	4/MET	4/MET
170-179	2	3	4/MET	4/MET	4/MET
160-169	1	2	3	4/MET	4/MET
150-159	0	1	2	3	4/MET
140-149	0	0	1	2	4/MET
130-139	0	0	0	1	3
120-129	0	0	0	0	2
110-119	0	0	0	0	2
100-109	0	0	0	0	1
90-99	0	0	0	0	0
80-89	1	1	1	1	0
70-79	2	2	2	2	0
60-69	3	3	3	3	1
50-59	4/MET	4/MET	4/MET	4/MET	2
< 50	4/MET	4/MET	4/MET	4/MET	4/MET

Table 6: Parameters for Blood Pressure Calculations

Systolic Blood Pressure	< 3 Months	3 - < 12 Months	1 – 4 Years	5 – 11 Years	12 – 17 Years
>150	4/MET	4/MET	4/MET	4/MET	3
145-150	4/MET	4/MET	4/MET	3	3
140-144	4/MET	4/MET	3	3	3
135-139	4/MET	4/MET	3	3	2
130-134	4/MET	2	2	3	2
125-129	4/MET	2	2	2	1
120-124	3	2	2	1	0
115-119	3	1	1	0	0
110-114	2	1	1	0	0
105-109	2	0	0	0	0
100-104	1	0	0	0	0
95-99	0	0	0	0	0
90-94	0	0	0	0	0
85-89	0	0	0	1	3
80-84	0	0	0	2	4/MET
75-79	0	0	2	4/MET	4/MET
70-74	1	2	4/MET	4/MET	4/MET
65-69	2	4/MET	4/MET	4/MET	4/MET
60-64	3	4/MET	4/MET	4/MET	4/MET
55-59	4/MET	4/MET	4/MET	4/MET	4/MET
50-54	4/MET	4/MET	4/MET	4/MET	4/MET
<45-49	4/MET	4/MET	4/MET	4/MET	4/MET

ALERT:

Blood Pressure is to be measured and recorded if the Total PEWS is ≥ 6 and should be continued until the Total PEWS is < 6 .

Table 7: Parameters for Oxygen Saturation Calculations

PEWS for Oxygen Saturation (%)				
0	1	2	3	4/MET
≥ 95	90-94	87-89	85-86	≤ 84

Table 8: Parameters for Oxygen delivery Calculations

Oxygen delivery			
PEWS	0	1	2
< 12 Years	Room Air Nasal Prongs Hudson Mask 4L	HFNP $\leq 1.5L/kg$ or HFNP with $FiO_2 \leq 40\%$ or Hudson Mask $>4L$	HFNP $\geq 1.6L/kg$ or HFNP with $FiO_2 > 40\%$
12-17 Years	Room Air Nasal Prongs	HFNP $\leq 1.5L/kg$ or	HFNP $\geq 1.6L/kg$ or

Oxygen delivery			
PEWS	0	1	2
	Hudson Mask 6L	HFNP with FiO ₂ ≤ 40% or Hudson Mask >6L	HFNP with FiO ₂ > 40%
High Care Charts			CPAP

ALERT:

Oxygen should be prescribed by a medical officer. If oxygen is applied or the amount of oxygen increased, the medical officer must be notified to review even if the PEWS is less than 4

Table 9: Parameters for Temperature Calculations

Temperature (°Celsius)				
PEWS	0	1	2	3
< 3 Months	36.5 – 37.4	36.0 – 36.4, 37.5 – 37.9	< 35.5-35.9	> 38
≥ 3 Months	36.1 – 37.9	≤36 38 – 39	≥39.1	

Table 10: Parameters for Level of Consciousness Calculations

Level of Consciousness	PEWS
A-Alert	0
V-Responds to Voice	1
P-Responds to Pain	3
U-Unresponsive	4/MET

ALERT:

If a child has as an AVPU of P (Responds only to Pain) or U (Unresponsive) a Glasgow Coma Scale should be commenced as per Neurological Observation Procedure and appropriate medical review requested.

The PEWS criterion is a tool and does not replace sound clinical judgement. There will be patients who will not score a PEWS ≥ 4; however review by medical officer would be in the best interest of the patient.

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Section 14 – Paediatric Escalation Process

Figure 3: Paediatric Early Warning Score Escalation Flowchart

PEWS Escalation Table			
PEWS	Notify	Escalate	Intra hospital escort
PEWS 4-5	Team Leader. RMO review within 30 minutes	After 60 minutes if no review and/or no improvement escalate per PEWS 6-7	RN
PEWS 6-7	Team Leader. Registrar review within 30 minutes	After 60 minutes if no review and/or no improvement escalate per PEWS ≥ 8	RN and RMO
PEWS ≥ 8	Team Leader. Registrar review immediately. Contact Consultant	Consider MET if no review and/or no improvement	RN and Registrar
Alteration to calling criteria → Patient meeting urgent review criteria → Registrar review within 15 minutes		Consider MET if no review and/or no improvement	RN and Registrar
Vital sign frequency and actions for PEWS ≥4: → ½ hourly for 1 hour → Commence fluid balance chart → If PEWS ≥ 6 BP must be measured with each set of vital signs If patient improves decrease frequency of vital signs to: → Hourly for 4 hours → 4 hourly for 24 hours			

Any escalation should be documented on the observation chart and/or the patient’s record.

