

Using NEWS2: an essential component of reliable clinical assessment

Authors: John Welch,^A John Dean^B and Jillian Hartin^C

ABSTRACT

The National Early Warning Score 2 (NEWS2) is the established track and trigger system to assess illness severity and risk of deterioration for patients in acute episodes of care in the UK. It is also increasingly used internationally. In this article, we outline established and recommended practice for initial and ongoing assessment. We also highlight where practice may not meet these standards, how the full context and assessment of the patient is paramount, and opportunities for more accurate assessment in the future.

KEYWORDS: NEWS2, deterioration, monitoring, clinical assessment

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Introduction

Physiological observations are a core component of clinical assessment and monitoring. These can be standardised and systematised in track and trigger early warning systems. Such systems combine commonly used vital sign measurements in a score that indicates and allows tracking of the acuity of illness and the risk of subsequent deterioration. They also recommend the clinical response required at specified trigger levels. The National Early Warning Score 2 (NEWS2) is the standard track and trigger early warning system used in the UK and increasingly internationally, both because of its usability (using easily obtainable measures) and its well-evidenced validity.^{1,2} It serves as a 'common language' of acuity and deterioration that enables consistency of practice, training and communication. NEWS2 is now also used by ambulance services, in general practice and in other community assessments.

While the application of NEWS2 is associated with reductions in both mortality and late escalations of care, its use has sometimes resulted in an inappropriate focus on the score rather than wider clinical assessment and context.^{3,4} We highlight good practice and areas for improvement, illustrated by case examples.

Authors: ^Anurse consultant, University College London Hospitals NHS Foundation Trust, London, UK and national clinical advisor for acute deterioration, NHS England, London, UK; ^Bconsultant physician, East Lancashire Hospitals NHS Trust, Blackburn, UK and clinical vice president, Royal College of Physicians, London, UK; ^Clead nurse of the patient emergency response and resuscitation team, University College London Hospitals NHS Foundation Trust, London, UK

How NEWS2 is used in practice in the UK

NEWS2 uses respiratory rate, oxygen saturation, need for oxygen therapy, heart rate, blood pressure, level of consciousness/confusion and temperature in an 'airway, breathing, circulation, disability and exposure' framework. It can be used in all adults over 16 years of age, though more specific scoring systems should be used in pregnancy. It is a general assessment for all clinical scenarios. Changes or stability of measures and scores over time are particularly helpful to understand the patient's condition, risk, recovery, stabilisation or deterioration.

It is essential that NEWS2 informs and is part of the clinical judgement of a patient's condition, risk and illness course. Many other factors will be involved in that clinical assessment. A high combined NEWS2 or individual parameter red scores should trigger escalation (patients are sometimes said to be 'NEWS-ing'). Condition-specific observations should be used alongside NEWS2 that might also trigger escalation. Escalation trigger points are for more detailed clinical assessments because of illness severity, risk of deterioration or change in condition. Patients should be informed and involved in assessments and decisions.

NEWS was initially validated for use on general medical and surgical wards before it spread to emergency departments and then pre-hospital services as evidence and experience in these areas developed.^{5,6} The National Institute for Health and Care Excellence (NICE) recommends that these parameters are recorded at the time of hospital admission or initial assessment; a recent audit of 156 hospitals showed that this was achieved within 30 minutes in 77% of patients.^{7,8} NEWS2 values guide frequency of ongoing observations, and the need for escalation (Table 1).⁹

Standardised charts should be used, with associated training, as these will ensure consistency and familiarity of use across care settings and organisations (Scenario 1).⁹

The response to escalation requires a structured review that includes time of escalation, time and grade of clinical response, clinical assessment, and plan (including a treatment plan and an individualised trigger score (threshold) for further escalation). Modifications to escalation thresholds are needed with particular diagnoses, prognosis, comorbidities, patient's wishes and treatment limitation plans (including do not attempt cardiopulmonary resuscitation and end-of-life pathways). These situations, therefore, require an appropriately competent clinical decision maker, and clear documentation and communication with the care team and patient (Scenario 2).

