



# National Early Warning Score (NEWS) 2

Standardising  
the assessment  
of acute-illness  
severity in the NHS

Updated report of a working party  
**December 2017**



1518  
2018



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## The Royal College of Physicians

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## Foreword

Common language is the fundamental pillar of human communication, allowing us to understand each other, collaborate and build more complex systems that benefit society. The modern NHS is the ultimate example of such a system – over a million people working across a multitude of settings, making continuous decisions that dictate people’s lives.

Systems operating with similar levels of risk use universal means of communication that reduce the chance of failure. Air traffic control systems the world over adhere to the common standards and language of the International Civil Aviation Organization to prevent disasters. Imagine what would happen if each airport pursued their own way of working?

The NHS should be no different. During my decade as national medical director, I have witnessed time and again the positive impact that use of a common language or approach can have in keeping people safe – something that has been frequently highlighted by the work of the National Quality Board.

Early warning score (EWS) systems are important tools in helping to identify patients at risk of deterioration – including sepsis – and in escalating them to get appropriate treatment as promptly as possible. However, the current use of different scoring systems across the NHS is detrimental to patient safety. Staff moving between care settings end up speaking at cross purposes, warning signs are missed, and patient care can ultimately be compromised.

The National Early Warning Score (NEWS) represents an opportunity to maximise the benefits that EWS systems can bring, by ensuring that staff across the NHS operate using the same language to provide patients with the right care at the right time. The NEWS is more efficient and effective than other tools, and has gained multiple endorsements from national bodies. It is used in settings across the world, including the US Naval Air Forces.

Alongside the launch of this updated NEWS tool, the NHS in England is setting out a national ambition to standardise the use of NEWS in acute and ambulance settings during 2018/19. The variation in scoring systems used in different settings – sometimes within the same trust – is undesirable and ultimately unsafe for patients. If healthcare professionals are all using the same language, this will save lives.

I would like to thank Bryan Williams and his colleagues at the Royal College of Physicians for their ongoing work to optimise the NEWS. Their dedication to allowing free access to relevant resources and training materials is generous and commendable, and has seen the NEWS spread to be used in the majority of hospitals across the country.

We must finish the job. With the right tool at our disposal, clinicians must seize this opportunity to unify the language used across the system, ensuring equality of treatment for all.

**Professor Sir Bruce Keogh**  
National Medical Director, NHS England

## NEWS: Saving lives across the world

Every so often, someone comes up with an idea that is so obvious, no one can understand why it wasn't thought of before. I am proud that the RCP's National Early Warning Score (NEWS) is one of those initiatives – not just a chart (or iPad) at the end of the bed to record the patient's physical signs and symptoms, but *the* chart at the end of the bed – a single point of truth to unify recording of symptoms across the NHS, consolidate training for doctors and nurses in the recording of symptoms, and thereby improve patient safety.

When the RCP launched the NEWS in 2012, we hoped to see the score adopted across the NHS. What has been more astonishing is the adoption of the score internationally, with requests to use NEWS coming from health services across the world from Europe to India and the USA, including the US Naval Air Forces!

Developing a national score was a logical extension of the RCP's other initiatives to improve the care of acutely ill patients, including the development of acute medical units and the specialty of acute medicine. In developing NEWS, we took the decision to make the chart free to download and use as the best way of encouraging NHS trusts to take up the resource, and 3 years later our own survey showed that over half of UK physicians were using it. Five years from launch, that number has increased again, but we need to see NEWS implemented across all acute NHS trusts, and we are grateful for the support of NHS England in making this happen.

As with any patient safety initiative, there was a need to review NEWS to ensure that it was still fit for purpose. A review group examined the feedback and evidence submitted to us, particularly on patients with COPD, and this revised version has been produced as a result. Additional research and papers published on the effectiveness of NEWS provided independent evaluation and demonstrated the value of the system. Another benefit of NEWS is that a NEWS score of 5 or more has been validated as a robust way of detecting patients with infection who are at clinical risk of acute deterioration due to sepsis, and the NEWS has now been recommended by NHS England as the warning system to be used across the NHS in assessing adults to help detect and treat sepsis earlier.

I would particularly like to thank the fantastic RCP team who made the update possible – firstly Professor Bryan Williams for his unwavering enthusiasm for all things 'NEWS', his championing of NEWS across the NHS, and steering the updating process. I would also like to thank several RCP staff for the significant part that they have played in the success of NEWS over the past few years – the RCP's committee manager for NEWS Tracy Scollin, RCP head of PR and public affairs Linda Cuthbertson, and the RCP's managing editor Natalie Wilder.

This update will mark the beginning of a new chapter as, with the support of NHS England and NHS Improvement, over the next year NEWS will become the default early warning score for NHS trusts and ambulances. Patients will benefit from its implementation, and staff will benefit from not having to learn a new score each time they join a new trust. And I hope that NEWS will continue its global journey, saving lives across the world ...

**Professor Jane Dacre**  
President, Royal College of Physicians

## Endorsement from National Outreach Forum

Since the publication of NEWS in 2012, critical care outreach teams, acute care teams and members of the National Outreach Forum (NOrF) have worked with enthusiasm and commitment to introduce and embed the NEWS into their respective organisations and further afield. They have done this willingly in the firm belief that standardising the process of patient assessment and the scoring, recording and response to clinical deterioration will improve both clinical outcomes and the quality of care for all patients.

The NOrF fully endorses the modifications and additions presented here within this update of the NEWS (NEWS2), encouraged not only by the growing body of evidence that supports these recommendations, but by their own clinical practice experience. Using NEWS means that everybody is speaking a common language; it provides a patient rather than an organisational focus and aids clear communications throughout the patient pathway, from first responders in prehospital care through to the acute setting and back again. The additional focus of the NEWS2 document on using the NEWS to better identify patients at risk of clinical deterioration due to sepsis is an important development. NOrF also fully endorses the improvements and additions made to the remarkably successful free web-based e-learning programme, and is firmly of the view that this has strongly supported the dissemination and learning for all staff in the use of the NEWS scoring system and observation chart in the UK.

Finally, we would like to acknowledge and thank critical care outreach and acute care teams for their tireless commitment to patient safety. It is only correct that these teams are now being referred to and acknowledged as the ‘safety engines of our hospitals’. This document therefore serves as a reminder that the availability of these teams 24/7 and the incorporation of NEWS should be integral to organisational patient-safety strategies.

**Lesley Durham RGN MA**  
NEWS Lead, National Outreach Forum



## Preface

The origin of the National Early Warning Score (NEWS) dates back to 2005, when I was chair of the Royal College of Physicians (RCP) Acute Medicine Task Force, which reported in 2007: *Acute medical care: the right person, in the right setting – first time*. This report produced a template for the organisation of acute medical care in our hospitals and contained a number of recommendations which have been implemented nationally. From my perspective, the most important recommendation in that report was the need for a standardised early warning system across the NHS, a national early warning system, to better identify patients at risk of clinical deterioration, to facilitate more timely and effective intervention and to save lives. We therefore decided to take forward the development of the NEWS and the RCP established the NEWS Development Group, which I was privileged to chair. This resulted in the launch of the NEWS in 2012.

Developing and championing the merits of a single standardised system such as the NEWS, for use across the NHS, was a major challenge, more than I could ever have imagined when we began the work over 10 years ago. The challenge was not because the process of developing and validating an early warning score was intellectually difficult, or that we were developing a completely novel concept; on the contrary, numerous early warning systems of varying complexity were already in use in parts of the NHS. The challenge was convincing the proponents of the many existing early warning systems of the huge advantages of 'everybody using the same system' and not *their* system! I quickly learned that developing the NEWS was relatively straightforward, compared with the challenge of system change on the required scale. The step change that we were looking for was to standardise the NEWS approach across the NHS, and link the scoring system to clearly defined principles with regard to the required urgency of response, the competency of the clinical responders, and the organisational infrastructure required to deliver an effective clinical response to acute illness, every time it is needed. Simple and pragmatic innovation done well can make a huge impact in healthcare, and the NEWS had the potential to do the same.

The uptake and impact of the NEWS over the past 5 years have been extraordinary, and beyond even the most optimistic expectations, especially considering that there was no national incentive or directive to implement it. The majority of NHS hospitals are now using the NEWS; over 120,000 NHS staff have voluntarily completed the online NEWS training and accreditation programme; and the NEWS is being used by many ambulance services and beginning to be used by some vanguard primary care centres to help better triage acutely ill patients. The NEWS is being taught in our medical and nursing schools and is increasingly being used at medical centres across the world. The use of the NEWS as a quality indicator has also been recorded by the Care Quality Commission during hospital inspections. The NEWS has been evaluated in formal studies in the UK and across the world, and has been shown to work very well. Moreover, evidence is beginning to emerge that where the NEWS has been implemented, patient outcomes have improved and lives have been saved.

Things looked very different in those early days during the development of the NEWS, and when the concept of change on the scale we were proposing was questioned and resisted on many fronts. After many difficult discussions, on many occasions, there were times when I wondered whether we would ever get over the line. These are the times when the support of colleagues in the NEWS Development and Review Groups and the leadership and staff at RCP made a big difference. I also learned the virtue of patience and the meaning of the 'long game'. I have certainly honed my political skills along the way!

And so, to this update, the NEWS2. We decided when the NEWS was launched that we would undertake a review of the NEWS after 5 years. Although the NEWS has performed very well in a variety of settings in the NHS and beyond, and substantial peer-reviewed evidence of its effectiveness for its core purpose

has accumulated, a constant stream of feedback from users identified a number of areas that we could improve and we have incorporated into the NEWS2. There have also been other key developments. First, the NEWS has now received the formal endorsement of NHS England (NHSE) and NHS Improvement (NHSI) for the NEWS to become the early warning system for the NHS in England. The NEWS has already been endorsed in Scotland and Wales. There is also enthusiasm for the NEWS to be more extensively used by ambulance services and primary care to facilitate more effective triage of patients requiring emergency care. Second, NHSE has incorporated the NEWS as the early warning system to improve the detection of clinical deterioration due to sepsis in adults. These are major steps towards the ultimate aim, to see NEWS embedded across the NHS to improve the detection of acute illness and improve patient outcomes. The support of Sir Bruce Keogh, the national medical director of NHSE, and Celia Ingham Clark, chair of the NHSE Cross-system Sepsis Programme Board, assisted by Sam Schwab, senior strategy advisor for NHSE, has been key to these latter developments and I am extremely grateful for their support, advice and encouragement.

It has been an honour to chair both the original NEWS Development and Implementation Group and the NEWS Review Group, which has produced this update of the NEWS on behalf of the RCP. The enthusiasm, dedication, endless support and above all encouragement, over the past 10 years, from so many colleagues in the NHS and staff at the RCP has been both humbling and inspiring. They are too numerous to mention here and it would be remiss of me to try, for fear of failing to acknowledge any of the many. They know who they are and the development of the NEWS from the fledgling idea to formal adoption and system-wide change in the NHS is the success of their contribution, a contribution that has and will continue to improve safety and outcomes for patients across the NHS and beyond.

**Professor Bryan Williams**  
Chair of medicine, University College London  
(Honorary) consultant physician, University College London Hospitals  
Chair of the NEWS Development and Implementation Group and the NEWS Review Group, RCP

## Members of the NEWS Review Group

<b>Professor Bryan Williams</b>	Chairman
<b>Professor Derek Bell</b>	Professor in acute medicine
<b>Dr Nic Blackwell</b>	NEWS online training module, OCB Media Ltd
<b>Ms Rachel Binks</b>	Royal College of Nursing
<b>Ms Linda Cuthbertson</b>	Head of PR and External Affairs, RCP
<b>Ms Lesley Durham</b>	Director and lead nurse, North of England Critical Care Network; NEWS lead, National Outreach Forum
<b>Mrs Liz Goodier</b>	Patient and Carer Network, RCP
<b>Dr Andrew Goddard</b>	Registrar, RCP
<b>Dr Gary Davies</b>	Clinical lead for acute medicine, Chelsea and Westminster Hospital
<b>Dr Bernard Higgins</b>	Chair, British Thoracic Society
<b>Dr Frank Joseph</b>	Chairman, Acute Medical Care Committee, RCP
<b>Dr Wei Shen Lim</b>	Consultant respiratory physician, Nottingham; British Thoracic Society
<b>Mr JP Nolan</b>	Lead for emergency and critical care nursing, Royal College of Nursing
<b>Dr Clifford Mann</b>	President, College of Emergency Medicine
<b>Dr Chris Moulton</b>	Vice president, College of Emergency Medicine
<b>Dr Donal O'Donoghue</b>	Renal physician, Salford Royal NHS Foundation Trust
<b>Dr Ruth Johnson</b>	Trainees representative, Society for Acute Medicine
<b>Professor Gary Smith</b>	Visiting professor, Centre of Postgraduate Medical Research and Education, School of Health and Social Care, Bournemouth University
<b>Mr John Welch</b>	University College London Hospitals critical care outreach; Nursing and Critical Care Outreach Forum; International Critical Care Outreach Forum
<b>Ms Tracy Scollin</b>	Committee manager, RCP

No conflicts of interest were declared.

## Acknowledgements

In addition to the listed members of the NEWS Review Group, the invaluable support of many colleagues who have made a significant contribution to the update of the NEWS is acknowledged. These include: the indefatigable Matt Inada-Kim, a physician in acute medicine, for his advice on acute care in sepsis, prehospital and hospital acute care pathways and critical reviews of the drafts; Celia Ingham Clark at NHS England for her advice and commitment in supporting the implementation of the NEWS to improve patient safety in the NHS; Drs Ronan O’Driscoll and Bernard Higgins, respiratory physicians, for their advice on updating the NEWS with regard to the safer use of oxygen in patients with type 2 respiratory failure; Professor Mervyn Singer, professor of intensive care medicine, for his advice on scoring systems for acute clinical deterioration and sepsis; John Welch, a nurse consultant in acute and intensive care, for his wise and detailed comments on various drafts and for advice on update of the NEWS chart; Lesley Durham and Rachel Binks from the National Outreach Forum and the Royal College of Nursing, who, along with Nic Blackwell from OCB Media Ltd, developed and updated the online training modules for the NEWS; Tracy Scollin, Linda Cuthbertson, Natalie Wilder and the leadership team at the RCP, who provided day-to-day support and advice to Bryan Williams in leading the development and update of the NEWS; and the many patients who have advised on the development of the NEWS and have inspired us.

# Executive summary

## Background

This document summarises the update to the National Early Warning Score (NEWS2). The NEWS was developed to improve the detection of and response to clinical deterioration in patients with acute illness. The original NEWS was released in 2012<sup>1</sup> and has been widely implemented across the NHS and in other healthcare settings across the world (see Appendix A for details of the NEWS Development and Implementation Group). The NEWS was created to standardise the process of recording, scoring and responding to changes in routinely measured physiological parameters in acutely ill patients. The NEWS was founded on the premise that (i) early detection, (ii) timeliness and (iii) competency of the clinical response comprise a triad of determinants of clinical outcome in people with acute illness.

At the time that the NEWS was developed, numerous publications and national reports on acute clinical care had advocated the use of so-called ‘early warning scores’ (EWSs), ie ‘track-and-trigger’ systems to efficiently identify and respond to patients who present with or develop acute illness.<sup>2–11</sup> A number of EWS systems were already in use across the NHS; however, the approach was not standardised.<sup>12</sup> This variation resulted in a lack of familiarity with local systems when staff moved between clinical areas/hospitals and impeded attempts to embed training in the detection and response to acute illness in a standardised way, across the NHS workforce. Put simply, when assessing acutely ill patients using these various scores, we were not speaking the same language, which led to a lack of consistency in the detection of and response to acute illness.

Building upon recommendations in its 2007 Acute Medicine Task Force report *Acute medical care: the right person, in the right setting – first time*,<sup>11</sup> the Royal College of Physicians (RCP) commissioned a multidisciplinary group to develop a National Early Warning Score (NEWS). At this time a review of the NEWS was scheduled for 2015, which has been conducted by the NEWS Review Group. This current report presents the conclusions of that review, culminating in this update to the NEWS: the NEWS2. This report includes a comprehensive review of the original justification for the NEWS and a discussion of the rationale for the updated sections of the NEWS. Updated sections of the document are indicated as ‘NEW’ and shaded.

## New Remit

Following its launch in 2012, the NEWS has been widely adopted across the NHS, and over 122,000 NHS staff have completed online competency training in the use of the NEWS. After launching the NEWS, the RCP encouraged feedback on user experience of the NEWS in routine clinical practice, and suggestions for improvement in any of the NEWS-related processes. The remit of the NEWS Review Group was to review these suggestions and decide whether any changes to the NEWS process and charts were necessary. This review was enhanced by inclusion of numerous peer-reviewed research publications, evaluating and validating the NEWS in various clinical settings in the NHS and beyond.

For this NEWS update and based on feedback from users, particular attention was paid to four important themes.