Figure 4: Paediatric MET Criteria

MET Criteria (Dial “8” for MET)
Neonatal MET if < 10 months or < 10 kg
Paediatric MET if > 10 months or > 10 kg
<ul style="list-style-type: none"> Any observation in the 4/MET zone SpO₂ < 90% on any O₂ SpO₂ < 60% in patients with Cyanotic Heart Disease on any O₂ Airway threat Respiratory or cardiac arrest Sudden drop in level of consciousness Repeated or prolonged seizures Severe or worsening respiratory distress, exhaustion or apnoea Any patient you are worried about that does not fit the above criteria

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Section 15 – Maternity Vital Signs

Scope

A Maternity Modified Early Warning Score (MEWS) chart is to be used for all women admitted to Maternity who are pregnant women or up to six weeks postpartum. If moving to a Partogram, document according to the Partogram form.

- Use the Antenatal Maternity General Observation Chart (MEWS) for all antenatal women.
- Use the Postnatal Maternity General Observation Chart (MEWS) for all birthing and postnatal women.
- Use the General Observation Chart – Adult (MEWS) for adult gynaecological patients and maternity patients admitted to general ward areas. The Adult Vital Sign Procedure (sections 1-5) applies.

15.1. Core Vital Signs

The minimum vital signs to be recorded with each set of vital signs include:

- Respiratory Rate
- Oxygen Saturations
- Heart Rate
- Blood Pressure
- Temperature
- Sedation Score

15.2. Frequency of Vital Signs

Minimum frequency

- Observations are to be performed a minimum of eight hourly unless otherwise specified in the management plan.
- A Maternity MEWS is to be calculated each time a set of observations is performed.

Increased frequency

- Vital signs can be performed more frequently as per documented procedures and/or the woman's clinical condition.
- For guidelines for deteriorating patient see Maternity MEWS or Adult (section 1.2).

Decreased Frequency

- Any decrease in frequency of vital signs must only be done on the direction and documentation of the team leader or a medical officer.
- Non-maternity patients see Adult Vital Signs (section 1).

15.3. Obtaining an Antenatal or Postnatal Maternity MEWS

- Antenatal and Postnatal Maternity MEWS must be scored whenever observations are taken for ALL antenatal or postnatal women who are inpatients of the maternity unit.
- For non-maternity patients see Adult Vital Signs (Section 1).

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- Each individual observation is scored according to the Antenatal or Postnatal Maternity MEWS criteria (see section 18 – Antenatal and Postnatal Maternity MEWS).
- The total MEWS is calculated by adding up the scores for each individual observation. The total is then documented on the observation chart.

15.4. Blood Pressure (BP)

- In the Antenatal and Postnatal Maternity MEWS chart, both Systolic and Diastolic Blood Pressures are utilised to calculate the total score (see section 18 Antenatal and Postnatal Maternity MEWS).
- Booking BP is to be documented on the Antenatal and Postnatal Maternity MEWS observation chart.
- Booking BP is the BP taken at the first antenatal appointment/presentation.

15.5. Variance to MEWS/MET

The Maternity MEWS may be altered to allow for the usual vital signs relating to an individual patient's pre-existing conditions (e.g. cardiac or lung disease). This is to be documented in the space provided on the observation charts by a senior medical officer (Consultant or Registrar) and a valid until date, be documented (see section 2.4).

ALERT:

A variance should **not** be used in **acute** conditions. Physiological changes in these cases are indications of failure of oxygen delivery and escalation of treatment should apply.

15.6. Antenatal Maternity Observations

Specific antenatal observations are to be performed and recorded on the back of the antenatal maternity observation chart.

These observations include:

- Antenatal blood loss
- Liquor
- Fetal Heart Rate

The frequency of these observations will depend on the frequency as stipulated in the Woman's Care Plan. These observations do not add to the woman's Antenatal Maternity MEWS. However, if these observations are abnormal (for example increasing blood loss) appropriate escalation is required.

15.7. Postnatal Maternity Observations

Specific postnatal observations are to be performed and recorded on the back of the Postnatal Maternity Observation chart.

These observations include:

- Fundus
- Perineum
- Lochia

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- Caesarean Section Wound Check

The frequency of these observations will depend on the frequency as stipulated in the Woman's Care Plan. These observations do not add to the woman's Postnatal Maternity MEWS. However, if these observations are abnormal (for example boggy fundus) appropriate escalation is required.