In practice, use of NEWS2 is variable. One ethnographic study found that 42% of behaviours were not as expected when

Table 1. Clinical response to National Early Warning Score 2 trigger thresholds

National Early Warning Score 2	Frequency of monitoring	Clinical response	Additional implementation guidance states
Total score = 0	Minimum 12-hourly	<ul style="list-style-type: none"> > Continue routine NEWS monitoring 	
Total score = 1–4	Minimum 4–6-hourly	<ul style="list-style-type: none"> > Inform a registered nurse, who must assess the patient > Registered nurse decides whether increased frequency of monitoring and/or escalation of care is required 	
Score of 3 in a single parameter	Minimum 1-hourly	<ul style="list-style-type: none"> > Registered nurse to inform medical team caring for the patient, who will review and decide whether escalation of care is necessary 	
Total score = 5 or more: Urgent response threshold	Minimum 1-hourly	<ul style="list-style-type: none"> > Registered nurse to immediately inform the medical team caring for the patient > Registered nurse to request urgent assessment by a clinician or team with core competencies in the care of acutely ill patients > Provide clinical care in an environment with monitoring facilities 	<p>A NEWS2 score of 5 or 6 that is new for the patient, unless an alternative escalation threshold has been previously determined:</p> <ul style="list-style-type: none"> > assessment is expected within 60 minutes > moving the patient to an environment with monitoring facilities should be considered
Total score = 7 or more: Emergency response threshold	Continuous monitoring of vital signs	<ul style="list-style-type: none"> > Registered nurse to immediately inform the medical team caring for the patient; this should be at least at specialist registrar level > Emergency assessment by a team with critical care competencies, including practitioner(s) with advanced airway management skills > Consider transfer of care to a level 2 or 3 clinical care facility, ie higher-dependency unit or ICU > Provide clinical care in an environment with monitoring facilities 	<p>A NEWS2 score of 7 or above that is new for the patient, unless an alternative escalation threshold has been previously determined:</p> <ul style="list-style-type: none"> > assessment is expected within 30 minutes > the patient should be monitored every 30 minutes initially > a clinician competent in the assessment of acutely ill patients will be decided locally and could be the emergency response team > if there is no improvement, senior clinician review is expected within 60 minutes > moving the patient to an environment with monitoring facilities should be considered

Adapted with permission from Royal College of Physicians. *National Early Warning Score (NEWS) 2: Standardising the assessment of acute-illness severity in the NHS*. RCP, 2017. ICU = intensive care unit; NEWS = National Early Warning Score.

ward staff measured and recorded vital signs (on paper or in an electronic health record (EHR)), calculated NEWS2 or escalated care.¹⁰ Examples included respirations counted without sight of a clock, oxygen saturation measured on patients' ears with devices designed for fingers, poor practice in the assessment of consciousness and vital signs written on paper towels before transcription into the EHR sometime later. Moreover, the recorded NEWS2 was usually lower than that calculated by the researcher; the accurate assessment would have upgraded the associated risk level and actions required in 27% of cases. EHRs, however, increase accuracy of calculations of scores and alerts to trigger a response.¹¹

High patient acuity, dependency or throughput (or reduced staffing levels) make effective monitoring, recognition of deterioration, appropriate escalation and timely response less likely.¹² Poor team-working and hierarchical structures also contribute to suboptimal processes.

Clinicians and managers should work to understand the barriers and enablers that affect best use of the NEWS2 system and ensure that local structures and processes demonstrably protect patients at risk of deterioration.¹³ Critically, any early warning score only has value if there is a reliable, timely and effective response: a dependable whole rapid response system is required.^{13,14} Most acute hospitals now have medical emergency, rapid response or

Scenario 1

Debbie is a 47-year-old woman with type 1 diabetes. She had dysuria for 3 days and subsequently needed support from her husband to mobilise. The district nurse assessed Debbie at home, with a vital-signs scoring National Early Warning Score 2 (NEWS2) of 5. This prompted the nurse to arrange an emergency ambulance transfer to the emergency department (ED).

At triage in ED, the NEWS2 score was 8. Debbie was then transferred to the 'resus' bay where she received emergency treatment for sepsis.

On day 3 of admission, Debbie was well enough to be discharged home (with a NEWS2 of 0).

Take home message

NEWS2 scoring supports clinical decision making and communication across primary and acute care, including ambulance services.

In Debbie's case, an initial NEWS2 of 5 supported timely escalation of treatment and prevention of septic shock.

critical care outreach teams who act as the experts in responding and supporting deteriorating patients who are triggering on NEWS2.