- ⇒ Determining how the NEWS could be used to better identify patients likely to have sepsis who were at immediate risk of serious clinical deterioration and required urgent clinical intervention
- ⇒ Highlighting that that a NEWS score of 5 or more is a key threshold for an urgent clinical alert and response

- ⇒ Improving the recording of the use of oxygen and the NEWS scoring of recommended oxygen saturations in patients with hypercapnic respiratory failure (most often due to COPD)
- ⇒ Recognising the importance of new-onset confusion, disorientation, delirium or any acute reduction in the Glasgow Coma Scale (GCS) score as a sign of potentially serious clinical deterioration, by including new confusion as part of the AVPU scoring scale (which becomes ACVPU).

Various additional refinements to the NEWS chart were also considered and implemented. 

## The National Early Warning Score

The NEWS is based on a simple aggregate scoring system in which a score is allocated to physiological measurements, already recorded in routine practice, when patients present to, or are being monitored in hospital.<sup>1</sup> Six simple physiological parameters form the basis of the scoring system:

- 1 respiration rate
- 2 oxygen saturation
- 3 systolic blood pressure
- 4 pulse rate
- 5 level of consciousness or new confusion\*
- 6 temperature.

\*The patient has new-onset confusion, disorientation and/or agitation, where previously their mental state was normal – this may be subtle. The patient may respond to questions coherently, but there is some confusion, disorientation and/or agitation. This would score 3 or 4 on the GCS (rather than the normal 5 for verbal response), and scores 3 on the NEWS system.

A score is allocated to each parameter as they are measured, with the magnitude of the score reflecting how extremely the parameter varies from the norm. The score is then aggregated. The score is uplifted by 2 points for people requiring supplemental oxygen to maintain their recommended oxygen saturation. This is a pragmatic approach, with a key emphasis on system-wide standardisation and the use of physiological parameters that are already routinely measured in NHS hospitals and in prehospital care, recorded on a standardised clinical chart – the NEWS2 chart.

### NHS England and the NEWS

NHS England and NHS Improvement have approved and endorsed use of the NEWS as the recommended early warning scoring system for use in adults across the NHS in England, to standardise the approach to detecting and grading the severity of acute illness. The NEWS has also been endorsed as the recommended early warning system to detect acute clinical illness/deterioration due to sepsis in patients with an infection or at risk of infection.

## Evaluation of NEWS

During its original development, the NEWS was evaluated against a variety of other EWSs in use at the time. The NEWS was shown to be as good at discriminating risk of serious clinical deterioration and

acute mortality as the best existing systems and better than most.<sup>13</sup> Furthermore, at the recommended trigger level for an urgent clinical response (NEWS score of 5 or more), the NEWS was more sensitive and specific than most existing systems.<sup>13</sup> Thus, the NEWS provided an enhanced level of surveillance of patients, with greater specificity in identifying those at risk of serious clinical deterioration. Subsequent experience in the use of NEWS in clinical practice and formal research-based evaluations have reaffirmed that the NEWS performs very well. Also, unlike other EWSs, the NEWS has now been validated in many settings within the NHS and internationally, including emergency departments and in the prehospital setting, ie by ambulance services.<sup>14–34</sup> In these studies, the NEWS has been shown to be a strong indicator of increased risk of serious clinical deterioration and mortality in patients with sepsis and a variety of acute medical illnesses, surgical patients and patients with acute trauma. There are two important caveats to this conclusion: (i) concern about the potential impact of the NEWS to inadvertently promote the overuse of oxygen therapy in patients with hypercapnic respiratory failure,<sup>35,36</sup> which is dealt with by this update, and (ii) the potential unreliability of the NEWS in patients with spinal cord injury, especially tetraplegia or high paraplegia, owing to disruption of the autonomic nervous system and resulting fluctuations in pulse rate, temperature or blood pressure that can lead to both increased and reduced sensitivity of the NEWS.<sup>37</sup> ■

## Using the NEWS

This report recommends that the NEWS be used to standardise the assessment of acute-illness severity when patients present acutely to hospital and in prehospital assessment, ie by the ambulance services. NEWS should also be used in emergency departments and as a surveillance system for all patients in hospitals, to track their clinical condition, alert the clinical team to any clinical deterioration and trigger a timely clinical response. This report also recommends that the NEWS should be evaluated with a view to extending its use to primary care, to aid triage and communication of acute-illness severity to ambulance and hospital services.


## The NEWS clinical observations chart

To facilitate a standardised and nationally unified approach to recording vital signs data, a colour-coded clinical chart (the NEWS chart) was developed for use across the NHS to record routine clinical data and track a patient's clinical condition. This has been widely deployed. The purpose of this tracking system is to alert the clinical team to any untoward clinical deterioration and to monitor clinical recovery. The NEWS should determine the urgency and scale of the clinical response.

### The NEWS2 chart update

The NEWS chart has been updated. In the NEWS2 chart:

- i the recording of physiological parameters has been reordered to align with the Resuscitation Council (UK) ABCDE sequence
- ii the ranges for the boundaries of each parameter score are now shown on the chart
- iii the chart has a dedicated section (SpO<sub>2</sub> Scale 2) for use in patients with hypercapnic respiratory failure (usually due to COPD) who have clinically recommended oxygen saturation of 88–92%
- iv the section of the chart for recording the rate of (L/min) and method/device for supplemental oxygen delivery has been improved

- v the importance of considering serious sepsis in patients with known or suspected infection, or at risk of infection, is emphasised. A NEWS score of 5 or more is the key trigger threshold for urgent clinical review and action
- vi the addition of ‘new confusion’ (which includes disorientation, delirium or any new alteration to mentation) to the AVPU score, which becomes ACVPU (where C represents confusion)
- viii the chart has a new colour scheme, reflecting the fact that the original red–amber–green colours were not ideal for staff with red/green colour blindness. 

## Clinical response to NEWS

Depending on the NEWS score, the report provides recommendations for the frequency of clinical monitoring, the urgency of clinical review, and the competency requirements of the clinical team needed to undertake that review and respond. The report emphasises the importance of ensuring that acute care response teams, with the appropriate competencies in acute clinical care, are available 24/7 in acute hospitals and free of other clinical responsibilities. This is especially important for patients with a NEWS score of 5 or more. Likewise, for primary care, prehospital or community care, clinical care pathways that ensure urgent access to an appropriate level of care should be defined for such patients. For patients with the highest NEWS scores, ie the most seriously ill, the report provides recommendations regarding the most appropriate clinical environment for ongoing critical care.

The NEWS provides the basis for a unified and systematic approach to the first assessment and triage of acutely ill patients, and a simple track-and-trigger system for monitoring clinical progress for all patients in hospitals. This is allied to recommendations on the urgency and competency of the clinical response, as well as the most appropriate environment for ongoing care of the most acutely ill patients. In so doing, the NEWS provides a template for the staff and infrastructure requirements for modern acute clinical care.

## NEWS and training and education

The NEWS provides the basis for standardising the training and credentialing of all staff engaged in the care of patients in hospitals and the prehospital assessment of patients. We recommend that this should be extended to undergraduate education for all medical, nursing and allied healthcare professionals. The NEWS is supported by an online training module and certification of completion of training (<http://tfinews.ocbmedia.com>). We also recommend that the NEWS becomes part of mandatory training for NHS clinical staff.



### The NEWS in a digital healthcare system

The NEWS can be readily transported into electronic health record and app-based systems. This has already happened in some NHS hospitals with mature electronic health record systems. There are potential advantages of automated calculation of the NEWS score and automated alert systems. Wherever this occurs, it is important that the standardised scoring systems and alert thresholds that underpin the NEWS remain unaltered.

An app is being developed to facilitate the use of the NEWS in hospitals and in primary care. 



## The NEWS and research and innovation

The NEWS provides standardised data on regional variations in illness severity and resource requirements, as well as objective measurements of illness severity and clinical outcomes – the latter providing an invaluable research resource to evaluate the efficacy of new systems of care and novel diagnostics and interventions.

## Conclusions

The NEWS has driven a step-change improvement in safety and clinical outcomes for acutely ill patients in our hospitals by standardising the assessment and scoring of simple physiological parameters and the adoption of this approach across the NHS. This update refines and improves the NEWS without changing its core principles.

## Recommendations

- 1 We recommend that the routine clinical assessment of all adult patients (aged 16 years or more) should be standardised across the NHS, with the routine recording of a minimum clinical dataset of physiological parameters resulting in the National Early Warning Score (NEWS).
- 2 The NEWS should not be used in children (ie aged <16 years) or in women who are pregnant, because the physiological response to acute illness can be modified in children and by pregnancy.
- 3 The NEWS may be unreliable in patients with spinal cord injury (especially tetraplegia or high-level paraplegia), owing to functional disturbances of the autonomic nervous system. Use with caution.
- 4 The NEWS should be used as an aid to clinical assessment – it is not a substitute for competent clinical judgement. Any concern about a patient’s clinical condition should prompt an urgent clinical review, irrespective of the NEWS.
- 5 We recommend that the NEWS is used to improve the following:
  - i the assessment of acute-illness severity
  - ii the detection of clinical deterioration
  - iii the initiation of a timely and competent clinical response.
- 6 In hospitals, the NEWS should be used for initial assessment of acute illness and for continuous monitoring of a patient’s wellbeing throughout their stay in hospital. By recording a patient’s NEWS score on a regular basis, the trends in their clinical responses can be tracked to provide early warning of potential clinical deterioration and provide a trigger for escalation of clinical care. Likewise, the recording of the NEWS trends will provide guidance about the patient’s recovery and return to stability, thereby facilitating a reduction in the frequency and intensity of clinical monitoring towards patient discharge.
- 7 The NEWS should be used in the prehospital assessment of acutely ill patients by ‘first responders’, eg ambulance services, primary care and community hospitals, to identify and improve the assessment of acute illness, triage and the communication of acute-illness severity to receiving hospitals.
- 8 The NEWS should be used in emergency departments to aid the initial assessment of patients, ongoing monitoring and patient triage decisions.

### The NEWS physiological parameters and scoring system

- 9 We recommend that the NEWS score should be determined from seven parameters (six physiological, plus a weighting score for supplemental oxygen):

Six physiological parameters routinely recorded:

- i respiration rate
- ii oxygen saturation
- iii systolic blood pressure

- iv pulse rate
- v level of consciousness and new confusion ('C'), thus AVPU becomes ACVPU, where C represents new confusion
- vi temperature.

In addition, a weighting score of 2 should be added for any patient requiring supplemental oxygen (oxygen delivery by mask or nasal cannula) to maintain their prescribed oxygen saturation range.

- 10 Each of the six physiological NEWS parameters are allocated a score according to the magnitude of disturbance to each parameter. The individual parameter scores should then be added up, along with a score of 2 for use of supplemental oxygen, to derive the aggregate NEW score for the patient.
- 11 We recommend four trigger levels for a clinical alert requiring clinician assessment based on the NEWS:
  - **LOW score:** an aggregate NEW score of 1–4
  - **A single red score:** an extreme variation in an individual physiological parameter (a score of 3 in any one parameter, which is colour-coded **red** on the NEWS2 chart)
  - **MEDIUM score:** an aggregate NEW score of 5 or 6. A **NEW score of 5 or more is a key threshold** and is indicative of potential serious acute clinical deterioration and the need for an urgent clinical response
  - **HIGH score:** an aggregate NEW score of 7 or more.
- 12 We recommend that these triggers should determine the urgency of the clinical response and the clinical competency of the responder(s).
  - A **low NEW score** (1–4) should prompt assessment by a competent registered nurse or equivalent, who should decide whether a change to frequency of clinical monitoring or an escalation of clinical care is required.
  - A **single red score** (3 in a single parameter) is unusual, but should prompt an urgent review by a clinician with competencies in the assessment of acute illness (usually a ward-based doctor) to determine the cause, and decide on the frequency of subsequent monitoring and whether an escalation of care is required.
  - A **medium NEW score** (5–6) is a **key trigger threshold** and should prompt an urgent review by a clinician with competencies in the assessment of acute illness – usually a ward-based doctor or acute team nurse, who should urgently decide whether escalation of care to a team with critical care skills is required (ie critical care outreach team).
  - A **high NEW score** (7 or more) is a **key trigger threshold** and should prompt emergency assessment by a clinical team / critical care outreach team with critical care competencies and usually transfer of the patient to a higher-dependency care area.

## The NEWS observations chart

- 13 We recommend the use of the standardised NEWS2 observation chart for the routine recording of clinical observations, across the NHS. This should eventually replace the existing NEWS chart.
- 14 The NEWS2 chart should replace the wide variety of temperature, pulse and respiration rate (TPR)

charts currently in use, to provide a standardised system for recording routine clinical data for all patients in hospital. A consistent format will provide easier recognition of a patient's clinical status, and facilitate national training in the measurement and recording of such data for all NHS staff (<http://tfinews.ocbmedia.com>).

- 15 The NEWS2 chart is colour-coded to provide both visual and numeric prompts to aid identification of abnormal clinical parameters.
- 16 The core of the NEWS2 chart for recording and scoring the NEWS physiological parameters should be consistent nationally. It is recognised that the rest of the chart area will be customised to reflect other key parameters not incorporated in the NEWS, eg urine output and pain scores, according to the clinical environment.
- 17 The NEWS can and should be used alongside validated scoring systems such as the Glasgow Coma Scale (GCS) or disease-specific systems as dictated by patient need.

### Using NEWS in clinical practice

- 18 We recommend that the NEWS is used to determine the urgency of clinical response and the clinical competency of the responder(s) according to acute-illness severity for patients in hospitals, or in prehospital assessment.
- 19 Concern about a patient's clinical condition should always override the NEWS if the attending healthcare professional considers it necessary to escalate care.
- 20 Clinical response to the NEWS should be recorded on the NEWS chart. This will provide a continuous record of actions taken in response to variations in the NEWS and act as a prompt for escalating care if necessary.
- 21 When clinical teams decide that the routine recording of data for the NEWS is not appropriate, eg for patients on an end-of-life care pathway, such decisions should be discussed with the patient (or their family/carer as appropriate) and recorded in the clinical notes.

### The NEWS and sepsis

- 22 We recommend that sepsis should be considered in any patient with a known infection, signs or symptoms of infection, or in patients at high risk of infection, and a NEWS score of 5 or more – 'think sepsis'.
- 23 We recommend that patients with suspected infection and a NEWS score of 5 or more require urgent assessment and intervention by a clinical team competent in the management of sepsis and urgent transfer to hospital or transfer to a higher-dependency clinical area within hospitals, for ongoing clinical care.

### The NEWS, supplemental oxygen and hypercapnic respiratory failure

- 24 We recommend that when supplemental oxygen is being used to maintain the desired oxygen saturation, the rate of oxygen delivery (L/min) and the delivery system/device should be documented on the NEWS chart using the British Thoracic Society oxygen delivery device codes.

- 25 For patients confirmed to have hypercapnic respiratory failure on blood gas analysis on either a prior or their current hospital admission, and requiring supplemental oxygen, we recommend (i) a prescribed oxygen saturation target range of 88–92%, and (ii) that the dedicated SpO<sub>2</sub> scoring scale (Scale 2) on the NEWS2 chart should be used to record and score the oxygen saturation for the NEWS.
- 26 The decision to use SpO<sub>2</sub> scale 2 should be made by a competent clinical decision maker and should be recorded in the patient's clinical notes.
- 27 In all other circumstances, the regular NEWS SpO<sub>2</sub> scale 1 should be used.
- 28 For the avoidance of doubt, the SpO<sub>2</sub> scoring scale not being used should be clearly crossed out across the chart.

### The NEWS and new confusion or delirium

- 29 We recommend the inclusion of 'new confusion' (including disorientation, delirium or any acute reduction in GCS score) as part of the assessment of consciousness on the NEWS chart. The AVPU term has been amended to ACVPU, where 'C' represents new confusion.
- 30 We recommend that new confusion scores 3 on the NEWS chart, ie a **red score** for a single score of 3, indicating that the patient requires urgent assessment.
- 31 We recommend that, if it is unclear whether a patient's confusion is 'new' or their usual state, the altered mental state/confusion should be assumed to be new until confirmed to be otherwise.

### Clinical response to the NEWS

- 32 The organisation of the clinical response to acute illness should be reviewed and agreed locally to ensure that the speed of response and clinical competency of the responder(s) match that recommended for each of the grades of acute-illness severity as defined by the NEWS.
- 33 We recommend that, in acute hospitals, local arrangements should ensure an appropriate response to each NEWS trigger level and should define:
  - the speed/urgency of response to acute illness, including a clear escalation policy to ensure that an appropriate response always occurs and is guaranteed 24/7
  - who responds, ie the seniority and clinical competencies of the responder(s)
  - the frequency of subsequent clinical monitoring
  - the appropriate settings for ongoing acute care, including availability of facilities, trained staff and timely access to higher-dependency care, if required.

### Clinical competencies of the responders to the NEWS

- 34 All healthcare staff recording data for, or responding to, the NEWS should be trained in its use and should understand the significance of the scores with regard to local policies for responding to the NEWS triggers and the clinical response required.

- 35 The clinical responders to critical NEWS triggers (score of 5 or more) should have the appropriate skills and competencies in the assessment and clinical management of acute illness.<sup>38</sup> In hospitals, team members should be clearly identified and provide coverage 24/7.
- 36 There should be locally agreed mechanisms for timely alert of the critical care teams responding to a critical NEW score (score of 5 or more). Members of these teams should have overriding responsibility to this role with regard to other duties, 24/7.