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Section 16 – Maternity Modified Early Warning Score (MEWS)

The Antenatal and Postnatal Maternity Modified Early Warning Score (MEWS) refers to a track and trigger system where vital signs are recorded at the bedside and a score is allocated to the vital signs that are outside of the normal range. The sum of the individual scores can indicate the severity of abnormal vital signs and assist in the identification of deterioration. An increasing Antenatal or Postnatal Maternity MEWS can trigger (if high enough) the escalation pathway for clinical review and management of the patient (see section 19).

- Vital signs are to be documented on the most relevant observation chart.
- Each vital sign is to be documented graphically, as this provides a visual cue to changes in the patient's condition.
- If the vital sign is outside the range of the graph, the numerical value should also be recorded.
- Each individual observation is allocated a Maternity Modified Early Warning Score.
- A Maternity MEWS is to be calculated each time a set of vital signs is performed.
- If there is a high frequency of recorded vital signs (i.e. every 5-10 mins) then a total Maternity MEWS is to be calculated every 30 minutes as a minimum.
- A Maternity MEWS of ≥ 4 requires actions to be taken as outlined in section 19.

ALERT:

Maternity MEWS does NOT replace calling the Medical Emergency Team (MET). If a woman meets the 4/MET criteria a Code Blue/MET should be called.

Following documentation of the complete set of vital signs a total Maternity MEWS is calculated by adding the individual scores (section 18).

If an observation is attempted and no reading is able to be obtained, this needs to be documented on the Antenatal or Postnatal Maternity MEWS chart. E.g. 'BP unrecordable' is written in the BP section.

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ALERT:

An unrecordable reading requires urgent review and MET/Code Blue should be considered.

Oxygen should be prescribed by a medical officer.

If oxygen is applied or the amount of oxygen increased, the medical officer must be notified to review even if the Antenatal or Postnatal Maternity MEWS is less than 4.

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Section 17 – Maternity Frequency of Observations for a Deteriorating Patient

17.1. For women with a Maternity MEWS ≥ 4

Frequency of vital signs

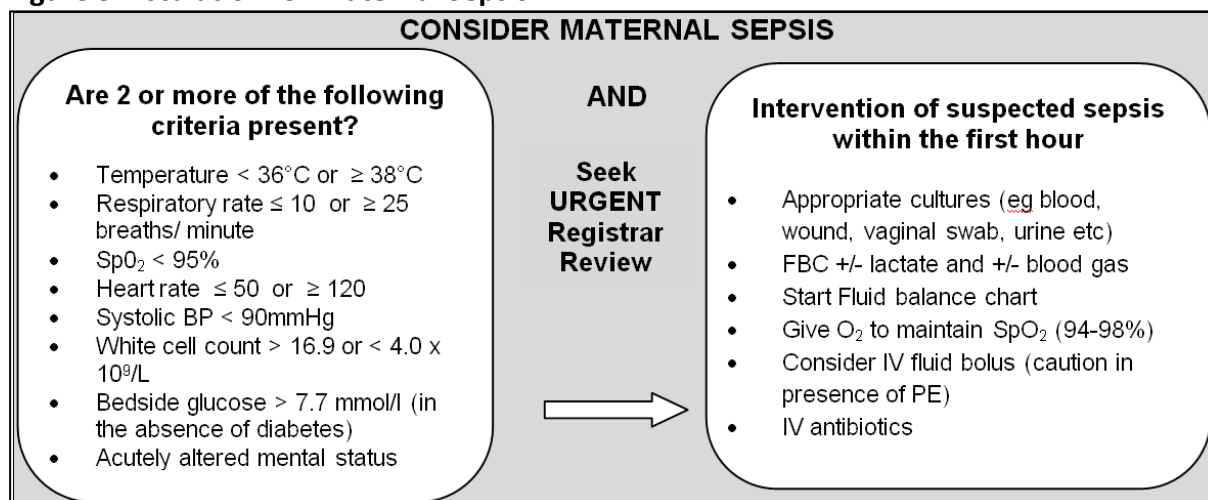
- Half hourly for the first hour (or more frequently if the patient's condition dictates).
- Then if the MEWS decreases to <4 :
 - Hourly for the next four hours.
 - Fourth Hourly for the next 24 hours.
 - Unless otherwise specified.
- If the total MEWS is ≥ 4 , the patient also requires review by the Team Leader and the appropriate level Medical Officer, as per the Escalation Process (Section 19).
- Women receiving a Magnesium sulphate infusion (already on hourly observations) will still trigger increased frequency of observations if they have a MEWS score of ≥ 4 .
- If the Antenatal or Postnatal Maternity MEWS is ≥ 4 the midwife MUST also notify the Team Leader or CMC.