Limitations of NEWS2

Many acutely unwell patients are elderly with multiple, interacting, complex long-term conditions. Clinical history, examination and investigations are all crucial, and ongoing measurement of the NEWS2 will be enhanced by other routine assessments to effectively monitor the patient (Table 2). While NEWS2 scores discriminate patients most and least likely to deteriorate (and to die) within 24 hours, facilitating rapid escalation, completion of all assessments or investigations must not delay lifesaving treatment.¹⁵ Clinical judgement and any concerns about a

Scenario 2

Albert is a 78-year-old man who had been on the cardiology ward for 3 weeks for treatment of heart failure. Albert has chronic kidney disease stage 3 and had a previous stroke. His left ventricular ejection fraction 4 months previously was 25%. When last stable 3 months ago, he did not get out of his house and has carers four times a day. Albert's National Early Warning Score 2 (NEWS2) was 5–6 for 10 days, despite intensive treatment for his heart failure, and his renal function worsened considerably. His NEWS2 score increased to 12, with raised respiratory and heart rates, and a drop in blood pressure, and he became unresponsive.

Assessment of Albert's deterioration resulted in recognition that he was in the last few hours or days of life. An end-of-life care plan was commenced, with cessation of physiological monitoring, and a focus on symptom relief and comfort.

Take home message

A high NEWS2 reflects significantly altered physiology and is indicative of high risk of death. When considered in conjunction with trajectory of scores, comorbidities and recent health status, conversations and plans around palliative care may be appropriate.

Table 2. Indicators used in conjunction with the National Early Warning Score 2

Indicators	Clinical use
Oxygen requirements	Respiratory failure
Capillary blood glucose and ketones	Diabetes or acute hyperglycaemia
Nurse worry or concern	Bed-side assessment
Patient or family worry or concern	Change in patient's condition
Fluid balance	Hydration and fluid status
Blood results eg creatinine or lactate	Acute kidney injury 2 or above, or sepsis/hypoperfusion
Pain	Acute onset or worsening of pain
Acute limb weakness	Stroke, expected stroke or spinal pathology
Neurological observations	Acute neurological presentation

patient's condition should override the NEWS2 if the attending healthcare professional thinks that it is necessary to escalate.⁹ In practice, such indicators as pallor, breathing pattern, bleeding, 'personality change', patient complaint, peripheral temperature and patient fatigue are used to both supplement and sometimes take precedence over NEWS2 (Scenario 3).¹² This is also important if any NEWS2 parameters have not been captured.

The recent Academy of Medical Royal Colleges sepsis guidance emphasises the value of NEWS2 in assessing acuity of illness, but recommends that if there are 'concerns about the patient's condition ... the severity status and accompanying actions should be upgraded according to patient need, and at least to the next NEWS band.'¹⁶

NEWS2 scoring for oxygen supplementation is binary (yes/no). In patients with COVID-19 needing oxygen therapy, oxygen requirements can rapidly increase if respiratory function deteriorates. This may not cause an additional rise in the NEWS2 value. Therefore, increasing oxygen requirements in patients with COVID-19 should trigger escalation to a competent decision

Scenario 3

Ahmed is a 37-year-old man and was diagnosed with testicular cancer 2 months previously. He was transferred to the oncology ward having vomited excessively in the day-care chemotherapy unit as his second dose of chemotherapy started. He had been vomiting for 3 days prior to this.

After antiemetics, he was sleeping intermittently over the next few hours. His National Early Warning Score 2 (NEWS2) was 2 on admission and the same 4 hours later. He was found collapsed by his bed just before midnight, and received emergency treatment for severe metabolic acidosis and hyperkalaemia secondary to acute kidney injury.

Take home message

A low NEWS2 does not mean no risk. Some patients (often, but not always, younger patients) may compensate for longer with deteriorating clinical status. It is important to assess and monitor the whole patient, including fluid balance and investigations.

Scenario 4

Kay is 57-year-old woman, runs at least three times a week, swims, sails, cycles and climbs. She fell off her bicycle 5 days previously, with resulting fractures, and underwent left ankle arthrodesis 3 days previously.

The ward nurse escalated at midday as he was worried that, over the course of 4 hours, Kay's oxygen requirement had gone from room air, then 2 L by nasal cannulae to now 60% by Venturi, although the National Early Warning Score 2 (NEWS2) has remained 3–4.

The ward doctor reviewed Kay and sent her for computed tomography angiography. Kay was subsequently diagnosed with a pulmonary embolism.

Take home message

Any oxygen requirement above room air only ever adds a score of 2 on NEWS2. Always ascertain the amount of oxygen being delivered to any patient.

maker.⁹ It is logical to apply this to other causes of respiratory failure (Scenario 4).

