EARLY WARNING SCORES

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What is an Early Warning Score?

In the United Kingdom Early Warning Scores (EWS) are now commonly used for the assessment of unwell hospital patients. The Early Warning Score is a simple physiological scoring system that can be calculated at the patient's bedside, using parameters which are measured in the majority of unwell patients. It does not require complex, expensive equipment to measure any of the parameters. It is reproducible[1] and can be used to quickly identify patients who are clinically deteriorating and who need urgent intervention. EWS can be used to monitor medical, pre and post-operative surgical, and Accident and Emergency patients. Early warning scores are sometimes also referred to as Patient at Risk scores (PARS) or Modified Early Warning Scores (MEWS).

How do you calculate an Early Warning Score?

An EWS is calculated for a patient using five simple physiological parameters. Mental response, pulse rate, systolic blood pressure, respiratory rate and temperature. For patients who are post-operative or unwell enough to be catheterised a sixth parameter, urine output, can also be added (See Table 1). The idea is that small changes in these five parameters will be seen earlier using EWS than waiting for obvious changes in individual parameters such as a marked drop in systolic blood pressure which is often a pre-terminal event.

Of all the parameters, respiratory rate is the most important for assessing the clinical state of a patient, but it is the one that is least recorded. Respiratory rate is thought to be the most sensitive indicatory of a patients physiological well being.[2,3,4]. This is logical because respiratory rate reflects not only respiratory function as in hypoxia or hypercapnia, but cardiovascular status as in pulmonary oedema, and metabolic imbalance such as that seen in diabetic ketoacidosis (DKA).

When and why to use an Early Warning Score?

An EWS score should be calculated for any patient that nursing staff are concerned about. It gives a reproducible measure of how "at risk" a patient is. Patients who have suffered major trauma, or have undergone major surgery, can be started on an EWS observation chart (table 1) as soon as they arrive on the ward to monitor their clinical progress, and give early warning of any deterioration. Repeated measurements can track the patient's improvement with simple interventions such as oxygen or fluid therapy or further deterioration. Serial EWS readings are more informative than isolated readings as they give a picture of the patient's clinical progress over time.

The scoring system was developed because not all unwell patients can be monitored on intensive care or high dependency units. It allows deteriorating patients to be identified, before physiological deterioration has become too profound. Once an unwell patient has been identified, with an EWS score of 3 or more, this should stimulate a rapid assessment of the patient by a ward doctor or, if available, the intensive care unit (ICU) team. The result of the review should be the modification of patient management to prevent further deterioration. If deteriorating patients are identified early enough, simple interventions such as oxygen, or fluid therapy, may prevent further deterioration and imminent collapse. The use of EWS has been shown to be effective in reducing mortality and morbidity of deteriorating patients as well as preventing ICU admissions[5,6,7,8,9,10].

What should happen if a patient has an Early Warning Score of 3 or more?

Studies have indicated that score of 3 or more requires urgent attention[4,6]. The level of response is dependent on the facilities available. In many UK hospitals a score of 3 triggers an immediate review by a ward doctor. If no improvement is seen the most senior ward nurse can then call a senior doctor. This gives the ward nursing staff the authority to refer upwards to more senior members of staff if a patient's clinical situation is not improving. Some UK hospitals have gone further and a score of 3 results in an immediate call, by the nursing staff, directly to the Intensive care unit registrar for a ward review. Other hospitals have been more cautious and use a score of 4 or even 5 as a call out trigger[4].

A generic EWS flowchart is given in figure 1.

Case Histories

1. A 60-year-old man arrived in hospital with increasing shortness of breath. He had no chest pain. He had a past history of a myocardial infarction and was awaiting coronary artery bypass surgery; he was also a known asthmatic. On arrival in hospital he was alert with a respiratory rate of 30, a pulse rate of 130 and a blood pressure of 108/60, his temperature was 38.5°C. He therefore had an EWS score of 5. He was assessed by the emergency doctors. A salbutamol nebuliser and oxygen therapy were given. After 15 minutes, on clinical observation, he looked better. His respiratory rate had dropped to 24, his pulse rate was 124 bpm, temperature remained the same but his blood pressure had dropped to 95/55mmHg. Therefore despite looking better his EWS score had risen to 6, suggesting he was still deteriorating. The intensive care team were called and he was admitted to the high dependency unit for observation and treatment. He was found to be septic from a chest infection. This case shows that subjective judgements made on appearance only can be misleading. More objective judgements are often made on the basis of physiological parameters.

2. A 72 year old patient arrived in recovery after a Whipple's resection of his pancreas for a pancreatic tumour. He had lost 3 litres of blood intra-operatively and was receiving a blood transfusion in recovery. Initially in recovery he was alert with a heart rate of 70bpm, a respiratory rate of 15, a blood pressure of 110/70mmHg, and a urine output of 20ml/hr. His EWS was 1. Over the next 3 hours in recovery he became more tachycardic and hypotensive. He was alert with a heart rate of 105, a respiratory rate of 20, a blood pressure of 95/50 and a UO of 10ml/hr. His temperature was not recorded. Therefore his EWS can be calculated as having risen to 4. Despite this a doctor did not review him, and he was sent back to the ward. By midnight he was drowsy, had a respiratory rate of 30, temperature of 38.5°C, heart rate of 120bpm, blood pressure of 90/50mmHg and his urine output was negligible. This made his EWS 11. He was finally reviewed, actively resuscitated and taken immediately back to theatre for an exploratory laparotomy. Two litres of blood and clot were found in his abdomen from a bleeding artery. He was in hypovolaemic shock. He was sent intubated to the intensive care unit and remained there overnight. If the EWS protocol had been followed this patient should have never left recovery. All the signs were there from a very early stage that he was deteriorating. Early intervention would have prevented the development of hypovolaemic shock and possibly an ICU admission.