Consult with the Obstetric Registrar/RMO for review within 30 minutes if any two of the following is present or if you are concerned:

- Diastolic BP > 90
- Protein $> +1$ in urine
- Visual disturbances
- Epigastric pain
- Headache
- If urine output is being monitored, $< 0.5\text{mls/kg/hour}$
- SBP > 160
- Brisk Reflexes

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Figure 5: Escalation for Maternal Sepsis



17.2. Escort off ward area

If the woman requires movement to another clinical area, the following escort should accompany the patient. Consideration needs to be given to the requirement for off ward procedures and discussion initiated with treating team consultant.

- Maternity MEWS 4-5 Registered Midwife/Nurse, who is appropriately skilled.
- Maternity MEWS 6-7 Registered Midwife/Nurse & a Medical Officer.
- Maternity MEWS ≥ 8 Registered Midwife/Nurse & Registrar.

ALERT:

The Maternity MEWS chart is a tool and should be used in conjunction with sound clinical judgement. There will be women who will not score a Maternity MEWS ≥ 4; however, review by medical officer will be in the best interest of the woman.

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Section 18 – Maternity Early Warning Scores & MET criteria calculations

Table 11: Parameters for Maternity MEWS

Maternity MEWS	4/MET	3	2	1	0	1	2	3	4/MET
Respiratory Rate (breaths per min)	≤ 4	5-8			9-20	21-24	25-30	31-35	≥36
Oxygen Saturation (%)	≤84	85-89	90-92	93-94	95-100				
Heart Rate (beats per min)	<40			40-49	50-99	100-109	110-129	130-139	≥140

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Maternity MEWS	4/MET	3	2	1	0	1	2	3	4/MET
Systolic Blood Pressure mmHg	<90				90-129	130-139	140-169	≥ 170	
Diastolic Blood Pressure mmHg		<45			45-89	90-99	100-109	≥ 110	
Temperature °C		≤ 34	34.1-35.9		36-37.4	37.5-37.9	38-38.9	≥39	
Sedation Score					Awake		Mild	Moderate	Severe

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Section 19 – Maternity MEWS Escalation

Table 12: Maternity MEWS Escalation Table

MEWS	Notify	Escalate	Observations	Intra-hospital escort
MEWS 4-5	Team Leader/CMC RMO to review within 30 minutes	After 60 minutes if nil review or improvement escalation as per MEWS 6-7	Vital signs: ½ hourly for 1 hour Commence fluid balance chart If woman improves, decrease vital sign frequency to: Hourly for 4 hours 4 hourly for 24 hours	Registered Nurse/Midwife
MEWS 6-7	Team Leader/CMC Registrar to review within 15 minutes	After 60 minutes if nil review or improvement escalation as per MEWS ≥ 8		Registered Nurse/Midwife & RMO
MEWS ≥ 8	Team Leader/CMC Contact Registrar to review immediately Contact Consultant	Consider MET if nil review or improvement		Registered Nurse/Midwife & Registrar

Any escalation should be documented on the observation chart and/or the clinical record.

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Section 20 – Neonatal Vital Signs

Scope

This section applies to:

- All newborn babies up to 28 days after birth outside of the Neonatal Intensive Care unit and Special Care Nurseries.
- This section does not apply to admissions to the Paediatric wards or Emergency Department (See Paediatric Vital Signs and Early Warning Scores section 11).

20.1. Core Vital Signs

The minimum vital signs to be recorded with each set of vital signs include:

- Respiratory Rate
- Effort of Breathing
- Oxygen Saturations
- Temperature
- Heart Rate

20.2. Frequency of Vital Signs

- Every newborn will have a risk assessment completed within one hour of birth, regardless of the location of birth.
- The risk assessment will be done by the midwife caring for the baby.
- The risk assessment will determine the interval of vital sign observations, which are recorded on the NEWS chart.
- All babies without risk factors will have a minimum of eight hourly vital signs measured unless otherwise documented in the management plan.
- All babies with risk factors will continue with frequency per the risk assessment unless otherwise documented in the management plan.

20.3. Risk Assessment

Table 13: Newborn Risk assessment

Neonatal Risk Assessment	
1.	Within 1 hour of birth ALL neonates require a risk assessment.
2.	Complete the following for ALL neonates prior to transfer between wards:
a.	Check heart rate, respiratory rate, temperature, oxygen saturation on foot ($\geq 95\%$) and record on Neonatal Early Warning Score (NEWS) Chart.
b.	Review cord gas if taken
3.	Postnatal period: Review risk assessment checklist and continue NEWS observation as per Procedure. Observations may be performed around feeds.
4.	When recording vital signs: Observations in coloured zone are scored. These scores are totalled to give a total NEWS. NOTE: frequency of observation intervals outlined below does not dictate timing of discharge.
5.	All neonates without risk factors are to have 8 hourly observations and risk assessed for Hypoglycaemia and Jaundice according to the relevant Procedures; <i>Hypoglycaemia and Jaundice in the Newborn.</i>