### The NEWS and frequency of clinical monitoring

- 37 The NEWS should be used to inform the frequency of clinical monitoring, which should be recorded on the NEWS chart.
- 38 We recommend that for patients scoring 0, the minimum frequency of monitoring should be 12 hourly, increasing to 4–6 hourly for scores of 1–4, unless more or less frequent monitoring is considered appropriate by a competent clinical decision maker.
- 39 We recommend that the frequency of monitoring should be increased to a minimum of hourly for those patients with a NEW score of 5–6, or a **red score** (ie a score of 3 in any single parameter) until the patient is reviewed and a plan of care documented.
- 40 We recommend continuous monitoring and recording of vital signs for those with an aggregate NEW score of 7 or more.

### The NEWS and clinical settings for acute clinical care

- 41 The NEWS should be used to aid decision making with regard to the most appropriate clinical setting for ongoing care. Local policies should define pathways for efficient and seamless escalation and transfer of care, including:
- access to clinical monitoring in hospitals, ie monitored beds, with staff trained to interpret and respond appropriately
  - timely access to staff trained in critical care, ie airway management and resuscitation and, when required, access to higher-dependency / critical care beds
  - timely access to specialist acute care, ie acute cardiac, respiratory, neurological, liver or renal support.

### The NEWS – education and training

- 42 Education, training and demonstrable competency in the use of NEWS should be a mandatory requirement and form part of mandatory training for all healthcare staff engaged in the assessment and monitoring of acutely ill patients across the NHS.
- 43 We recommend that education regarding NEWS should form part of undergraduate nursing, paramedical and medical training.
- 44 We recommend that the clinical responders to NEW scores of 5 or more must have competency in the assessment of acutely ill patients. Responders to a NEW score of 7 or more must also have competency in critical care skills and airway management.

## The NEWS and research and development

- 45 We recommend that future research be directed towards evaluating the efficiency of the NEWS in improving clinical response times and clinical outcomes in patients with acute illness – including in the primary care setting.
- 46 We recommend that the NEWS be used to catalyse an expansion of research into the effectiveness of novel interventions, diagnostics and care pathways in acute care in the NHS.

# 1 Background and introduction

Surveys suggest that about one-third of potentially preventable deaths in the UK relate to poor clinical monitoring.<sup>39</sup> Other preventable deaths can often be attributed to an inadequate response to clinical deterioration, in terms of the urgency of the response, the clinical experience and competency of the responders, and ensuring that the patient is in the most appropriate setting for ongoing clinical care.

In 2012, the Royal College of Physicians (RCP) responded to the need to improve the outcomes of patients with acute illness by launching the National Early Warning Score (NEWS).<sup>1</sup> The principal aim of the NEWS was to standardise clinical monitoring and embed it into the routine culture of the NHS – to trigger an appropriate clinical response, in time, person and place. Since its launch, the NEWS has been deployed across the majority of hospitals in the NHS and has been adopted by healthcare systems in many other parts of the world. The NEWS has also been tested and validated in many different healthcare settings, including emergency departments and prehospital care, and has performed well.<sup>14–34</sup> This collective experience has provided valuable feedback to the NEWS Review Group.

To continue to improve the safety and outcomes for patients with acute illness, there has been recent national and international focus on the need to improve the detection and treatment of sepsis,<sup>40–42</sup> which results in perturbations of many of the physiological parameters already recorded by the NEWS.<sup>43,44</sup> After considering feedback from users of the NEWS over the past 4 years and being cognisant of the opportunity to further improve the detection of and response to sepsis, the RCP has decided to update the NEWS.



Importantly, the core principles of the NEWS, the NEWS scoring system, and the NEWS thresholds and triggers remain unchanged. There are, however, some important changes that should enhance the usability, safety and performance of the NEWS, the most significant of which are:

- i a new section on the NEWS2 chart for scoring oxygen saturation for patients with hypercapnic (often termed type 2) respiratory failure, to ensure the most appropriate prescription of supplemental oxygen, when required, for these patients
- ii recognition of the importance of new confusion (or delirium) as a sign of potentially important clinical deterioration. This is reflected in the addition of 'C' to the Alert, Voice, Pain, Unresponsive (AVPU) score, which becomes ACVPU
- iii a strong emphasis on the potential use of the NEWS to identify serious sepsis in patients with known or suspected infection, or at high risk of infection. Such patients with a NEWS of 5 or more are at serious risk of clinical deterioration and a poor clinical outcome, and need urgent assessment and intervention.

We have taken the opportunity to make improvements to the NEWS chart. The online training modules and credentialling for the use of the NEWS have also been updated to highlight the changes and illustrate their use in practice (<https://tfnews.ocbmedia.com/>).

In updating this document, where appropriate the original discussion of the rationale and methodology for the development of the NEWS have been retained, and updated where new evidence or experience in the use of the NEWS has reinforced the existing recommendations or prompted changes in any aspect of the NEWS processes or documentation. This update also includes a summary of frequently asked questions from users of the NEWS and responses to these questions (Appendix B). ▀



## Original rationale for developing the NEWS

When a patient is acutely unwell and presents to hospital, or deteriorates and becomes acutely unwell while in hospital, time is of the essence: a fast and efficient clinical response can improve the outcome for this patient. Evidence suggests that the triad of (i) early detection, (ii) timeliness of response and (iii) competency of the clinical response is critical to defining patient outcomes.<sup>2–9,13–34</sup>

At the time that the NEWS was originally developed, a number of national reports provided key levers for change, including guidance from the National Institute for Health and Care (previously Clinical Excellence (NICE) and the RCP's Acute Medicine Task Force.<sup>9–11</sup> Each report highlighted the importance of a systematic approach to clinical monitoring and advocated the use of an 'early warning score' (EWS), ie a 'track-and-trigger' system, to efficiently identify and respond to patients who present with, or develop, acute illness.<sup>9–11</sup> These reports emphasised that the clinical response to the acutely ill patient could be substantially improved by the routine embedding of a simple EWS system based on two key requirements:

- 1 a systematic method to measure and record simple physiological parameters in all patients, to allow early recognition of those presenting with acute illness or who are deteriorating
- 2 a clear definition of the appropriate urgency and scale of the clinical response required, tailored to the level of acute-illness severity.

The NEWS Development Group noted that, to deliver these objectives, appropriate system-wide training and education were required and that the availability of a single, national EWS system (ie the NEWS) would facilitate this.

A guiding principle was that the approach to grading of acute-illness severity should not be complex and needed to be pragmatic if it was to be deployed across all healthcare systems and utilised by all healthcare professionals.

Illness severity can be quantified by measurement of a combination of simple physiological parameters, such as respiration rate, oxygen saturation, temperature, systolic blood pressure, pulse rate and level of consciousness – all of which are often already recorded during routine patient assessments. Based on these simple physiological measurements, at the time that the NEWS was developed, many EWS or track-and-trigger systems were in use worldwide.<sup>2–8</sup> Our review of these EWS systems noted that they varied in complexity, ranging from single physiological parameter scores through to multiple-parameter, aggregate weighted scores, and a combination of these systems.<sup>45,46</sup> In the setting of acute illness in hospitals, these EWS systems appeared to be a good predictor of patient mortality and hospital length of stay;<sup>2–8,45,46</sup> however, a challenge in developing the NEWS was the absence of studies that systematically evaluated the performance and impact of EWS systems.

Another lever for change and the development of the NEWS was the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) 2007 report *Emergency admissions: A journey in the right direction?*<sup>10</sup> This report recommended that:

*A clear physiological monitoring plan should be created for each patient commensurate with their clinical condition. This should detail what is to be monitored, the desirable parameters and the frequency of observations. This should be regardless of the type of ward to which the patients are transferred.*<sup>10</sup>

The NCEPOD report did not, however, emphasise the importance of standardising the physiological monitoring plan, which the NEWS Development Group considered to be of fundamental importance, to ensure that everybody was 'speaking the same language' and to facilitate education and training in the initial assessment and continuous monitoring of acutely ill patients across the NHS. Thus, the key

principle of the NEWS was standardisation of the assessment and response to acute illness, with the expectation that this would drive a step change in safety, quality of care and patient outcomes in acute care, across the NHS.

In developing the NEWS, a number of important factors were considered by the NEWS Development Group, including:

- Which physiological parameters should be measured routinely and included in the scoring system?
- What weighting/score should be given to the magnitude of disturbance in each of these parameters?
- Should a clinical alert be based on an extreme variation of one physiological parameter, an aggregate score of all parameters, or a combination of both?
- At what 'score' should the clinical response be escalated, ie the sensitivity of the trigger?
- What should be the nature of the clinical response with regard to the clinical competencies of the responder/s?

From this list of considerations, it was clear that designing a standardised EWS system presented a number of challenges, not least to ensure: (i) that the scoring system was not so complex that it was never used in routine clinical care; (ii) that the trigger was not too sensitive that it led to unnecessary alerts and 'alert fatigue', which could overwhelm the clinical response teams; but also (iii) that the scoring system was not so insensitive that these teams never responded at all. It was also recognised that, for a standardised NEWS to work, it had to be supported by training for all healthcare professionals, thus permitting wide implementation using a common language. To facilitate this, at the time of the NEWS launch in 2012, an online training module for the NEWS was made available (<https://tfinews.ocbmedia.com/>), which provided certification after completion of the NEWS training module. The uptake of this online training has been remarkable, with over 157,000 NHS staff undertaking online training and over 122,000 completing training by October 2017, a completion rate of over 77%.

When the NEWS was launched, a number of EWS systems had already been developed and implemented by many hospitals across the NHS. However, the situation was far from ideal, for a number of reasons:

- 1 The various EWS systems being used in the NHS at that time utilised a variety of different physiological parameters to derive their score. Moreover, the 'weighting' given to individual physiological parameters differed between scoring systems – thus the scores for different levels of illness severity differed depending on which EWS system was being used. Consequently, clinical staff in different hospitals, or even in different clinical settings within the same hospital, were using different EWS systems and the staff were not necessarily familiar with the differences between the different systems. Not only was this suboptimal, it was potentially dangerous.
- 2 Few local EWS systems had been formally evaluated, and none had been adequately evaluated to determine whether they accurately identified acute-illness severity across a broad spectrum of acute clinical settings. Furthermore, they were often modified from their original design and the modifications were not consistent in different hospitals.
- 3 Where EWS systems were being used, the frequency of monitoring, and speed and magnitude of an 'appropriate clinical response', to a specific level of acute-illness severity were often poorly defined and/or adhered to. Many hospitals using EWS systems did not have robust response systems in place, with the appropriate balance of staff trained in the clinical competencies required to respond adequately to a medium or high score, especially 'out of hours' and rarely 24/7.

- 4 The variety of EWS systems had thwarted the potential for a single EWS system to be used to standardise the assessment of acute-illness severity beyond the hospital setting, ie in the community and/or other prehospital settings, eg by GPs and ambulance services.
- 5 The absence of a nationally standardised approach to the detection of and response to acute illness in hospitals had impeded attempts to embed standardised training in how to assess and respond to the acutely ill patient into undergraduate and postgraduate education and training curricula.

These limitations in clinical practice had been recognised by the RCP Acute Medicine Task Force report in 2007,<sup>11</sup> which noted that ‘A number of basic assessment tools or “early warning scores” are currently in use nationwide’, and commented that ‘there is no justification for the continued use of multiple different early warning scores to assess illness severity’.

The Acute Medicine Task Force went on to recommend the following:

*The physiological assessment of all patients should be standardised across the NHS with the recording of a minimum clinical data set resulting in an NHS early warning (NEW) score. This will provide a standardised record of illness severity and urgency of need, from first assessment and throughout the patient journey.<sup>11</sup>*

This would allow consistent face-to-face assessment of illness severity across the NHS and provide a valuable baseline from which to evaluate the patient’s clinical progress. It would also enhance good clinical practice, support standardised recording of vital data and provide an important source of documentation for audit of the quality of patient care. Furthermore, the development of NEWS would provide an important first step towards national unitary clinical documentation across all acute healthcare providers.<sup>11</sup>

The Acute Medicine Task Force report had recognised that a key weakness was the lack of a standardised EWS system embedded within the culture of the NHS, and that fixing this would have the potential to transform clinical practice and patient safety. The lack of standardisation also prevented a single EWS system from forming the basis for the routine training and education of all NHS staff, with significant patient safety implications that could be remedied by the establishment of a National Early Warning Score (NEWS) to be used by all staff as part of staff credentialling.

The term ‘National’ rather than ‘NHS’ was subsequently used for the title of the NEWS, because the NEWS Development Group wanted to see the culture of standardised recording of illness severity adopted both within and beyond the NHS. This has now happened, in a remarkably short time frame and without any central directive mandating the implementation of the NEWS, or any dedicated funding to support its implementation. This most likely reflects the fact that the NEWS was a clinically led initiative, responding to a real clinical need to improve the detection of and response to acute illness, and to improve patient safety and outcomes in our hospitals.

## **Recognising the potential benefits of a National Early Warning Score (NEWS) through standardisation**

The key principle underpinning the recommendations in the original RCP report describing and recommending the implementation of the NEWS across the NHS was ‘standardisation’.<sup>1</sup> In developing the NEWS, there was the potential for endless discussions about which parameters should be included in the NEWS, the thresholds for each parameter within the scoring system and the scaling of the response to specific scores. Such discussions, although important, were not allowed to detract from the overarching desire to create a system that reduced variation in care and improved training and

communication – recognising that this would be overwhelmingly important in driving a step change in the assessment of and response to acute illness. The NEWS Development Group also recognised that the NEWS had to be practical and user-friendly, to enable its use in NHS acute hospitals and also to encourage its wider uptake in other settings, eg in the community and the prehospital assessment of patients with acute illness.

Consequently, and importantly, the NEWS did not advocate a radical shift in the methods of assessment of illness severity – the NEWS adopted the basic principles and competencies that already existed. The key message was standardisation and the widespread adoption of a single national EWS, ie the NEWS.

The key principle underpinning the NEWS is standardisation.

The stated potential benefits of a standardised NEWS included:<sup>11</sup>

- a single EWS system for early detection of acute illness by measurement of specific physiological parameters in a standardised format
- a standardised scoring system to determine illness severity to support consistent clinical decision making and an appropriate clinical response
- the standardisation of training in the detection of acute illness and management of acutely unwell patients, and incorporation of such training earlier into clinical careers
- adoption of a standardised scoring system throughout hospitals, not solely in the context of acute clinical deterioration but also for continuous monitoring of all patients, providing a standardised means of identifying and responding to patients with unanticipated acute deterioration in their clinical condition while in hospital
- the opportunity to extend the application of the NEWS to prehospital and primary care, to standardise the assessment of acute illness in these settings.

The original NEWS report<sup>1</sup> also noted that the use of the NEWS in all hospitals would provide a standardised national platform to record defined levels of illness severity. This would facilitate the development of simple acute-illness severity profiles: (i) to assist with audit and capacity planning of human resource needs and their allocation to match illness severity; and (ii) to provide a powerful research tool to assess the impact of interventions, the quality of care and clinical outcomes.

The NEWS – Everybody is speaking a common language.

## 2 Methodology

This section retains the original description of the methodology used to develop the NEWS in the original report,<sup>1</sup> followed by a description of the processes and rationale for updating the NEWS for the current report.

To develop the NEWS, the RCP commissioned their Acute Medicine Task Force to convene a working group to develop the NEWS. This was titled the NEWS Development and Implementation Group (NEWSDIG), hereafter referred to as the NEWS Development Group. The specific objective of this group was to develop a single EWS system that could be implemented across the NHS.

### Remit of the original NEWS Development Group

- to develop a National Early Warning Score (NEWS) for use in adults
- to define the physiological parameters that would be included in the NEWS, based on existing routine physiological measurements
- to define the weighting that should be applied to each of the parameters to derive the final aggregate NEWS score
- to define the generic features of an appropriate scaled response to acute-illness severity as defined by the NEWS, with regard to frequency of monitoring, the urgency of clinical response and levels of escalation of care
- to design a generic and standardised observation chart to record the NEWS parameters in routine clinical practice
- to develop an online training resource to support the implementation of the NEWS.

### Original process for the development of the NEWS

The process involved small-group discussion meetings of the NEWS Development Group, to review existing EWS systems and related published literature and reports. This culminated in an initial draft report. The draft report was circulated to a wide group of national stakeholders<sup>1</sup> for review, which led to an updated version of the draft report. This version was then reviewed by the RCP Council, culminating in further recommendations for improvement, and the production of the final NEWS publication in 2012.<sup>1</sup>

The NEWS Development Group reviewed a wide variety of EWS systems in use across the NHS, aided at the time by a recently completed detailed review of the performance of 33 different aggregate weighted, track-and-trigger systems.<sup>45,46</sup> This facilitated discussion about the physiological parameters incorporated into existing EWS systems and the performance of these systems. The group noted that the existing EWS systems had many common features, but also subtle differences with regard to the physiological parameters included, the number of parameters used to derive a score, and the weightings given to each parameter. This, in turn, influenced the performance of these systems in identifying acute illness.