References

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Royal Devon and Exeter Healthcare NHS
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EARLY WARNING SCORE

For all emergency and compromised post ITU patients

This should be assessed on all emergency admissions, major surgery, all patients returning from ITU/HDU and any patient that you are concerned about. *If outside this range call cardiac arrest team.

Date of admission	Affix patient label here
Consultant	
Ward	

Date															
Time															
HR 30-180*															
BP <60*															
Resp. rate 8-40*															
Central Nervous System															
Temp.															
Urine															
Score															
Doctor Y / N															
Grade if called															

Score	3	2	1	0	1	2	3
HR per minute		<40	41-50	51-100	101-110	111-129	>130
BP systolic	<70	71-80	81-100	101-199		>200	
Resp per minute		<8		9-14	15-20	21-29	>30
Central Nervous System				Alert	Drowsy/ rousable to voice or newly confused	To pain	Un-responsive
Temperature		<35		35.1-37.5	>37.5		
Urine output	Nil	<20mls/2hrs or has not voided within 4hrs of admission	20-50ml/2hrs or has not voided within 4hrs of admission	>50ml/2hrs			

If the patient has a score of 3 or more follow the flowchart overleaf ❹

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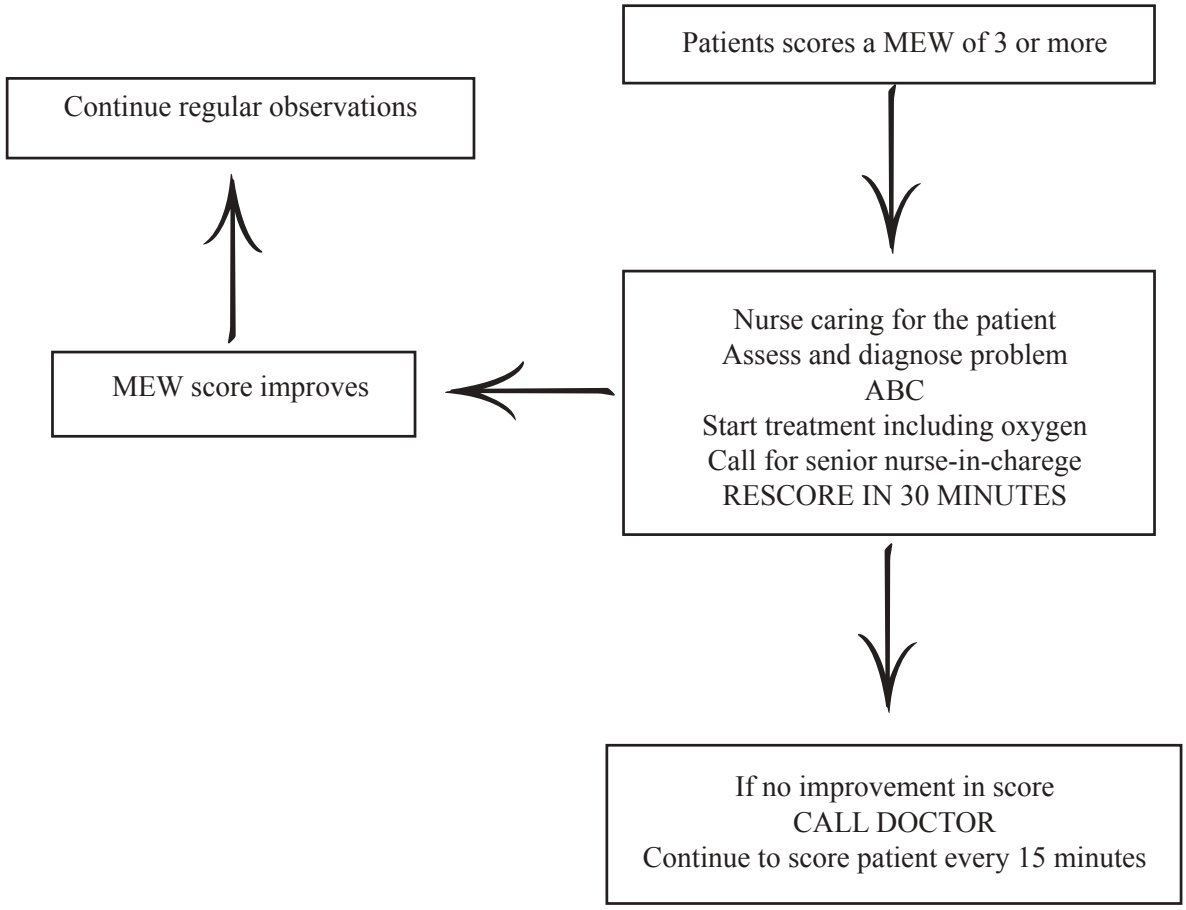
Table 1.

EARLY WARNING SCORE GENERIC FLOWCHART
Any patient scoring more than 3 requires urgent attention



If **UNRESPONSIVE** patient has any of the following pre-arrest signs:

A - Severe airway compromise

B - Respiratory rate <8 or >40

C - Heart rate <30 or >120
Systolic BP <60
Oxygen Saturations <85%

CALL SENIOR HELP/DOCTOR IMMEDIATELY

Contact number for doctor on call:

Staff called as per flowchart

	Name	Grade	Time
1.			
2.			
3.			

Figure 1.