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Neonatal Risk Assessment to be attended within one hour of birth					
Risk factor Assessment (tick as applicable) ✓	Yes	No	Initial Observation intervals	Minimum ongoing observation frequency whilst in	Observe for:
Is this neonate at risk of Respiratory Distress/Infection or hypoglycaemia?					
Maternal Opioid within 4 hours of birth (eg Morphine, Codeine, Remifentanyl, Fentanyl, Oxycodone, Tramadol, Pethidine, Methadone, Heroin)	<input type="checkbox"/>	<input type="checkbox"/>	Hourly for 4 hours →	8 hourly	Respiratory depression Poor feeding
Meconium in liquor – healthy and vigorous at birth	<input type="checkbox"/>	<input type="checkbox"/>	Hourly for 4 hours →	8 hourly	Respiratory distress Signs of infection Temperature instability Poor feeding Hypoglycaemia Lethargy
Meconium in liquor – active resuscitation at birth	<input type="checkbox"/>	<input type="checkbox"/>	Hourly for 4 hours →	4/24 for 24 hours then 8 hourly	
Low Apgar ≤5 @ 5 minutes or Low cord pH (<7.0)	<input type="checkbox"/>	<input type="checkbox"/>	Hourly for 4 hours → (plus Gas & BGL @ 1 hour)	4/24 for 24 hours then 8 hourly	
GBS positive mother – Antibiotic cover ≥ 4 hours of birth	<input type="checkbox"/>	<input type="checkbox"/>	4 hourly for 24 hours→	8 hourly	
GBS positive mother –no antibiotic cover or administered < 4 hours before birth	<input type="checkbox"/>	<input type="checkbox"/>	4 hourly for 48 hours→	8 hourly	
Maternal fever > 38°C	<input type="checkbox"/>	<input type="checkbox"/>			
Prolonged ROM > 18 hours	<input type="checkbox"/>	<input type="checkbox"/>			
Is this neonate premature?					
Born before 37 weeks	<input type="checkbox"/>	<input type="checkbox"/>	4 hourly for 48 hours→	8 hourly	Respiratory distress; Temperature instability; Poor feeding; Hypoglycaemia
Is this neonate at risk of subgaleal haemorrhage?					
Instrumental birth (neonate will also need scalp observations)	<input type="checkbox"/>	<input type="checkbox"/>	Hourly for 4 hours→	4/24 for 24 hours then 8 hourly	Lethargy, Poor feeding, irritable, jittery, apnoea, seizures
Neonate has no risk factors?					
If no risk factors identified the following observation frequency applies:	<input type="checkbox"/>	<input type="checkbox"/>	8 hourly→	8 hourly	Routine post-natal care

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Section 21 – Neonatal Early Warning Scores (NEWS)

21.1. Neonatal Early Warning Score (NEWS)

A Neonatal Early Warning Score (NEWS) refers to a track and trigger system where vital signs are recorded at the bedside and a score is allocated to the vital signs that are outside of the normal range. The individual scores are summed to a total NEWS and can then indicate the severity of abnormal vital signs to assist in the identification of deteriorating patients. An increasing NEWS can trigger (if high enough) an escalation pathway for clinical review and management of the patient (section 24).

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ALERT:

- NEWS does NOT replace calling the Neonatal Medical Emergency Team (Neonatal MET)
- If a baby meets the Neonatal 4/MET criteria a Neonatal Code Blue/MET should be called as per Medical Emergency/Code Blue procedure.

- The vital signs are to be documented on the Neonatal Early Warning Score (NEWS) observation chart.
- Each vital sign is to be documented graphically as this provides a visual cue to changes in the patients' condition.
- Following documentation of the complete set of vital signs total NEWS is calculated by adding the individual scores (section 23).
- If the vital sign is outside the range of the graph the numerical value should also be recorded.
- Each individual observation is allocated a Neonatal Early Warning Score.

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Section 22 – Neonatal Early Warning Score and Frequency of Observations for a Deteriorating Neonate

22.1. For neonates with NEWS ≥4

If the total NEWS is ≥4,

- Review by Team Leader or CNC/CMC.
- Contact the appropriate Medical Officer as per escalation process Section 24.
- The frequency of vital signs is escalated to a minimum of:
 - Half hourly for the first hour (or more frequently if the patient's condition dictates).
- Then if the NEWS decreases to <4:
 - Hourly for the next four hours.
 - Fourth Hourly for the next 24 hours.
 - Unless otherwise specified.
 - Commence a fluid balance chart.

ALERT

Consider Neonatal Code Blue/MET if patient not reviewed or NEWS not improved.