It was clear from this literature review that the existing evidence to guide the formulation of the NEWS, or any other EWS, was very limited and far from optimal. Moreover, where EWS systems were in use, in many cases, local modifications had been applied. Furthermore, in hospitals, the presentation of data on local charts differed in such a way that it was not obvious even when the same EWS system was being used, creating potential for confusion.

The NEWS Development Group noted that there was uncertainty and no agreed standard about how an EWS should be validated. The group was unanimous in the view that some form of pre-launch evaluation and validation of any new EWS was essential, and there was much discussion about what was meant by 'validation' in this context. A number of important issues were considered: what was the most appropriate outcome measure against which to validate an EWS system? Was it the efficiency of the system at predicting clinical deterioration that required an escalation of clinical care? Was it the sensitivity and/or specificity of the trigger and appropriateness of the escalation of care? Was it the avoidance of the need to transfer a patient to higher-dependency care? Was it the ability of the EWS to predict in-hospital mortality or mortality over a longer period? Was it length of stay in hospital? Was it a combination of these outcomes?

Moreover, if the response to an EWS was not standardised (which it rarely was), how would it be possible to know whether the scoring system per se was working suboptimally, or simply compromised by an inadequate clinical response? Put simply, unless the speed and nature of the clinical response was controlled for, it is difficult to evaluate an EWS system in isolation. It was clear that more robust research was needed, and that the adoption of a standardised NEWS would help facilitate and inform such research. That said, the premise that an EWS, supported by education and standardised responses, had the potential to improve the efficiency of acute care and clinical outcomes appeared to be well grounded in evidence.<sup>2-9,45,46</sup>

The NEWS Development Group discussed various physiological parameters that might be included in the NEWS (see below). The group noted that some EWS systems had solely used an aggregate score derived from the physiological parameters. This prompted discussion about what to do about the occurrence of an extreme variation in a single physiological parameter – should this be sufficient to act as a trigger for an urgent clinical review of the patient? There was concern that an extreme variation in a single parameter should not be ignored if the aggregate score was insufficient to trigger a response to a medium or high score, while accepting that this scenario would be very unusual.

The NEWS Development Group finally agreed on six physiological parameters that should form the basis of the NEWS. At that time, there was much discussion about the practicality of including oxygen saturation. It was noted that the measurement of oxygen saturation had already become commonplace in hospitals and in prehospital assessment. How to incorporate the use of supplemental oxygen when used to maintain oxygen saturation was also considered. This had not featured in many EWS systems previously, but was an important consideration if oxygen saturation was to be incorporated into the NEWS.

After reviewing all of the available information, complemented by the clinical experience of the members of the NEWS Development Group, the final format for the NEWS was agreed. An analysis of the performance of the NEWS was then undertaken by members of the NEWS Development Group, using an extensive NHS hospital clinical database of bedside physiological measurements, linked to a range of clinical outcomes, including death within 24 hours of assessment. This initial evaluation of the NEWS, supporting the recommendations in the original NEWS report, was subsequently published.<sup>13</sup> Since publication of the NEWS, further favourable evaluations of the performance of NEWS have been reported, from research undertaken independently by other groups, in a variety of different care settings in the NHS and across the world;<sup>14-34</sup> see section 3.

Formulating the recommendations in the original NEWS report represented a balance of assessment of the available evidence, experienced clinical and professional judgement, patient and user opinion, evaluation and validation, and pragmatism – the latter being especially important. The guiding principle was that if the NEWS was going to work in all acute-care settings across the NHS, including prehospital assessment, then it must be simple to implement and must use physiological parameters that were already being routinely measured in the NHS.

The original NEWS report acknowledged that, as with all new innovations in healthcare, there needed to be a process of ongoing evaluation and evolution, and that ‘fine tuning’ of the NEWS may be required, based on the clinical experience that would flow from its widespread use.<sup>1</sup>

The NEWS provided the essential first step on the road towards a standardised approach to grading acute-illness severity, in order to trigger a timely and appropriate clinical response in our hospitals. Without a standardised NEWS, this was never going to happen. This approach to the development, validation and evolution of the NEWS was considered preferable to the existing fragmented adoption of multiple EWS systems across the NHS, without national review, standardised training in their use, or oversight of their suitability via objective audit of their performance.

Finally, the NEWS Development Group emphasised that the normal baseline for physiological parameters, and the magnitude and character of the physiological response to acute illness, is often modified in children and during pregnancy. The NEWS was designed for use in patients aged 16 years and more and is not recommended for use in children aged under 16 years or during pregnancy. Furthermore, the NEWS Development Group recognised that the chronically disturbed physiology of some patients, eg those with chronic obstructive pulmonary disease (COPD), could affect the sensitivity of the NEWS. This latter point was the source of considerable feedback following the launch of the NEWS<sup>35,36</sup> and, working with representatives from the British Thoracic Society (BTS), the NEWS Review Group has made changes to the NEWS scoring system, specific to the clinical management of patients with hypercapnic respiratory failure. Feedback was also received about the unpredictable performance of the NEWS in patients with spinal cord injury (specifically tetraplegia and high-level paraplegia) due to disturbed autonomic function,<sup>37</sup> and this is now highlighted in this NEWS update.

### Developing the original NEWS – from evidence to recommendations

The benefits of recording routine physiological measurements as the basis for an EWS system were well established and had underpinned the NICE recommendations to adopt this approach to detect and respond to acute illness.<sup>9</sup>

The NEWS Development Group agreed and adopted the same physiological parameters for the NEWS as those recommended by NICE.<sup>9</sup> The decision to add an additional weighting score for the use of supplemental oxygen was based on literature reviews which suggested that this improved the precision of EWS systems at detecting acute-illness severity, and was complemented by direct review of data presented to the NEWS Development Group from a comprehensive analysis of the performance of EWS that included supplemental oxygen.<sup>13</sup>

Decisions with regard to the weighting given to the NEWS parameters were based on the aforementioned analysis,<sup>13</sup> review of normal ranges currently used by other EWS systems, and group discussion. The pre-launch formal desktop evaluation of the performance of the NEWS showed that it performed very favourably versus other EWS systems; these data were subsequently published<sup>13</sup> and are discussed further in section 3. The sensitivity of the NEWS trigger was also evaluated using the same database.

Throughout the process, it was clear that the evidence base and criteria for assessment of EWS systems were far from ideal, but it was also unlikely that any other EWS system had undergone such an extensive evaluation prior to launch.

## Methodology for updating the NEWS


A blue graphic element consisting of a white triangle pointing to the right, containing the word "New" in white text.

Following the publication of the original NEWS report in 2012,<sup>1</sup> the RCP encouraged feedback from users of the NEWS, and the NEWS Review Group was established under the chairmanship of the original chair of the RCP Acute Medicine Task Force and NEWS Development Group (Professor Bryan Williams, University College London Hospitals).

The NEWS Review Group comprised some members of the original NEWS Development Group, plus additional members with expertise in the clinical areas under consideration for the update of the NEWS.

Various sources of feedback collected by the RCP since the launch of NEWS were reviewed and grouped into themes. In many of these themes, clarification rather than update of the NEWS was required (see the FAQs in Appendix B). There were other themes for which update of the NEWS was formally considered and approved by the NEWS Review Group, and these are discussed in the sections that follow.

The recently published NICE guidance *Sepsis: recognition, diagnosis and early management* (NG51)<sup>40</sup> highlighted the importance of early detection of sepsis to improve patient outcomes. The physiological disturbance that frequently accompanies serious sepsis is identified by the NEWS and would usually result in a NEWS score of 5 or more, prompting urgent clinical assessment and treatment. The performance of the NEWS in this context was supported by a recent report on the quick Sepsis-related Organ Failure Assessment (qSOFA) score<sup>43,44</sup> (see section 5). The qSOFA score was recently developed by an international consortium and evaluated against existing sepsis scoring systems, to identify patients at risk of serious clinical deterioration due to sepsis.<sup>43,44</sup> The qSOFA score performed very well in identifying patients with confirmed or suspected sepsis who were at risk of serious clinical deterioration. The NEWS Review Group noted that the qSOFA scoring system used three of the six physiological parameters already recorded in the NEWS, effectively supporting the use of the NEWS to identify patients with a known or suspected infection who were likely to be at imminent risk of serious clinical deterioration due to sepsis.

All of the aforementioned changes to the NEWS were discussed and agreed by the NEWS Review Group, and approved by the RCP Council. 



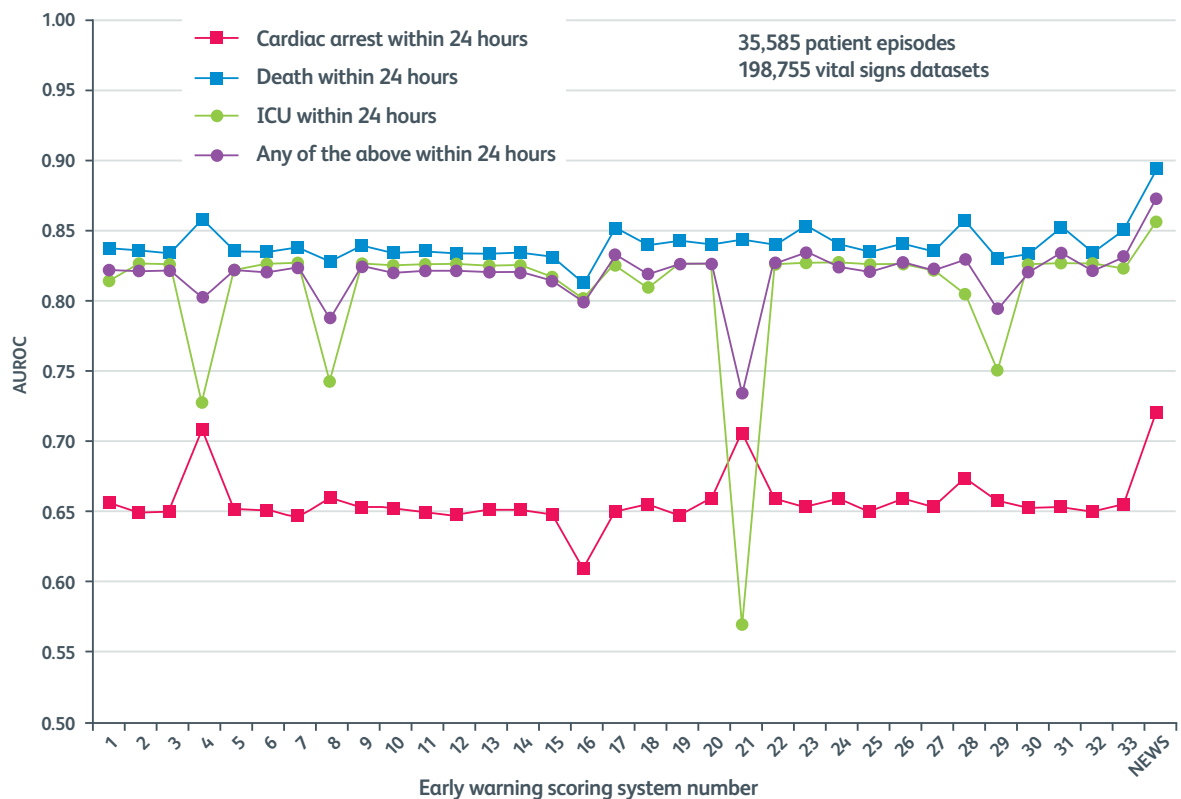
### 3 Evaluation and validation of the NEWS



At the time that the NEWS was developed, a number of EWS systems were reviewed, including single-parameter scoring systems and aggregate weighted scoring systems. The NEWS Development Group adopted an aggregated scoring system for the NEWS; recent systematic reviews support this recommendation in showing that aggregate weighted scoring systems outperform single-parameter scoring systems in identifying deteriorating patients.<sup>47,48</sup> The group also noted that outcome measures for EWS systems remained poorly described and validated, but recognised that acute clinical deterioration culminating in transfer to an intensive care unit (ICU), cardiac arrest and short-term mortality were important measures of the effectiveness of an EWS. A recent systematic review supported these conclusions, showing that EWS systems performed well for the prediction of cardiac arrest and death within 48 hours and, consistent with the recommendations of the NEWS Development Group, concluded that these systems should have their performance and effectiveness assessed more rigorously as their use becomes more widespread.<sup>49</sup>

In the original development of the NEWS (see above), the NEWS Development Group undertook a pre-launch evaluation that was subsequently published.<sup>13</sup> This study analysed the ability of the NEWS to identify patients in hospital who were at risk of significant clinical deterioration – comparing the performance of the NEWS with 33 other EWS systems that were in use at the time of the study. This study examined almost 200,000 observations from a large vital signs database from over 35,000 consecutive acute medical admissions to a UK hospital. The study concluded that NEWS was superior to all of the other EWSs at identifying patients at risk of the combined outcomes of cardiac arrest,

**Figure 1: Area under receiver operating curves (AUROCs) for the NEWS and 33 other EWS systems previously evaluated using the EWS system scores relative to each outcome studied. Reprinted from Smith *et al*,<sup>13</sup> copyright 2013, with permission from Elsevier**



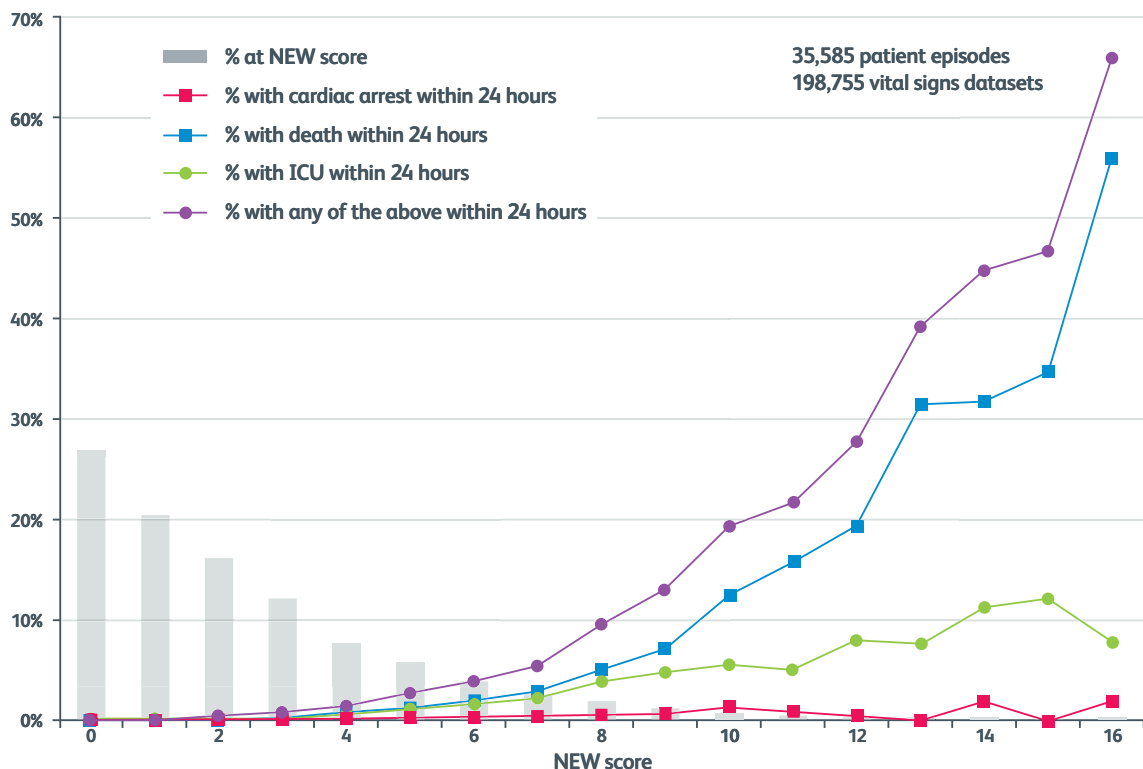
unanticipated ICU admission or death within 24 hours of a NEWS score (Figure 1). This confirmed that the NEWS was a robust system that achieved its aims.

The same study also examined the efficiency of the various EWS systems relative to the NEWS.<sup>13</sup> Efficiency in this context relates to the sensitivity and specificity of the NEWS alerts. The NEWS exhibited the greatest efficiency of all EWS systems tested, ie the number of ‘triggers’ expected per combined clinical outcome. The NEWS generated fewest triggers to predict the combined outcome of cardiac arrest, unanticipated ICU admission or death within 24 hours of a NEWS score. This is an important finding with regard to the sensitivity of NEWS (ie how often NEWS triggers a response) and the specificity of NEWS (ie how often that trigger predicts the likelihood of serious clinical decompensation).