Patients' self-reported and/or relatives' view of how the patient is compared with their normal state are important elements of assessment. The patient should be asked how they feel when vital signs are measured or if there are any concerns or other adverse signs. The reasons for the patient's distress must be clarified, any changes in physical or mental state or behaviour noted and escalated for clinical assessment. Creating reliable means for patients or their families/carers to escalate worries and concerns about their illness and deterioration when standard care is inadequate can provide an invaluable safety net.¹⁷

Using NEWS in context

NEWS2 will be measured in hospitals on initial assessment at presentation, continued at an appropriate frequency throughout the hospital stay in most adult patients and, as noted earlier, it should always be seen as part of a clinical assessment. The main inappropriate use of NEWS2 is when it is looked at either as an overall score in isolation or without considering the overall clinical context.

On initial assessment in hospital, any measures prior to attendance should be sought to understand any changes, and it must be set in the context of the presenting problems. Frequency of repeated measures will be determined by the initial assessment, but can be modified following full clinical assessment if there are other indications of disease severity despite a normal or low NEWS2, or if the patient has levels that they live with that may be persistently raised. It is also important to understand which of the measures is contributing to the score, and what individual parameters are abnormal even if they are not themselves 'scoring' (eg pulse rate with blood pressure or respiratory rate). Therefore, a single NEWS2 score, if raised without clinical context or component parts, is an inadequate assessment. Treatments should target the underlying cause and not just 'correcting the numbers'.

As illustrated in Scenario 2, a high NEWS2 score can indicate that someone is nearing the end of their life. If persistently raised and treatment of causes are not proving effective, consideration of

palliation must be part of the plan if further treatment escalation is not possible or desirable, and measuring NEWS2 components discontinued.

Clinical assessment incorporating NEWS2 should result in a monitoring plan that includes the escalation thresholds for the individual patient. Local systems must, therefore, be able to record when escalation thresholds and monitoring frequency change for the individual patient beyond the generic approach.

Automated alerting systems also need to be configured appropriately to prevent 'alert fatigue', so that a 'new' score at the agreed individual threshold should create an alert, but continued scores at this level without recovery should not automatically trigger. Ongoing clinical review and trigger thresholds should be established following the initial triggered review.

As illustrated in Scenarios 3 and 4, a normal or mildly raised NEWS2 score, does not exclude severe illness, or the need to trigger a clinical review. Patients may be assessed to have severe illness on initial or subsequent clinical assessment. Their underlying or acute condition may have other elements of monitoring (eg capillary blood glucose or oxygen requirements), which in themselves should have thresholds that trigger further clinical assessment.

Future opportunities

A NEWS2 value is simply calculated from just seven easily obtained measures. Early warning scoring systems that use NEWS2 parameters but also many more variables including combinations of vital signs, laboratory datasets, patient age, comorbidities and frailty have been shown to have greater predictive accuracy than NEWS2, although they require that data to be available and significant processing power to compute.^{18,19} On a less sophisticated level, more detailed analysis of NEWS2 at particular time points, and its trends and changes over time may yield greater predictive power too.²⁰

Other technological advances include wireless wearable patient monitors that provide continuous or semi-continuous vital-sign data that can enable much more frequent calculation of the NEWS2. One recent before–after study with medical and surgical patients suggested that use of such a system reduced the number of escalations required and unplanned admissions to critical care.²¹ Wireless wearable systems to monitor patients at home that will allow earlier discharge from hospital and reduction of preventable admissions are under investigation.

On a more human level, NHS England is supporting a national programme to develop, test and evaluate reliable methods for patients (or their families/carers) to routinely input their views (especially regarding their wellness/illness and trajectory) as well as their worries and concerns into the health record, with evidence that those views and concerns are considered and acted on by the healthcare team. It is hypothesised that these approaches will supplement NEWS2 monitoring and enhance more reliable, earlier detection of deterioration.²²

Summary and conclusion

NEWS2 is a well-established, validated, easy to use track and trigger system for illness severity and the risk of deterioration. While used throughout the NHS, research suggests that it is not always used accurately, and there are risks that less experienced clinicians might place an over reliance on its measures without considering its limitations or the wider clinical context.

Digitisation of measurement and the use of AI give opportunities for more accurate measurement and triggering of response, and also the addition of other measurements that can assess illness severity, deterioration, risk and recovery.

Emphasis should be given to the consistent and accurate use of NEWS2 within and across pathways of care and care settings as part of clinical assessment. Clinical judgement remains paramount. Patient, clinician and family concerns can add significantly to assessment. Other measures that are disease specific should be used alongside NEWS2. The response to a trigger must be a detailed clinical assessment that can determine intervention, ongoing monitoring and escalation requirements for the individual patient, and sometimes palliation with cessation of measuring NEWS2. ■

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Address for correspondence: Dr John Dean, The Spine, 2 Paddington Village, Liverpool L7 3FA
Email: john.dean@rcp.ac.uk