Consult with the Neonatal Registrar to review the neonate **immediately** if any of the following are present:

Escalate immediately if:	Neonate may have:
Unwell, pale or mottled Low temperature < 36°C despite rewarming High temperature > 37.5°C on two measures	Infection
No urine output by 24 hours of age or ≤ 2 wet nappies in second 24 hours	Dehydration

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Escalate immediately if:	Neonate may have:
Delayed stooling or persistent meconium > 10% weight loss	
Grunting Persistent tachypnoea or respiratory distress Oxygen saturation < 95% in air	Respiratory distress
Apnoea or cyanotic spells Repetitive or stiffening movements	Seizures
Dusky, cyanosed, oxygen saturation < 95% in air Cyanosis on crying or feeding Skin pallor of sudden onset	Congenital heart disease
Lethargy, apnoea, high pitched cry Jittery or seizures	Hypoglycaemia (if any doubt check BSL - medical review if < 2.6mmol/L)
Jaundice before 24 hours of age Deepening jaundice (lemon to orange yellow)	Haemolysis/severe jaundice
Pooling of saliva/secretions Bilious (green or green/yellow) vomitus Abdominal distension No meconium by 24 hours	Gastro intestinal obstruction

22.4. Escort off ward area

If the neonate requires transfer to another clinical area, the following escort applies:

- NEWS 4-5 Registered Midwife/Nurse, who is appropriately skilled.
- NEWS 6-7 Registered Midwife/Nurse and Neonatal RMO.
- NEWS ≥ 8 Registered Midwife/Nurse and Neonatal Registrar.

Consideration needs to be given about the requirement for off ward procedures and discussion initiated with treating team consultant.

ALERT:

The NEWS criterion is a tool and should be used in addition to sound clinical judgement. There will be newborn babies who will not score NEWS \geq 4. However, review by medical staff will be in the best interest of the newborn baby.

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Section 23 – Neonatal Early Warning Scores & MET criteria calculations

Table 14: Parameters for NEWS calculation

NEWS Score	4/MET	3	2	1	0	1	2	3	4/MET
Respiratory Rate (breaths/minutes)	≤24			25-29	30-59	60-64	65-69	70-80	≥81
Effort of Breathing					Normal	Mild	Moderate	Severe	
Oxygen Saturation (%) (Foot)	≤ 84	85-86	87-89	90-94	≥95				
Temperature (°C)		≤ 35.4	35.5-35.9	36.0-36.4	36.5-37.4	37.5-37.9		≥ 38.0	
Heart Rate (beats/minutes)	≤69		70-79	80-89	90-159	160-169	170-179	180-189	≥190

23.1. To obtain NEWS for Effort of Breathing:

APLS (Advanced Paediatric Life Support) for criteria effort of breathing:

- Stridor
- Accessory muscle use
- Recession
- Wheeze
- Nasal flaring
- Grunting
- Gasping

Effort of breathing:

Normal = nil of the NEWS criteria (NEWS 0)

Mild = presence of 1 criteria (NEWS 1)

Moderate = presence of 2 criteria (NEWS 2)

Severe = presence of 3 or more criteria (NEWS 3)

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Section 24 – Neonatal Escalation Process

Table 15: NEWS escalation flowchart

NEWS	Notify	Escalate	Observations	Intra-hospital escort
NEWS 4-5	<ul style="list-style-type: none"> Team Leader/CMC RMO to review within 30 minutes 	After 60 minutes if nil review or improvement escalation as per NEWS 6-7	<ul style="list-style-type: none"> Vital signs: ½ hourly for 1 hour Commence fluid balance chart <p>If neonate improves decrease frequency to:</p> <ul style="list-style-type: none"> Hourly for 4 hours 4 hourly for 24 hours 	Registered Nurse/Midwife
NEWS 6-7	<ul style="list-style-type: none"> Team Leader/CMC Registrar to review within 15 minutes 	After 60 minutes if nil review or improvement escalation as per NEWS ≥ 8		Registered Nurse/Midwife & RMO
NEWS ≥ 8	<ul style="list-style-type: none"> Team Leader/CMC Contact Registrar to review immediately Contact Consultant 	Consider MET if nil review or improvement		Registered Nurse/Midwife & Registrar

Figure 6: MET Criteria Escalation Process

MET Criteria

Dial “8” for Neonatal Code Blue

- Health Professional worried about clinical state
- Any observation in the 4/MET zone
- Airway threat
- Central cyanosis
- Seizure(s)
- Cardiac or Respiratory arrest
- Severe or worsening respiratory distress, exhaustion or apnoea

Any escalation should be documented on the observation chart and/or the patient’s record.

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Section 25 – Hospital in the Home

Scope

This section pertains to all adult and paediatric Hospital in the Home (HITH) patients who receive clinical treatment in their own home environment.

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The Modified Early Warning Scores (MEWS) system and the Paediatric Early Warning Scores (PEWS) will be applied to all HITH patients.

NURSING ALERT

If a HITH patient has an increase in MEWS or PEWS during treatment on the CHHS campus, refer to the escalation flowchart for adults in section 4 and 5 or paediatric escalation flowchart shown in section 14.

Procedure

- MEWS/PEWS is calculated each time a set of observations is performed (see MEWS & PEWS chart)
- MEWS/PEWS is calculated and documented on the Adult or (correct age) Paediatric General Observation Chart.