The NEWS was also the most effective system for efficient deployment of emergency response teams. Figure 2 shows the anticipated frequency of the NEWS scores in acute medical admissions versus the likelihood of serious clinical deterioration or death within 24 hours of the score. It is clear that a NEWS score of 5 or more is associated with increased risk of a serious clinical outcome and that this score will be recorded in ~5% of patients in a typical acute medical admissions area. **This supports the use of a NEWS score of 5 or more as a threshold to alert emergency response teams in hospitals.**

Another study from Sweden, having translated the NEWS into Swedish, tested its performance in an acute medical setting at a university hospital and showed that the NEWS performed well in predicting admissions to ICU, especially in those with a lower level of consciousness and lower oxygen saturation, and importantly showed that the NEWS had ‘excellent inter-rater reliability’.<sup>27</sup>

**Figure 2: The distribution of NEWS scores and their relationship to each of the four outcomes studied. Reprinted from Smith *et al*,<sup>13</sup> copyright 2013, with permission from Elsevier**



## Single extreme values (red score of 3 in a single parameter) versus aggregate NEWS as a medium critical-level alert

In the original NEWS, a single extreme value (red score) of 3 for any parameter was regarded as a medium-level alert, equivalent to an aggregate NEWS score of 5 or more. New evidence has questioned whether this is appropriate.<sup>15,16</sup> Analysis of a large patient dataset found that escalating clinical care based on a single parameter with a NEWS score of 3 would increase workload by 40% compared with using an escalation trigger of an aggregate NEWS score of 5 or more, but would only increase detection of adverse outcomes by 3%.<sup>16</sup> Thus, the escalation criteria for the NEWS have been amended so that a single red score of 3 is not given the same weighting as an aggregate NEWS score of 5 or more.

## Evaluating the NEWS in the emergency department

Data supporting the use of the NEWS have also emerged from studies in emergency departments (EDs).<sup>14,18,21,31,50</sup> Triage systems are often used in EDs at initial assessment, but these systems are not designed to detect clinical deterioration with repeated measurements. A recent study tested the NEWS in an ED in Amsterdam. NEWS was documented on admission to the ED, 1 hour after arrival and at transfer to the general ward or ICU. The NEWS was shown to be a good predictor of patient outcome, including the need for hospital admission, the length of hospital stay and 30-day mortality, at all time points.<sup>31</sup>

Another study at a general emergency hospital in Norway examined the performance of the NEWS in the ED, in patients specifically admitted as an emergency with respiratory distress. The NEWS performed well and was correlated closely with 30-day, 90-day and in-hospital survival, the need for ICU admission and probability for patients to be discharged directly to home.<sup>21</sup>

A further study evaluated the NEWS across 20 EDs in Scotland in patients with sepsis. The study showed that an increased NEWS score on arrival at the ED was associated with poorer patient outcome in a graded way, ie each rise in a NEWS category was associated with an increased risk of in-hospital death within 30 days or ICU admission within 2 days. The authors concluded that the wider use of the NEWS in EDs could facilitate more effective triage to a high-acuity area and more senior clinician involvement at an early stage.<sup>14</sup> Importantly, this study also validated the effectiveness of the NEWS in evaluating patients with sepsis.

Another study focused on the potential use of the NEWS at ED triage to provide a trigger to screen for severe sepsis.<sup>18</sup> They reported that a NEWS score of 3 or more had a sensitivity of 93% and a specificity of 77% to detect patients at risk of severe sepsis at ED triage.

## Position statement from the Royal College of Emergency Medicine on the use of NEWS in adult patients attending EDs – June 2016

The Royal College of Emergency Medicine (RCEM) reported the results of a national database review of clinical incidents, which showed that common themes contributing to clinical incidents were failure to recognise acute clinical deterioration, failure to escalate physiologically unstable patients to a sufficiently senior practitioner, and unsafe transfer of unstable patients owing to inadequate handover to ward-based teams. The RCEM recognised that the use of the NEWS could be helpful in managing the transition of care between clinical teams, ie from prehospital care to ED, and from ED to ward-based or higher-dependency care. The RCEM recommended that, while the use of the NEWS was already standard practice in many EDs, all EDs should use the NEWS.<sup>50</sup>

## Evaluating the NEWS in the prehospital setting

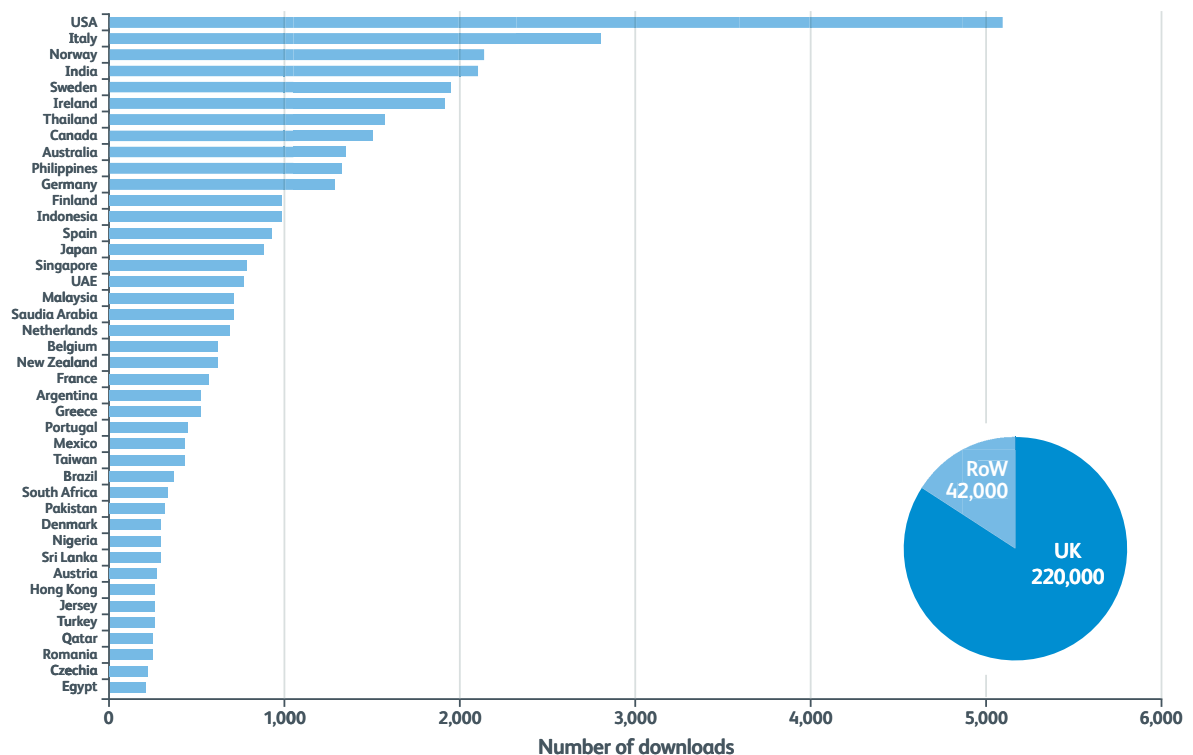
Although the NEWS was designed with an initial focus on the hospital setting, the NEWS Development Group had recommended that the NEWS could and should be used in the prehospital setting to better identify patients at risk and facilitate more effective triage of patient transfers to the most appropriate clinical area for ongoing care.<sup>1</sup> This recommendation in the original NEWS report is supported by findings from subsequent studies and by systematic review of the validity and performance of the NEWS in the prehospital setting.<sup>19,20,51,52</sup> In one study in the NHS,<sup>19</sup> all ambulance crews recorded the NEWS while transporting unselected patients to a single hospital in Scotland. The NEWS predicted 48-hour and 30-day mortality and ICU admission. Importantly, similar results were noted for both trauma and non-trauma patients. The authors concluded that the use of the NEWS in the prehospital setting may facilitate earlier recognition of deteriorating patients, earlier involvement of senior ED staff and more appropriate levels of critical care.<sup>19</sup>

## Uptake of the NEWS

Uptake of the NEWS has been brisk and widespread, extending from the NHS to international hospitals in Europe and beyond. The NEWS document has been downloaded over ¼ million times, with over 220,000 downloads in the UK and over 40,000 downloads from across the world (Figure 3).

Recent surveys suggest that over 90% of NHS hospitals are using an EWS and that the majority (over 75%) have already implemented the NEWS,<sup>42</sup> indicating that implementation of the NEWS has gone beyond a tipping point. This is fundamental to the guiding principle of the NEWS: that a single EWS system embedded within a healthcare system has the potential to transform patient care and outcomes. The Care Quality Commission (CQC), in its inspection of NHS hospitals in England, now recognises the

**Figure 3: Downloads of the NEWS document from the RCP website since the launch of the NEWS (July 2012 – June 2017), stratified by country (excluding the UK). RoW = rest of the world; UAE = United Arab Emirates**



use of the NEWS as an important quality standard. NHS Wales has implemented NEWS as the standard in all secondary and tertiary hospitals.<sup>53</sup> The Scottish Intercollegiate Guidelines Network (SIGN) has recommended that all acute hospitals should implement the NEWS.<sup>54</sup> The NEWS has also been implemented in Ireland.<sup>55</sup>

Importantly, the NEWS has now been endorsed by NHS England (NHSE) and NHS Improvement (NHSI) as the recommended early warning system for use across the NHS in England, recognising the importance of standardisation. NHSE, in its guidance on early detection of clinical deterioration due to sepsis in adults, has also recommended the NEWS as the early warning score to detect clinical deterioration in patients with suspected sepsis. [www.england.nhs.uk/wp-content/uploads/2017/09/sepsis-guidance-implementation-advice-for-adults.pdf](http://www.england.nhs.uk/wp-content/uploads/2017/09/sepsis-guidance-implementation-advice-for-adults.pdf)

### Summary of the evaluation of the NEWS

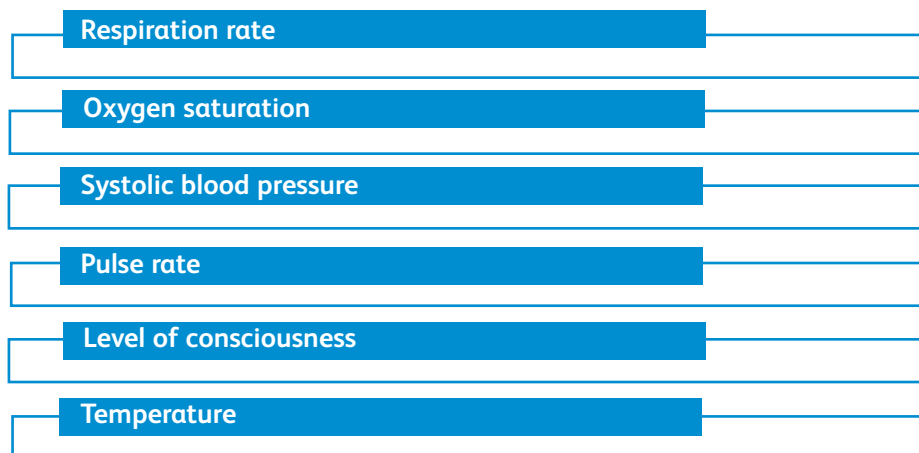
When the NEWS was launched, there was explicit recognition of the need for ongoing evaluation and validation of its performance.<sup>1</sup> The independent validations of the NEWS cited above continue to grow and have been conducted in a variety of settings in the UK and internationally. They have all vindicated the decision to develop the NEWS and have validated its performance. In the 5 years since its launch, the NEWS has been evaluated against existing EWS systems and has been shown to be a leading system at discriminating risk and the need for escalation of care in acutely ill patients. The NEWS has also been shown to be a robust predictor of clinical outcomes in a wide variety of patients in different clinical settings. Moreover, unlike other EWS systems, the NEWS has now been externally evaluated and validated in peer-reviewed published studies from multiple acute hospital sites and settings, nationally and internationally, and in the prehospital assessment of patients. The uptake of the NEWS across the NHS has exceeded all expectations. This provides opportunities to leverage the huge potential of national standardisation in the assessment and response to acute illness, to improve training, service delivery, capacity planning and organisation in acute care, as well as the conduct of research into new interventions and care pathways, ultimately improving patient experience and outcomes. ■

## 4 Update on the physiological parameters incorporated into the NEWS

The original NEWS Development Group considered many physiological parameters that could be included in an acute-illness severity score. Many, eg temperature, pulse and blood pressure, were already being recorded routinely in patients in hospital. Consideration was also given to individual patient characteristics, such as age and gender, that might have influenced physiological responses to acute illness and clinical outcomes. Thus, a simple concept such as the NEWS had the potential to become extremely complex and cumbersome in use. The NICE 2007 guideline *Acutely ill adults in hospital: recognising and responding to deterioration* (CG50) had adopted a pragmatic approach and recommended the routine measurement of six physiological parameters to assess illness severity: pulse rate, systolic blood pressure, respiration rate, oxygen saturation, level of consciousness and temperature.<sup>9</sup>

The NEWS Development Group agreed with the recommendations of the NICE report and concluded that the routine recording of six physiological parameters should form the basis of the NEWS. In addition, for patients requiring supplemental oxygen to maintain their target oxygen saturation, the addition of 2 points to the NEWS score was recommended, based on data from aforementioned analyses.

### Physiological parameters included in the NEWS




It is very uncommon for a significant disturbance of a single physiological parameter to occur in isolation. For example, it would be unusual for temperature to increase without any concomitant increase in respiration rate and/or pulse rate. Thus, disturbances in multiple parameters in unison are more common, and an aggregate score of disturbances in multiple physiological parameters is a more robust measure of acute-illness severity than single-parameter scoring systems.<sup>17,30,34,45,46</sup> This is true for a single assessment at baseline, but even more can be gained by repeated measurements to define trends, which can highlight deterioration or improvement in a patient's clinical condition. Furthermore, significant disturbances in these six parameters are not necessarily unidirectional. For example, a low temperature in severe sepsis is just as concerning as a high temperature. Thus, upward and downward trends in physiology needed to be weighted and scored in the NEWS.

## Review of the physiological parameters incorporated in the NEWS

The justification for the inclusion of various physiological parameters into the NEWS scoring system is discussed below. Where the recommendations have been updated, the new additions to the NEWS are highlighted.

### Sequence of recording physiological parameters on the NEWS2 chart

**New**

The sequence of recording physiological parameters has been reordered on the NEWS2 chart to reflect the ABCDE (Airway, Breathing, Circulation, Disability, Exposure) sequence used to assess the acutely ill patient. 

**Respiration rate:** An elevated respiration rate is a powerful sign of acute illness and distress in all patients. The respiration rate may be elevated as a consequence of generalised pain and distress, sepsis remote from the lungs, central nervous system (CNS) disturbance and metabolic disturbances such as metabolic acidosis. A reduced respiration rate is an important indicator of CNS depression and narcosis.

**Oxygen saturation:** The non-invasive measurement of oxygen saturation by pulse oximetry is routinely used in clinical assessment in the acute setting, but at the time that the NEWS was developed it had not often been incorporated into EWS systems. As the routine measurement of oxygen saturation had become more common, it was considered to be an important parameter to include in the NEWS. Oxygen saturation is a powerful tool for the integrated assessment of pulmonary and cardiac function. The technology required for the measurement of oxygen saturation, ie pulse oximetry, is now widely available, portable and inexpensive. The NEWS Development Group recommended that oxygen saturation measured by pulse oximetry should be a routine part of the assessment of acute-illness severity as part of the NEWS. The NEWS Review Group recommended no changes to the measurement of oxygen saturation, but has made new recommendations and changes to the chart with regard to the use of supplemental oxygen in patients with hypercapnic respiratory failure (see below, 'supplemental oxygen'.)

**New**

**Supplemental oxygen:** Patients requiring supplemental oxygen are at greater clinical risk. Thus, the requirement for supplemental oxygen to maintain satisfactory oxygen saturation was incorporated into the NEWS. The NEWS Development Group recommended that a weighting score of 2 be added to the aggregate NEWS score for any patient requiring supplemental oxygen. Note that 'supplemental oxygen' here refers to routine oxygen delivery by mask or nasal cannula.

The original NEWS report noted that caution was needed to ensure that appropriate oxygen saturation, ie 88–92%, was set for patients with hypercapnic respiratory failure, often referred to as 'type 2' respiratory failure (usually due to COPD), and in the use of supplemental oxygen for these patients, while monitoring arterial blood gases according to the BTS recommendations.<sup>56</sup> The NEWS Development Group had also noted that the combination of low oxygen saturation and an additional score of 2 for supplemental oxygen was likely to trigger at least a medium-level NEWS alert in patients with COPD, and that this would prompt an urgent review by a competent clinical decision-maker who would determine the appropriate oxygen saturation for the patient and whether supplemental oxygen was required. However, feedback has emphasised that, in some COPD patients at initial assessment, the delivery of oxygen could be inappropriately encouraged by the NEWS in an endeavour to restore oxygen levels to the normal range. In those with hypercapnic respiratory failure, this could lead to dangerous CO<sub>2</sub> retention and serious clinical deterioration.<sup>35–37</sup>

The NEWS Review Group has responded to these concerns and has added a new section to the NEWS2 chart specifically for use in patients with known hypercapnic respiratory failure who would benefit from a resetting of their respiratory oxygen saturations to 88–92%, with the NEWS scores for this section adjusted accordingly. This is discussed in detail in section 5.

The NEWS Review Group recommended two changes to the NEWS2 chart related to the use of supplemental oxygen:

- 1 A new section of the chart has been created for patients with hypercapnic respiratory failure, with the NEWS score adjusted to reflect the lower oxygen saturation range (88–92%) recommended for these patients (see section 5).
- 2 The NEWS chart has been updated to ensure that the oxygen delivery system / device codes are recorded alongside the oxygen flow rate, so that the mode and quantity of oxygen delivery can be more accurately recorded for patients requiring supplemental oxygen (see section 5). ■

The NEWS Review Group recommend that patients requiring high-flow oxygen, continuous positive airway pressure (CPAP) or non-invasive ventilation (NIV) to maintain their oxygen saturation at the desired level, should be managed by staff experienced in their use, usually in a higher-dependency care area.

**Systolic blood pressure:** Although an elevated blood pressure (hypertension) is an important risk factor for cardiovascular disease, it is a low or falling **systolic** blood pressure (hypotension) that is most significant in the context of assessing acute-illness severity. Hypotension may indicate circulatory compromise due to sepsis or volume depletion, cardiac failure or cardiac rhythm disturbance, CNS depression, hypoadrenalism and/or the effect of blood pressure-lowering medications. It is important to note that some people have a naturally low systolic blood pressure (<100 mmHg) and this might be suspected if the patient is well and all other physiological parameters are normal, or confirmed by reference to previous records of blood pressure.

Hypertension is given less weighting in the context of acute-illness assessment. Severe hypertension, eg systolic blood pressure  $\geq 200$  mmHg, may occur as a consequence of pain or distress, but it is important to consider whether the acute illness may also be a consequence of, or exacerbated by, severe hypertension and to take appropriate clinical action.

**Diastolic blood pressure** does **not** form part of the scoring system for acute-illness severity because it does not add value in this context. However, diastolic blood pressure should be routinely recorded as it may be severely elevated and require treatment in some acute settings, ie accelerated hypertension.

**Pulse rate:** The measurement of heart rate is an important indicator of a patient's clinical condition. Tachycardia may be indicative of circulatory compromise due to sepsis or volume depletion, cardiac failure, pyrexia, or pain and general distress. It may also be due to cardiac arrhythmia, metabolic disturbance, eg hyperthyroidism, or drug intoxication, eg sympathomimetics or anticholinergic drugs.

Bradycardia is also an important physiological indicator. A low heart rate may be normal with physical conditioning or as a consequence of medication, eg with beta blockers. However, it may also be an important indicator of hypothermia, CNS depression, hypothyroidism or heart block.



**Level of consciousness:** A change in the level of consciousness is an important indicator of acute-illness severity.<sup>43,44</sup> The NEWS originally recommended the widely used Alert, Voice, Pain, Unresponsive (AVPU) scale to assess four possible outcomes to measure and record a patient's level of consciousness. The assessment is done in sequence and only one outcome is recorded. For example, if the patient responds to voice, it is not necessary to assess the response to pain.



### Refinement of the AVPU classification to include new confusion (ACVPU)

Beyond the recording of level of consciousness using the AVPU scale, it is well recognised that the onset of acutely altered mentation, ie 'new confusion' (delirium), can be an important sign that a patient requires urgent assessment.

New-onset confusion (any new reduction in the Glasgow Coma Scale or delirium would also fit this criterion) is a sign of potentially serious clinical deterioration in patients and especially those with confirmed or suspected sepsis. The NEWS Review Group recommend including 'new confusion' as part of the assessment of consciousness, hence the term ACVPU rather than AVPU to reflect this change. New confusion scores 3 on the NEWS2 chart, indicating a code red (for a single score of 3), ie that the patient requires urgent assessment.

### Updated ACVPU assessment

**Alert:** A fully awake patient. Such patients will have spontaneous opening of the eyes, will respond to voice and will have motor function. Previously, a patient could be considered alert even if disorientated or confused. This is no longer considered appropriate because acute alteration in mentation or new confusion now scores higher (3 NEWS points) on the NEWS2 chart, as this can be indicative of serious risk of clinical deterioration, especially in patients with sepsis.

**New confusion:** A patient may be alert but confused or disorientated. It is not always possible to determine whether the confusion is 'new' when a patient presents acutely ill. Such a presentation should always be considered to be 'new' until confirmed to be otherwise. New-onset or worsening confusion, delirium or any other altered mentation should always prompt concern about potentially serious underlying causes and warrants urgent clinical evaluation.

**Voice:** The patient makes some kind of response when you talk to them, which could be in any of the three component measures of eyes, voice or motor – eg patient's eyes open on being asked 'Are you okay?'. The response could be as little as a grunt, moan, or slight movement of a limb when prompted by voice.

**Pain:** The patient makes a response to a pain stimulus. A patient who is not alert and who has not responded to voice (hence having the test performed on them) is likely to exhibit only withdrawal from pain, or even involuntary flexion or extension of the limbs from the pain stimulus. The person undertaking the assessment should always exercise care and be suitably trained when using a pain stimulus as a method of assessing levels of consciousness.

**Unresponsive:** This is also commonly referred to as 'unconscious'. This outcome is recorded if the patient does not give any eye, voice or motor response to voice or pain. ■

**Temperature:** Both pyrexia and hypothermia are included in the NEWS, reflecting the fact that the extremes of temperature are sensitive markers of acute-illness severity, sepsis and physiological disturbance.

### Physiological parameters considered but not included in the NEWS

Other clinical and demographic parameters were considered by the original NEWS Development Group to determine whether they should be included in the NEWS. These were further reviewed again by the NEWS Review Group and they concluded that the original recommendations for each of these parameters should remain unchanged.

The recommendation that these parameters should not be included as part of the scoring system for the NEWS does not mean that they are unimportant, or that they should not be recorded and considered as part of the overall clinical evaluation of the patient.

**Age:** Older age is associated with higher clinical risk, but the relationship between age and the physiological response to acute illness is complex. Moreover, chronological age is not always a good indicator of biological age. The NEWS Development Group was unconvinced that it was necessary to apply an arbitrary weighting to the NEWS aggregate score on the basis of age, based on current evidence.<sup>57</sup>

**Urine output:** The monitoring of urine output is important in many clinical situations. However, formal estimation of urine output is not always available at first assessment, and measurement of urine output is not routinely required for the majority of patients in hospital. The NEWS Development Group did not consider it practical or necessary for formal monitoring of urine output to be part of the scoring system for the NEWS. That said, we recognise that urine output monitoring is essential for some patients as dictated by their clinical condition.

**Pain:** The symptom of pain must be recorded and responded to by the clinical team. Pain and/or its cause will usually, but not always, generate physiological disturbances that should be detected by the scoring system for the NEWS. The NEWS Development Group noted that, while the symptom of pain should be routinely recorded and responded to, it should not form part of the aggregate score for the NEWS.

**Gender, ethnicity and obesity:** There is no evidence that these parameters have any significant influence on previously evaluated EWS systems. The NEWS Development Group recommended that gender, ethnicity and obesity should not form part of the weighting or scoring system for the NEWS.

**Pregnancy:** Physiological parameters and their response to illness are modified by pregnancy. Existing EWS systems and the NEWS may be less reliable in estimating acute-illness severity during pregnancy and the NEWS should not be used in pregnancy.

**Comorbidities including immunosuppression:** Comorbidities impact on clinical outcome. For many comorbidities, there are disease-specific scoring systems, the use of which is not precluded by the NEWS. Furthermore, the NEWS was designed to be generic and should reflect the physiological perturbations associated with various comorbidities. For this reason, the NEWS Development Group recommended that no additional weighting should be allocated to the NEWS for comorbidities or for immunosuppressed patients.

## 5 Rationale for updated sections of the NEWS



In this section the NEWS Review Group explain the rationale for updating certain parts of the NEWS.

### NEWS update: Oxygen saturation, supplemental oxygen and patients with hypercapnic (type 2) respiratory failure

The NEWS Review Group discussed the safe use of NEWS in patients with hypercapnic respiratory failure, ie patients who are hypoxic with a  $\text{PaCO}_2 > 6$  kPa. Such patients are at risk of rapidly worsening hypercapnia if too much oxygen is delivered – the recommended range for oxygen saturations for such patients is 88–92%.<sup>58</sup> Concern was expressed that the existing NEWS system could inadvertently encourage the overuse of supplemental oxygen in patients with hypercapnic respiratory failure in an attempt to reduce the NEWS score by increasing oxygen delivery and oxygen saturation beyond the recommended range for patients with hypercapnic respiratory failure.<sup>35–37</sup> The most common cause of hypercapnic respiratory failure is COPD and thus, these patients will be frequently encountered in EDs, acute medical units and respiratory medicine ward areas. Not all acutely ill patients with COPD will present with hypercapnic respiratory failure and, in many of those who do, this complication will have been recognised by blood gas analyses during prior hospital admissions and some may carry an alert card.

The key is to identify patients with hypercapnic respiratory failure by urgent blood gas analysis and prescribe the appropriate level of supplemental oxygen to maintain oxygen saturation in the recommended target range for these patients ( $\text{SpO}_2$  88–92%).

Although COPD is the most common cause, there are other causes of hypercapnic respiratory failure (eg morbid obesity, chest-wall deformities or neuromuscular disorders). For all of these patients, an initial target oxygen saturation range of 88–92% is suggested pending the availability of urgent blood gas results, with oxygen delivered (if required) using either a nasal cannula or a 24% Venturi mask at 2–4 L/min (or a 28% Venturi mask at 4 L/min if a 24% mask is not available). Comprehensive details on the clinical management of these patients is available.<sup>58</sup>

The original NEWS scoring system was designed for patients whose normal range for oxygen saturation is set at a higher level (ie  $\text{SpO}_2$  96–100%); for  $\text{SpO}_2$  values below this, the NEWS score increases. Thus, for those with hypercapnic respiratory failure and a desired target saturation of 88–92%, the NEWS would score 3 points for the low  $\text{SpO}_2$  and 2 points if supplemental oxygen is required, a total of 5 points. It could be argued that this is an appropriate score for a high-risk, acutely ill patient that would prompt urgent clinical review. However, after review by a competent clinical decision-maker and confirmation that a lower  $\text{SpO}_2$  range was appropriate, there was no way to reset the scoring system on the NEWS chart to demonstrate that, for a patient with hypercapnic respiratory failure, the  $\text{SpO}_2$  levels are in an appropriate range.

Audits of hospital care have shown that the administration of high-flow oxygen, rather than titrated oxygen, to patients with acute exacerbations of COPD increases mortality, hospital length of stay, requirement for ventilation, and admission to higher-dependency care.<sup>59–62</sup> In contrast, the use of titrated oxygen treatment, ie via a Venturi mask, has resulted in less acidosis and reduced mortality. This has also been confirmed in the prehospital setting.<sup>63</sup>

The NEWS Review Group concluded that the NEWS2 chart could be made safer for patients with hypercapnic respiratory failure by having two scoring systems for  $\text{SpO}_2$ :

- 1 the existing SpO<sub>2</sub> scoring system (Scale 1) that would apply to the majority of patients
- 2 a dedicated SpO<sub>2</sub> scoring system for patients with hypercapnic respiratory failure (Scale 2) whose desired oxygen saturations are set at a lower level (88–92%), with the NEWS scoring system adjusted accordingly (see below).

*NEWS2 chart oxygen saturation scoring systems: Scale 1 is the usual scale for patients with normal oxygen saturation. Scale 2 is the scale to be used for patients with hypercapnic respiratory failure and a recommended oxygen saturation range of 88–92%. The section of the chart not being used should be clearly crossed out.*

A+B SpO <sub>2</sub> Scale 1 Oxygen saturation (%)																	
≥96																	≥96
94–95															1		94–95
92–93															2		92–93
≤91															3		≤91
SpO <sub>2</sub> Scale 2 <sup>1</sup> Oxygen saturation (%) Use Scale 2 if target range is 88–92%, eg in hypercapnic respiratory failure  <sup>1</sup> ONLY use Scale 2 under the direction of a qualified clinician																	
≥97 on O <sub>2</sub>															3		≥97 on O <sub>2</sub>
95–96 on O <sub>2</sub>															2		95–96 on O <sub>2</sub>
93–94 on O <sub>2</sub>															1		93–94 on O <sub>2</sub>
≥93 on air																	≥93 on air
88–92																	88–92
86–87															1		86–87
84–85															2		84–85
≤83%															3		≤83%

### NEWS update: Using the NEWS2 oxygen saturation (SpO<sub>2</sub>) scoring systems

- The new SpO<sub>2</sub> scoring Scale 2 is for patients with a prescribed oxygen saturation requirement of 88–92% (eg in patients with hypercapnic respiratory failure). This should only be used in patients confirmed to have hypercapnic respiratory failure on blood gas analysis on either a prior, or their current, hospital admission.
- The decision to use the new SpO<sub>2</sub> scoring Scale 2 should be made by a competent clinical decision-maker and should be recorded in the patient’s clinical notes.
- In all other circumstances, the regular NEWS SpO<sub>2</sub> scoring scale (Scale 1) should be used.
- For the avoidance of doubt, the SpO<sub>2</sub> scoring scale not being used should be clearly crossed out across the chart.

### NEWS update: Precise recording of supplemental oxygen delivery

The mode and rate of oxygen delivery are often poorly documented. Recording the rate of oxygen flow (L/min) without recording the mode of delivery or device does not define how much oxygen the patient is receiving. The NEWS2 chart has been updated to allow clearer recording of whether the patient is breathing air or oxygen; the device being used, if any; and the rate of oxygen delivery. For the documentation of the oxygen delivery system, the device codes as recommended by the BTS should be used (see Table 1).<sup>58</sup>

Air or oxygen?																
A=Air														2		A=Air
O <sub>2</sub> L/min																O <sub>2</sub> L/min
Device																Device

- We recommend that, when supplemental oxygen is being used to maintain the desired oxygen saturation, the rate of oxygen delivery (L/min) and the delivery system/device should be documented on the NEWS2 chart using the BTS oxygen delivery system / device codes.



Sepsis is now defined as ‘life-threatening organ dysfunction caused by a dysregulated host response to infection’.<sup>44</sup> This description has been endorsed by the Academy of Medical Royal Colleges in the UK, and in the new Surviving Sepsis Campaign international guidelines.<sup>64</sup> NICE, in its recent guidance on sepsis,<sup>40</sup> put this more simply in its information for the public as a ‘rare but serious reaction to infection’ in which the ‘immune system response becomes overactive and starts to cause damage to the body itself’.

‘Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection.’

Sepsis is important and affects millions of people globally. Sepsis is a main cause of acute illness, death and disability in the UK; the 2015 confidential enquiry suggested that there are around 200,000 cases of sepsis a year in the UK, with almost 60,000 (29%) patients dying and the majority of survivors suffering significant complications.<sup>41</sup> The annual UK death rate due to sepsis is higher than that due to breast, bowel and prostate cancer combined, and the associated cost of sepsis to the NHS is estimated at £2.5 billion per annum. A recent point prevalence study across 15 hospitals in Wales found that sepsis was the reason for 26% of cases of deterioration and resulted in 22% mortality,<sup>65</sup> while a study of ward patients referred to a critical care outreach team reported that 39% had sepsis and that 25% of these patients died.<sup>66</sup>

Data from the UK and USA are remarkably consistent in showing that sepsis contributes to 1 in every 2–3 deaths in hospital, and that most of these patients have sepsis at the time of admission to hospital.<sup>43,44</sup> Thus, early detection and intervention are essential to reduce sepsis-related mortality. Detection can be challenging because the clinical presentation of sepsis can be subtle, non-specific and highly variable.

There are subgroups of patients who are more likely to be at risk of sepsis, eg:

- patients who have recently had surgery or those with burns, blisters or cuts to the skin
- patients who are immunocompromised, including those receiving cancer chemotherapy, immunosuppressive biologics and long-term steroids
- patients post-splenectomy
- patients with indwelling cannulas or catheters.

What differentiates sepsis from uncomplicated infection is the aberrant or dysregulated host response and the presence of organ dysfunction, and sepsis mortality increases with progressive organ dysfunction. This was the basis for various sepsis-scoring systems that incorporate signs of organ dysfunction, eg the Sequential Organ Failure Assessment (SOFA) sepsis score, which combines vital signs (systolic blood pressure, GCS) and laboratory data as a method of quantifying the severity of sepsis.

**Septic shock:** This is a subtype of sepsis with a much higher mortality, characterised by profound circulatory and metabolic abnormalities, typically with hypotension resistant to vasopressor treatment and a raised lactate level (>2 mmol/L) in the absence of hypovolaemia. Patients with septic shock have an inpatient mortality of >40%.