Core Vital Signs

The minimum vital signs to be recorded with each set of vital signs include:

- Respiratory Rate
- Oxygen Saturations
- Heart Rate
- Blood Pressure
- Temperature
- Sedation score

Usual Systolic Blood Pressure (UBP)

- The Blood Pressure (BP) score is determined by comparing the current systolic reading and the patient's usual Systolic Blood Pressure (UBP) and the greater the difference the greater the score. The patient's UBP is to be recorded on the observation chart in the space provided.
- The nursing staff may determine and document the UBP.
- If a UBP for the patient is unable to be determined then commence with a UBP of 130 mmHg and review by a medical officer.

Modified Early Warning Score/Paediatric Early Warning Score

- A set of vital signs will be performed by nursing staff at every home visit.
- The vital signs are to be documented on the relevant observation chart.
- Each vital sign is to be documented graphically as this provides a visual cue to changes in the patient's condition.
- If the vital sign is outside the range of the graph the numerical value should be recorded.
- Each vital sign is allocated an Early Warning Score.
- MEWS/PEWS are to be calculated by adding the individual scores each time a set of vital signs is performed.
- MEWS/PEWS of ≥ 4 requires actions to be taken as per HITH MEWS/PEWS flowchart.

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HITH MEWS/PEWS Flow Chart

<i>HITH MEWS/PEWS Table</i>		
<i>MEWS/PEWS</i>	<i>Notify/Action</i>	<i>Escalation</i>
MEWS/PEWS ≥4	Contact Registrar for advice	IF REPEAT MEWS/PEWS < 4 <ul style="list-style-type: none"> repeat MEWS/PEWS next visit
	Repeat MEWS/PEWS after 15 minutes	IF REPEAT MEWS/PEWS ≥ 4 <ul style="list-style-type: none"> Contact Registrar and patient to attend HITH Unit for review. If clinical concern action as per MEWS/PEWS ≥6
MEWS/PEWS ≥ 6	<ul style="list-style-type: none"> Call Ambulance Notify Emergency Department of transfer Notify Registrar of transfer 	

ALERT

Notification should also occur where clinical deterioration occurs other than that is assessed by the MEWS/PEWS criteria or where sound clinical judgement would suggest that notification is in the best interest of the patient (see criteria for emergency ambulance criteria below).

HITH Medical Emergency Ambulance Calling Criteria

Acute Changes to Physiology

Airway

- Threatened

Breathing

- All respiratory Arrests
- Respiratory Rate: less than 6 breaths per minute
- Respiratory Rate: greater than 36 breaths per minute
- Oxygen Saturation < 85%

Circulation

- All Cardiac Arrests
- Pulse Rate less than 40 beats per minute
- Pulse Rate greater than 140 beats per minute
- Systolic Blood pressure less than 90

Neurological

- Sudden fall in level of consciousness
- Fall in Glasgow Coma Scale (GCS) of more than 2
- Repeated or prolonged Seizures

Other

- Any patient who you are seriously worried about that does not fit the above criteria.
E.g. Active bleeding, chest pain

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Section 26 – Escalation process Post Anaesthetic Care Unit (PACU)

PACU - Adult

The MEWS clinical pathway should be activated 20 minutes after <u>extubation</u> or earlier if clinical condition indicates			
MEWS	Notify	Escalate	Intra hospital escort
MEWS ≥ 6	Team leader Contact case related Anaesthetic Registrar to review within 10 minutes	After 20 minutes if patient's MEWS has not improved or there is a delay in review, re-contact the case related Anaesthetic Registrar After 10 minutes if nil review or nil improvement escalate as per MEWS ≥ 8 (see below)	RN and RMO
MEWS ≥ 8	Team Leader Contact case related Anaesthetic Registrar to review within 10 minutes	After 10 minutes if patient's MEWS has not improved or there is a delay in review, contact the case related Anaesthetic Consultant or Anaesthetic Consultant of the day After hours contact the on-call Anaesthetic Consultant Consider MET Notify Surgical Consultant	RN and <u>Reg</u>

PACU – Paediatric

NURSING ASSESSMENT ON ARRIVAL TO PACU	GUIDANCE	INTERVENTION
Airway	<p><i>Nurse Alert:</i> <i>Only experienced PACU nurses competent in managing paediatric airways should look after paediatric patients < 13 years OR < 30 kg</i></p> <p>Concern with airway patency</p>	<ul style="list-style-type: none"> • Call Anaesthetist who provided patient care <ul style="list-style-type: none"> ○ If Anaesthetist not available call OT 8 Anaesthetist • Notify Team Leader • Consider MET call <p>After hours</p> <ul style="list-style-type: none"> • MET call • Airway positioning such as Jaw Thrust • O2 supplement /PEEP/ ventilation
Blood Pressure (All paediatric patients have Blood Pressure measured on	Perform regular BP measures if:	<p>BP PEWS ≥ 2 and patient has alterations in other vital signs:</p> <ul style="list-style-type: none"> • Measure BP with every set of vital signs <p>Patient received Clonidine in the Operating Theatre:</p> <ul style="list-style-type: none"> • Measure BP prior to departure from PACU • Monitor for bradycardia