**Recognition of sepsis:** Early recognition and treatment are essential to reduce sepsis-related mortality. This can be difficult because the clinical presentation of sepsis may be variable, subtle and non-specific. Numerous criteria and algorithms have been proposed to improve the early recognition of sepsis. Some (including the SOFA score) incorporate blood tests to detect organ dysfunction. Unfortunately, analysing blood takes time in the hospital, and may not be possible at all in prehospital settings. Most systems are

based on long-established Systemic Inflammatory Response Syndrome (SIRS) criteria. However, recent work has shown that SIRS criteria are oversensitive and lack specificity in identifying sepsis, with 47% of ward patients developing signs of SIRS at some point,<sup>67</sup> and the need for two or more SIRS criteria to define severe sepsis excluding 12% of otherwise similar patients.<sup>68</sup>

In order to better enable early recognition of sepsis with easily obtainable measures, the international consensus definition task force analysed data from nearly 5 million patient encounters, including approximately 850,000 patients with presumed infection, to determine which values could most accurately identify patients with sepsis at the bedside.<sup>43</sup> It was found that two or more of the following criteria indicated patients likely to have poor outcomes: tachypnoea (respiration rate 22/minute or more), hypotension (systolic blood pressure 100 mmHg or less) or altered mentation (GCS <15).<sup>44</sup> These values make up the qSOFA score. This analysis has since been supported by an international prospective cohort study in 30 EDs, where the qSOFA score was shown to predict mortality in patients presenting with suspected infection significantly more accurately than either SIRS criteria or descriptors of 'severe sepsis'. Moreover, it was found that mortality was 3% for patients with qSOFA scores 0 or 1, but 24% for patients with a qSOFA score of 2 or more, illustrating that qSOFA scoring effectively identifies high-risk patients.<sup>69</sup>

Early recognition and treatment are essential to reduce sepsis-related mortality.

## The NEWS and improving the detection of sepsis

Many of the scoring systems and algorithms that have been developed to improve the early recognition of sepsis measure similar physiological parameters to the NEWS. Some (including the SOFA score) incorporate blood tests to detect organ dysfunction. Unfortunately, requesting and analysing blood tests takes time and reduces the speed, pragmatism and broad applicability of sepsis-detection systems, especially in prehospital care settings. The most effective approach to improving the early recognition of sepsis is one that builds on the routine vital signs monitoring systems that are already embedded into the healthcare system, ie the NEWS.

NHSE, in its recent guidance on early detection of clinical deterioration due to sepsis in adults, has recommended the NEWS as the early warning score to detect clinical deterioration in patients with suspected sepsis. [www.england.nhs.uk/wp-content/uploads/2017/09/sepsis-guidance-implementation-advice-for-adults.pdf](http://www.england.nhs.uk/wp-content/uploads/2017/09/sepsis-guidance-implementation-advice-for-adults.pdf)

**The NEWS and consideration of the qSOFA score:** The NEWS Review Group noted that qSOFA scoring is a quick, simple and easily repeatable method of assessing acuity of illness severity in patients with infection by measuring just three parameters. The predictive validity of qSOFA (area under the curve (AUC): 0.81; 95% confidence interval (CI): 0.80–0.82) is similar to using the full SOFA scoring (which involves more comprehensive assessment of organ dysfunction using blood tests) outside critical care settings.<sup>43,44</sup> However, the NEWS Review Group also noted that the three qSOFA parameters (respiration rate, systolic blood pressure and level of consciousness) are also components of the updated NEWS, which now includes new confusion. Moreover, the NEWS goes further by supplementing these three key parameters with additional measures of acute illness severity, ie oxygen saturation, pulse rate and temperature, as well as assessing the effects of oxygen therapy. The extra variables recorded in the NEWS would be expected to enhance the ability of the NEWS to identify patients at risk compared with qSOFA, and a study of 30,677 patients with suspected infection in the ED or general ward area supports this hypothesis, finding that NEWS was superior to qSOFA in predicting adverse outcomes, and that both systems were superior to the use of SIRS criteria.<sup>70</sup> Furthermore, audit data from 20 EDs in the UK

**Table 2: Initial NEWS score recorded in the ED and subsequent patient 30-day mortality in patients with sepsis (n = 2,003). Adapted with permission from BMJ Publishing Group Ltd<sup>14</sup>**

Initial NEWS score	30-day mortality (%)
0–4	5.5
5–6	11.3
7–8	13.3
9–20	27.6

**Table 3: Initial NEWS score and subsequent ICU admission and/or mortality in patients with sepsis (n = 2,003). Adapted with permission from BMJ Publishing Group Ltd<sup>14</sup>**

Initial NEWS score	ICU admission and/or mortality (%)
<5	8
5–6	23
7–8	27
9–20	35

showed that even a single NEWS calculated from the first set of observations was predictive of adverse outcomes. In this analysis, patients with a NEWS score of 5 or 6 had twice the mortality of those with a NEWS score of 0–4 (see Table 2).<sup>14</sup> Furthermore, patients with a NEWS score of 5 or more suffered almost three times the combined adverse outcomes of ICU admission and/or mortality compared with those with a NEWS score of 0–4 (see Table 3).<sup>14</sup>

It is unsurprising that the NEWS performs well in stratifying illness severity in patients with infection, because the original database used to develop and evaluate the NEWS was derived from 35,585 acute medical admissions,<sup>71</sup> many of whom would have had an underlying diagnosis of sepsis. Thus, apart from settings where oximeters or thermometers are not available and qSOFA may be very useful (although a sphygmomanometer will still be required), we recommend that the NEWS should be used as the main method of assessing illness severity and risk of deterioration in all patients, including those with suspected sepsis. A raised NEWS (ie NEWS score of 5 or more) in a patient with signs and symptoms of infection, or clinical deterioration in a patient at high risk of infection, should always prompt the question ‘Is this sepsis?’ and trigger an immediate escalation in care.

### Defining the NEWS threshold for likely sepsis

As indicated in Tables 2 and 3 above, a NEWS score of 5 or more is associated with a >3-fold-increased risk of patient transfer to an ICU or death in patients with sepsis. Data from the development of qSOFA



have also been invaluable in helping to define the appropriate NEWS threshold for acute-illness severity likely to be associated with a high mortality and likely to benefit from immediate intervention. qSOFA scores, when measured in patients with infection, correlate very well with the agreed international consensus 'gold standard' scoring of illness severity in sepsis using the full SOFA criteria.<sup>43,44</sup> A qSOFA score of 2 is a critical threshold, and the three key qSOFA parameters are included in the more comprehensive NEWS system.

The three qSOFA parameters and key values are:

- **Respiration rate 22/minute or more**  
⇒ This equates to a NEWS score of 2 if the respiration rate is 22–24/minute, or a NEWS score of 3 if the respiration rate is 25/minute or more.
- **Systolic blood pressure 100 mmHg or less**  
⇒ This equates to a NEWS score of 2 if the systolic blood pressure is 91–100 mmHg, or a NEWS score of 3 if the systolic blood pressure is 90 mmHg or less.
- **Altered mentation (GCS <15)**  
⇒ Now that new confusion (which includes delirium or any new reduction in GCS) has been included in the assessment of consciousness in the NEWS, this is a NEWS score of 3.

If the qSOFA values measured in a particular patient revealed only low-level tachypnoea and mid-hypotension, the qSOFA could be 2 and the NEWS score only 4, and thus below the critical trigger NEWS score threshold of 5. However, this is most unlikely, as it assumes that there would be no additional abnormalities in oxygen saturation, pulse rate or temperature, any of which would increase the NEWS score to 5 or more. In all other cases in which the qSOFA is 2, ie a more elevated respiration rate or lower blood pressure, this would bring the NEWS score to at least 5, as would any cases where new confusion or any other acute alteration in mentation was apparent. In support for this conclusion, an assessment of 60 consecutive acute admissions with signs of infection and a qSOFA score of 2 or more at University College London Hospital found that, in every instance with a qSOFA score of 2 or more, there was a NEWS score of 5 or more (SJ Gonzaga, personal communication, December 2016).

Having considered all of the available evidence, we suggest that a NEWS score of 5 or more in patients with a known infection, signs or symptoms of infection, or at high risk of infection, is most likely to represent sepsis requiring a rapid escalation of clinical care, confirmatory investigations and urgent treatment. Even if it isn't sepsis, a NEWS score of 5 or more is the recommended threshold for urgent escalation of care for all deteriorating patients – an approach that has become standard practice in most NHS hospitals. Ninety-five per cent of acute care providers use aggregate EWS systems for assessing, tracking and triggering escalation of all causes of acute clinical deterioration, including sepsis, and the majority are now using the NEWS.<sup>42</sup>



## NEWS score of 5 or more? Think sepsis!

In a patient with a **NEWS score of 5 or more** and a known infection, signs and symptoms of infection, or at risk of infection, think '**Could this be sepsis?**' and **escalate care immediately.**

Importantly, the NICE sepsis guidelines<sup>40</sup> recognised the importance of an EWS such as the NEWS in recognising possible sepsis, stating ‘Consider using an early warning score to assess people with suspected sepsis in acute hospital settings’, with an additional quality measure to evaluate ‘the proportion of patients who developed hospital-acquired infections that had an early warning score’.

## The NEWS and improving the detection of sepsis

**A note on temperature and sepsis:** Some may find it surprising that temperature does not feature amongst the qSOFA parameters (although it is a component of NEWS). This reflects the fact that although altered temperature is an indicator of possible underlying infection, temperature is a poor discriminator of sepsis. The NICE sepsis guideline<sup>40</sup> stated ‘Do not use a person’s temperature as the sole predictor of sepsis’ and ‘Do not rely on fever or hypothermia to rule sepsis either in or out’.

**Reflection on the NEWS versus single-parameter scoring systems for sepsis:** The NEWS is an aggregate (multi-parameter) weighted EWS system, with progressively greater deviations from normal physiology resulting in higher values. This contrasts with those where only one or two extreme vital sign values are used as triggers, eg so-called Medical Emergency Team (MET) criteria. Indeed, there are some systems which only use the extremes of single NEWS values (with a score of 3) as single triggers,<sup>72</sup> although these were not intended or validated for that purpose. A fundamental objection to this type of approach is that it is possible to have a NEWS score of 12 (and a very high risk of adverse outcomes) without the total score including any single extreme value. A study comparing the NEWS (an aggregate weighted method) with the MET criteria (a single-parameter system) in general wards showed that the NEWS identified patients at risk irrespective of individual or admission characteristics, while the MET criteria discriminated poorly and did not predict adverse outcomes.<sup>72</sup> Another analysis of almost 104,000 admissions compared the NEWS with 44 sets of MET criteria, finding that, for a range of outcomes, NEWS discriminated well, while MET criteria were associated with high trigger rates.<sup>17</sup> ■

## 6 How the NEWS works

In addition to the physiological parameters that are recorded for the NEWS, there are three additional considerations:

- 1 how to score and weight the physiological parameters
- 2 defining the trigger thresholds for single parameters and the aggregate NEWS score
- 3 defining the clinical response to the trigger, in terms of:
  - i the urgency of response
  - ii the clinical competencies of the responder(s)
  - iii the frequency of clinical monitoring required
  - iv the most appropriate clinical setting for ongoing care.

### Scoring system for the NEWS physiological parameters

Once measured and recorded, the individual physiological parameters and the additional score for supplemental oxygen are weighted and aggregated to derive the NEWS score. For each physiological parameter, a normal 'healthy' range is defined. Measured values outside of this range are allocated a score (1–3), which is weighted and colour-coded on the observation chart according to the magnitude of physiological disturbance and deviation from the normal range. If supplemental oxygen is required to maintain oxygen saturations, two additional points are added to the aggregate NEWS score.

The weighting allocated to each physiological parameter for a specific level of disturbance is critical in defining the sensitivity of the final aggregate NEWS score as a trigger for a clinical response. The NEWS Development Group reviewed the weightings used in a number of EWS systems and made adjustments, based on clinical opinion from the members of the NEWS Development Group (Chart 1).

### Using the NEWS2 charts

The NEWS2 charts are high-quality charts, with no copyright restrictions, that can be downloaded free of charge from the RCP website: [www.rcplondon.ac.uk/national-early-warning-score](http://www.rcplondon.ac.uk/national-early-warning-score). All the charts should be printed in colour. Although A4 charts continue to be available, feedback from users has indicated that an A3 chart is preferred and is now recommended for routine clinical use.

### NEWS thresholds and triggers

The scoring template for the NEWS is shown in Chart 1. The NEWS Development Group also defined the thresholds for triggering a clinical response. This decision was critical to the performance of the NEWS in terms of its ability to discriminate different levels of acute-illness severity. Clearly, a system that was too sensitive and lacked the ability to discriminate which patients did and which did not require urgent clinical review would have overwhelmed hospitals and would have justifiably fallen into disrepute. Conversely, a system that was too insensitive and triggered so infrequently that it missed the opportunity for early clinical intervention would have failed to meet the key objective to improve care.

Chart 1: The NEWS scoring system

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO <sub>2</sub> Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO <sub>2</sub> Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

In the development of NEWS, there was much discussion regarding the level of the aggregate NEWS score that should trigger a medium- and a high-level clinical alert. The conclusion was based on formal evaluation of the sensitivity of the NEWS with regard to the frequency of clinical alerts at different aggregate NEWS scores, and the specificity of the NEWS relative to other EWS systems with regard to predicting in-hospital mortality.<sup>13,34</sup> Further evaluation following the launch of the NEWS and its use in various acute care settings has confirmed that the thresholds for the NEWS triggers were set at appropriate levels (see section 3).

An aggregate NEWS score of 5 or more is a key threshold that should trigger an urgent clinical review; a NEWS score of 7 or more should trigger a high-level clinical alert, ie an emergency clinical review.

A NEWS score of 5 or more is a key threshold requiring an urgent clinical review.



**A single red score:** This refers to an extreme variation in a single physiological parameter (ie a score of 3 on the NEWS chart, coloured red to aid identification, and representing an extreme variation in a single physiological parameter). The original consensus of the NEWS Development Group was that extreme values in one physiological parameter (eg pulse ≤40 beats per minute, a respiration rate of ≤8 per minute or a temperature of ≤35°C) could not be ignored and required urgent clinical evaluation irrespective of the aggregate NEWS score.

Experience of using the NEWS has shown that a single red score is very unusual and that the use of a single extreme value as an alert is much less specific at predicting an adverse clinical outcome than an aggregate NEWS score of 5 or more<sup>15,16</sup> (see section 3). We now recommend that a single extreme value

of 3 does not warrant the same level of alert as a NEWS score of 5 or more, but should prompt an urgent review by a clinician (usually a ward-based doctor) to determine the cause and decide whether an escalation of care is required and the frequency of subsequent monitoring (see Chart 2). ▀

**Chart 2: NEWS thresholds and triggers**

NEWS score	Clinical risk	Response
Aggregate score 0–4	Low	Ward-based response
Red score Score of 3 in any individual parameter	Low–medium	Urgent ward-based response*
Aggregate score 5–6	Medium	Key threshold for urgent response*
Aggregate score 7 or more	High	Urgent or emergency response**

\* Response by a clinician or team with competence in the assessment and treatment of acutely ill patients and in recognising when the escalation of care to a critical care team is appropriate.

\*\*The response team must also include staff with critical care skills, including airway management.

## 7 Using the NEWS

We recommend that the NEWS is recorded during the initial hospital assessment of a patient, including in the ED, and throughout the patient's hospital stay, as part of the standard clinical observation chart across the NHS.

The NEWS should also be implemented in prehospital assessment of acutely ill patients by first responders, eg the ambulance services, to improve triage and the communication of acute-illness severity to receiving hospitals.

### New

The NEWS should be evaluated in primary care with a view to implementing the NEWS as a means of triaging acutely ill patients who might need urgent clinical intervention (eg for sepsis) and transfer to hospital. ▀

During clinical assessment, the NEWS physiological parameters should be recorded, each being allocated a score reflecting the magnitude of physiological disturbance. If supplemental oxygen is required to maintain oxygen saturation, two additional points should be added to the aggregate score, to give an individualised NEW score for the patient.

### New

A competent clinical decision-maker should make the decision about whether to use the Scale 2 oxygen saturation section of the NEWS chart, which is specific to patients with hypercapnic respiratory failure (usually COPD) who require their 'usual' oxygen saturations to be set at 88–92% in accordance with BTS guidelines. When this clinical decision is taken, the Scale 1 oxygen saturation section of the chart should be clearly crossed out. Conversely, for all other patients, the Scale 2 oxygen saturation section of the chart should be clearly crossed out, to avoid confusion.

In a patient with a confirmed or suspected infection, or at risk of infection, a NEW score of 5 or more should raise the suspicion of sepsis and prompt an urgent clinical response by a clinical team competent in the management of sepsis and higher-dependency care. ▀

The NEWS should guide the clinical response and define whether an escalation of care is required or not. An escalation of care is defined by: (i) the urgency of response; and (ii) the clinical competencies of the team responding to the patient's clinical condition. For patients with the highest NEW scores, ie a NEW score of 7 or more, this will often necessitate patient transfer to a higher-dependency area.

The NEWS should also be used to guide the frequency of patient monitoring, which should be recorded on the chart.

The NEWS should be used for continuous monitoring of a patient's wellbeing throughout their stay in hospital, not solely for the initial assessment of illness severity. By recording the NEWS on a regular basis, trends in the patient's clinical response can be tracked, providing early warning of clinical deterioration and the need for more intensive treatment. The recording of the NEWS trends will also provide information about a patient's recovery, facilitating a reduction in the frequency and intensity of clinical monitoring and transfer to a lower-dependency clinical area, towards the patient's safe discharge from hospital.

### New

Education and training and demonstrable competency in the use of NEWS should be a mandatory requirement for all healthcare staff, including undergraduates and paramedics. ▀

The NEWS is an aid to clinical decision making – it is not a barrier or alternative to skilled clinical judgement. There will be circumstances when a healthcare professional judges that the NEWS underestimates their concern for the patient’s clinical condition. In such circumstances, care must be escalated to a more senior clinical decision-maker. In circumstances in which the healthcare professional feels that the NEWS may be overestimating the severity of a patient’s clinical condition, they should also escalate decision making to a more senior decision-maker within the clinical team, to determine whether escalation of care is warranted or not.