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NURSING ASSESSMENT ON ARRIVAL TO PACU	GUIDANCE	INTERVENTION
admission to PACU)		<ul style="list-style-type: none"> Requested by Anaesthetist Surgery \geq 2 hours Renal, cardiac, neurological, or adrenal disorders Diabetic ketoacidosis, suspected sepsis Significant trauma
Level Of Consciousness		<ul style="list-style-type: none"> Review by Anaesthetist if AVPU PEWS is $>$ 1 after 20 minutes in PACU
Pain	Pain relief as per medication chart <i>Note: there is no Pain Protocol for Paediatric patients</i>	<ul style="list-style-type: none"> If pain relief ineffective patient review by Consultant /Registrar Notify Team Leader
If after 20 minutes in PACU PEWS \geq 4	<ul style="list-style-type: none"> Notify Team Leader Anaesthetic Registrar to review within 10 minutes If after 20 minutes patient's PEWS has not improved and patient has not been reviewed, re-contact Registrar to review patient. If after 10 minutes there has been no improvement and no review then contact <ul style="list-style-type: none"> Anaesthetic Consultant and/or Surgical Consultant Consider MET <p>Note - for children with a PEWS of $>$ 0 preoperatively and scoring a PEWS \geq 4 in PACU, the requirement for anaesthetic review is at the discretion of the anaesthetist.</p>	

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Section 27 – Escalation process Gastroenterology Hepatology Unit (GEHU)

GEHU

The MEWS clinical pathway should be activated 20 minutes after the completion of the procedure or earlier if clinical condition indicates.			
MEWS	Notify	Escalate	Intra hospital escort
MEWS \geq 6	Team Leader Contact Registrar to review within 10 minutes	At 10 minutes if patient's MEWS has not improved or there is a delay in review, re-contact the Registrar After a further 10 minutes if nil improvement or still no review Escalate as per MEWS \geq 8 (see box below)	RN and RMO
MEWS \geq 8	Team Leader	After 10 minutes if patient's MEWS has not improved or there is a	RN and Reg.

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The MEWS clinical pathway should be activated 20 minutes after the completion of the procedure or earlier if clinical condition indicates.			
MEWS	Notify	Escalate	Intra hospital escort
	Contact Registrar to review within 10 minutes	delay in review contact the case related Consultant Consider MET	

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Implementation

Vital Sign procedures will be taught as part of the COMPASS© education workshops and annual refresher training.

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Related Policies, Procedures, Guidelines and Legislation

Policies

- Clinical Handover Policy

Procedures

- Continuous Opioid Infusion Procedure
- Epidural Infusion and Patient Controlled Epidural Analgesia (PCEA) Management
- Hypoglycaemia in the Newborn Procedure
- Intrathecal Epidural Morphine management Procedure
- Jaundice in the Newborn Procedure
- Ketamine Infusion Procedure
- Code Blue Medical Emergency Procedures
- Patient Controlled Analgesia (PCA) Management Procedure
- Regional Local Anaesthetic Technique Procedure
- Post-Operative Handover and Observations Procedure

Guidelines

- Standard 9 – Recognising and Responding to Clinical Deterioration in Acute Health Care, The Australian Commission on Safety and Quality in Health Service Standards

Legislation

- *Health Records (Privacy and Access) Act 1997*
- *Work Health and Safety Act 2011*

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Definition of Terms

ABHR	Alcohol Based Hand Rub
APLS	Advanced Paediatric Life Support
BP	Blood Pressure
CMC	Clinical Midwife Consultant
CNC	Clinical Nurse Consultant
EWS	Early Warning Score
ISBAR	Identify Situation Background Assessment Recommendation
IV	Intravenous
MET	Medical Emergency Team
MEWS	Modified Early Warning Score
MO	Medical Officer
NAC	Non acute care admission status
NEWS	Neonatal Escalation Process
PCA	Patient Controlled Analgesia
PEWS	Paediatric Early Warning Score
RM	Registered Midwife
RN	Registered Nurse
UBP	Usual Blood Pressure
SpO2	Peripheral capillary oxygen saturation

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Search Terms

Adult, MEWS, Escalation, Neonatal, Hospital in the Home, Newborn, Maternity, NEWS, Maternity MEWS, Observation, Mental Health, Paediatric, MET, PEWS, Vital Signs

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Policy Team ONLY to complete the following:

<i>Date Amended</i>	<i>Section Amended</i>	<i>Divisional Approval</i>	<i>Final Approval</i>
21/02/2018	Complete Review	Narelle Boyd, ED, Critical Care	CHHS Policy Committee

This document supersedes the following:

<i>Document Number</i>	<i>Document Name</i>
CHHS14/048	Vital Signs and Early Warning Scores Procedure

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