Education and competency in the use of the NEWS should be a mandatory training requirement for all healthcare staff.

We recommend that reasons not to act on the NEWS should be recorded in the clinical notes.

When clinical teams decide that the routine recording of data for the NEWS is not appropriate, eg for patients on an end-of-life care pathway, such decisions should be discussed with the patient (or their family/carer as appropriate) and recorded in the patient’s notes.

Whoever records the physiological data for the NEWS should be trained to measure the physiological parameters accurately, understand the significance of the NEWS and be familiar with the response policies for changing the frequency of monitoring and escalation of clinical care.

The NEWS system will only work if:

- the staff undertaking the routine measurements are trained in its use
- response systems and staff are in place to deliver the recommended urgency of response by a clinical team with an appropriate level of clinical competency, 24/7.

Measure and record the score for each of the six physiological parameters

Add up the scores and add 2 for any use of supplemental oxygen to derive the final NEWS score

Use the NEWS to define and record:

- whether escalation of clinical care is required and its urgency
- the competencies of the clinical review required
- the frequency of monitoring required
- the most appropriate clinical setting for ongoing clinical care

## The NEWS2 chart

At the time that the NEWS was developed, many different observation charts to record routine physiological measurements were in use across the NHS – there was no standardised approach to the design of observation charts. This variation was an obstacle to standardised training, and engendered a lack of familiarity with clinical data recording when staff or patients relocated to different clinical areas or different hospitals. The RCP’s Acute Medicine Task Force report in 2007 had recommended the development of ‘standardised documentation’ for the NHS for ‘inpatient basic observation charts ... which could be part of the NEW scoring system’. It further noted that ‘there seems to be little, if any, justification for individual hospitals, or other healthcare providers, investing in the development of customised documentation.’<sup>11</sup> These statements further underscore the core principle of the NEWS, ie standardisation of what is measured, how it is recorded and how it is scored.

The NEWS Development Group developed a generic NEWS chart to support improved clinical documentation and communication. Recognising the need for expert input in chart design, the NEWS Development Group commissioned the NHS Training for Innovation team to work with members of the NEWS Development Group, representation from the Royal College of Nursing and the National Outreach Forum to develop the original standardised generic NEWS chart. The NEWS charts are now used by the majority of NHS hospitals across the UK and should be used by all.

## NEWS update: Summary of changes to the NEWS2 chart (see Chart 1)



Changes to the NEWS chart in this update reflect feedback and suggestions to improve the layout of the chart, across a number of common themes. The changes recommended by the NEWS Review Group are summarised below.

- The order of vital signs recorded on the NEWS2 chart has been changed to conform to the ABCDE approach, as recommended by the Resuscitation Council (UK). A (Airway) and B (Breathing) are grouped for respiration rate and oxygen saturation; C (Circulation) for pulse rate and blood pressure; D (Disability) for the ACVPU score; and E (Exposure) for temperature.
- The range of values on the scale for vital signs is now used to label the rows on the NEWS chart. This is designed to reduce ambiguity with regard to the NEW score for each physiological parameter when a specific value is at a boundary between different NEW scores for that parameter.
- The section of the chart for recording supplemental oxygen has been modified to better record the device for oxygen delivery and the rate (L/min) using the BTS recommended codes – see Table 1.
- The NEWS2 chart includes two sections for recording oxygen saturation (see below).

<b>A+B</b> <b>SpO<sub>2</sub> Scale 1</b> Oxygen saturation (%)	≥96																			≥96
	94–95																			94–95
	92–93																			92–93
	≤91																			≤91
<b>SpO<sub>2</sub> Scale 2†</b> Oxygen saturation (%) Use Scale 2 if target range is 88–92%, eg in hypercapnic respiratory failure  †ONLY use Scale 2 under the direction of a qualified clinician	≥97 on O <sub>2</sub>																			≥97 on O <sub>2</sub>
	95–96 on O <sub>2</sub>																			95–96 on O <sub>2</sub>
	93–94 on O <sub>2</sub>																			93–94 on O <sub>2</sub>
	≥93 on air																			≥93 on air
	88–92																			88–92
	86–87																			
<b>Air or oxygen?</b>	A=Air																			A=Air
	O <sub>2</sub> L/min																			O <sub>2</sub> L/min
	Device																			Device



- The upper panel (SpO<sub>2</sub> Scale 1) is unchanged from the previous NEWS chart and should be used for the majority of patients.
- The lower panel (SpO<sub>2</sub> Scale 2) is a new section on the chart for patients in whom the target oxygen range is set at 88–92% (usually patients with type 2 respiratory failure due to COPD) in accordance with BTS recommendations.<sup>58</sup> **This section of the chart should only be used for recording and scoring oxygen saturation when a clinical decision has been made to target oxygen saturation at 88–92%.** The decision to use this section of the chart must be recorded in the patient's notes and the other section of the chart for recording oxygen saturations must be clearly crossed out to avoid confusion. ■
- We recommend the use of the standardised NEWS2 chart for the routine recording of clinical data across the NHS.
- The NEWS2 chart (Chart 3) should replace alternative vital sign / observation charts. This provides a standardised system for recording routine clinical data for all patients in hospital. This consistent format, if used in all hospitals, will provide familiarity in recognition of patient data and will facilitate training in the measurement and recording of such data in a systematic and standardised way by all NHS staff.

### New

- The NEWS2 chart is colour-coded to aid identification of abnormal clinical parameters as they are measured and entered onto the chart. Colour-coding of the NEWS2 chart provides a visual prompt, as well as a numeric score of illness severity. The charts should not be photocopied in black and white for clinical use. The colour-coding of the NEWS2 chart has been changed to remove the previous red–amber–green colours (because of concerns about colour blindness). Softer colour tones are now used, with progressive warming of the colour tone as the score increases. This colour system has been successfully deployed and evaluated at University College London Hospitals for more than a year. ■
- We recommend that the actual measured value for each physiological parameter should be recorded on the chart and this is essential when the value exceeds the range for any given parameter on the chart.
- The NEWS chart contains dedicated sections to record the frequency of monitoring as defined by the NEWS and the clinical response to a change in score, eg an escalation in acute care – this provides a record to track the responses to changes in the NEWS.
- We recommend that the NEWS2 chart should remain consistent and standardised across the NHS.
- The NEWS is not designed to replace commonly used generic scoring systems such as the GCS or other disease-specific systems, which should be used alongside the NEWS when indicated. To this end, we recognise that the NEWS chart will often be embedded into a larger observation / vital signs chart, containing these additional measurements, generic scoring systems and other information, eg pain scores and urine output, tailored to specific clinical areas. When this occurs, the NEWS chart should remain unchanged to maintain standardisation.

## The NEWS in a digital healthcare system

### New

The NEWS can be readily transported into electronic health record or app-based systems. This has already happened in some NHS hospitals with mature electronic health record systems. This brings advantages, with automated calculation of the NEWS score and automated alert systems. Wherever this occurs, it is important that the standardised scoring systems and alert thresholds that underpin the NEWS remain unaltered.

Chart 3: The NEWS2 observation chart (reduced from actual size)

NEWS key		FULL NAME																			
0 1 2 3		DATE OF BIRTH						DATE OF ADMISSION													
	DATE													DATE							
	TIME													TIME							
<b>A+B</b> Respirations Breaths/min	≥25													3							≥25
	21–24													2							21–24
	18–20																				18–20
	15–17																				15–17
	12–14																				12–14
	9–11													1							9–11
≤8													3							≤8	
<b>A+B</b> SpO <sub>2</sub> Scale 1 Oxygen saturation (%)	≥96													1							≥96
	94–95													2							94–95
	92–93													3							92–93
	≤91																				≤91
<b>SpO<sub>2</sub> Scale 2<sup>†</sup></b> Oxygen saturation (%) Use Scale 2 if target range is 88–92%, eg in hypercapnic respiratory failure  <b>†ONLY use Scale 2 under the direction of a qualified clinician</b>	≥97 on O <sub>2</sub>													3							≥97 on O <sub>2</sub>
	95–96 on O <sub>2</sub>													2							95–96 on O <sub>2</sub>
	93–94 on O <sub>2</sub>													1							93–94 on O <sub>2</sub>
	≥93 on air																				≥93 on air
	88–92																				88–92
	86–87													1							86–87
	84–85													2							84–85
≤83%													3							≤83%	
<b>Air or oxygen?</b>	A=Air																				A=Air
	O <sub>2</sub> L/min													2							O <sub>2</sub> L/min
	Device																				Device
<b>C</b> Blood pressure mmHg Score uses systolic BP only	≥220													3							≥220
	201–219																				201–219
	181–200																				181–200
	161–180																				161–180
	141–160																				141–160
	121–140																				121–140
	111–120																				111–120
	101–110													1							101–110
	91–100													2							91–100
	81–90																				81–90
	71–80																				71–80
61–70													3							61–70	
51–60																				51–60	
≤50																				≤50	
<b>C</b> Pulse Beats/min	≥131													3							≥131
	121–130													2							121–130
	111–120																				111–120
	101–110													1							101–110
	91–100																				91–100
	81–90																				81–90
	71–80																				71–80
	61–70																				61–70
	51–60																				51–60
	41–50													1							41–50
	31–40																				31–40
≤30													3							≤30	
<b>D</b> Consciousness Score for NEWS onset of confusion (no score if chronic)	Alert																				Alert
	Confusion													3							Confusion
	V																				V
	P																				P
	U																				U
<b>E</b> Temperature °C	≥39.1°													2							≥39.1°
	38.1–39.0°													1							38.1–39.0°
	37.1–38.0°																				37.1–38.0°
	36.1–37.0°																				36.1–37.0°
	35.1–36.0°													1							35.1–36.0°
	≤35.0°													3							≤35.0°
<b>NEWS TOTAL</b>																					<b>TOTAL</b>
Monitoring frequency																					Monitoring
Escalation of care Y/N																					Escalation
Initials																					Initials

- We recognise that paper-based observation charts are gradually being replaced by electronic data systems in many hospitals. We recommend that, where this occurs, the NEWS system, triggers and response thresholds remain unchanged within the electronic format. This is important to maintain a validated and standardised approach to detect and respond to acute clinical deterioration in patients across the NHS. ▲
- NEWS charts are available for free download at the RCP website ([www.rcplondon.ac.uk/national-early-warning-score](http://www.rcplondon.ac.uk/national-early-warning-score)) and also at <http://tfinews.ocbmedia.com>.

### Clinical response to the NEWS (see Chart 4)

When a patient presents to hospital with an acute illness, or suffers an acute deterioration in their clinical condition while in hospital, the NEWS should be used to help determine the urgency and scale of the clinical response required.

The clinical response to NEWS has four key components:

- 1 the urgency of the response
- 2 the seniority and clinical competencies of clinical staff required to attend to the patient
- 3 the frequency of ongoing clinical monitoring
- 4 the setting in which the ongoing clinical care should be delivered.

In 2007, the NICE guideline *Acutely ill adults in hospital: recognising and responding to deterioration* recommended that 'A graded response strategy for patients identified as being at risk of clinical deterioration should be agreed and delivered locally'.<sup>9</sup> It went on to recommend that the response should be graded around three levels:

- i low score
- ii medium score
- iii high score.

NICE did not think it appropriate to recommend a specific configuration for the organisation of the response to a specific score, but instead provided generic guiding principles.<sup>9</sup> The NEWS Development Group concurred with these conclusions.

We recommend that the clinical response to the NEWS should be agreed locally and organised around three graded triggers (low, medium, high).

We recommend that the locally agreed response to each NEWS trigger level should define:

- the speed/urgency of response – to include an escalation process to ensure that a response always occurs
- who responds? ie the seniority and clinical competencies of the responder(s)
- the frequency of subsequent clinical monitoring of the patient
- the appropriate clinical setting for ongoing acute care.

## Organisation of the local response to the NEWS

The NEWS grading system is designed to enable clinical staff to recognise and respond to acute illness and/or acute clinical deterioration and to trigger different levels of clinical response, proportionate to the illness severity.

We recommend that the NEWS grading system is used to determine the clinical response to acute-illness severity in hospitals, and in a prehospital assessment.

Clinical concern about a patient's condition should always override the NEWS if the attending healthcare professional considers it necessary to escalate care.

In hospitals, the clinical response to acute deterioration in a patient's clinical condition involves a wide range of clinical staff, including ward-based nursing staff, junior and senior medical staff, hospital-at-night teams, critical care outreach teams and cardiac arrest teams. The composition of the response teams will depend on the size of the hospital and the complexity of their case-mix, and should be defined locally.

Clinical concern about a patient's condition should always override the NEWS if the attending healthcare professional considers it necessary to escalate care.

The experience in use and the published evaluations of NEWS (see section 3) have allayed initial concerns about the potential workload impact with regard to the frequency of NEWS alerts, and the clinical response required for medium and high NEWS scores. In many cases, the use of the NEWS has prompted a hospital-wide review of readiness to respond to acute clinical deterioration and has resulted in clinical resources being more effectively configured and deployed 24/7. An analysis of the NEWS<sup>14</sup> has indicated that, in a typical large acute hospital setting in the UK, ~20 % of observation sets may record a NEWS score of 5 or more and prompt a medium-level alert, with ~10% of observation sets potentially scoring 7 or more, thereby prompting a high-level alert. More research is needed to evaluate the impact of the NEWS on resource utilisation and patient outcomes.

We recommend that the clinical response to acute-illness severity as determined by the NEWS should be reviewed and agreed locally to ensure that the speed of response and clinical competency of the responders matches those recommended for each of the three grades of acute-illness severity, as defined by the NEWS.

We recommend that local arrangements should ensure that:

- 1 the urgency and competency of response to acute illness are guaranteed 24/7
- 2 there are appropriate settings, facilities and trained staff in place for ongoing care when it is necessary to escalate care to higher-dependency settings.

## Urgency of response

The speed and urgency of response to acute illness are a critical determinant of clinical outcomes.

We recommend that the processes for alerting clinical staff and ensuring a timely clinical response should be agreed locally and clearly defined as an overriding responsibility for all staff alerted to a patient with an acute deterioration in their clinical condition.

## Frequency of clinical monitoring

The NEWS should be used to inform the frequency of clinical monitoring (Chart 4). The NEWS chart contains a section to record the frequency of monitoring as guided by the NEWS score.

The frequency of monitoring should be dictated by the patient's clinical condition and stability. NICE in its guidance in 2007 recommended a minimum frequency of 12-hourly monitoring.<sup>9</sup> The NEWS Development Group considered this a reasonable recommendation for a small group of patients, but noted that more frequent monitoring (eg 6 hourly) is likely to be required earlier in the course of a patient's acute-hospital admission. The NEWS Development Group concluded that 12-hourly monitoring should be regarded as a minimum standard, that many patients would require more frequent monitoring and that clearer guidance was required to define who would benefit from more frequent monitoring.

We recommend that for those in the low-score group, the minimum frequency of monitoring should be 12 hourly, increasing to 4–6 hourly for an aggregate NEWS score of 1–4, unless more or less frequent monitoring was considered appropriate by a competent clinical decision-maker.

We recommend that the frequency of monitoring should be increased to a minimum of every hour for those patients with an aggregate NEWS score of 5–6, or a red score of 3 in a single parameter.

While any patient can be considered for continuous monitoring, it is essential for patients with a score of 7 or more.

## Appropriate setting for ongoing clinical care

The NEWS should be used to help decide the most appropriate clinical setting for ongoing care, including:

- 1 access to facilities for more frequent or continuous clinical monitoring, ie monitored beds, with sufficient staff, trained to interpret and respond
- 2 timely access to staff trained in critical care, ie airway management and resuscitation
- 3 timely access to specialist acute care, ie non-invasive ventilation (NIV), acute cardiac, neurological, liver or renal support.

Local policies and care pathways should be in place to ensure the efficient and seamless escalation and transfer of care when required.

## Clinical competencies of responders to the NEWS

The original NEWS Development Group noted that the Department of Health (DH) had published a framework of the competencies for recognising and responding to acutely ill patients in hospital.<sup>38</sup> This document should be referred to for a detailed description of the competency framework that underpins the recommended graded clinical response to the NEWS. This framework was produced in response to the NICE guideline CG50<sup>9</sup> and noted that 'staff caring for patients in any acute hospital setting should have competencies in monitoring, measurement and interpretation of vital signs, equipping them with the knowledge to recognise deteriorating health and respond effectively to acutely ill patients'. The NEWS Development Group supported the underlying principles of these DH and

NICE reports, ie that the competencies should be built around the ‘chain of response’ that reflects escalating levels of intervention in the care of an acutely ill patient, corresponding to low, medium and high track-and-trigger scores, and that the response should be ‘effective, timely and seamless’.

**Chain of response:** Key elements of the ‘chain of response’ are the recorder, the recogniser and the responder. The responder can be further subdivided according to the competencies in acute care required to deliver an effective response, ie the primary responder, secondary responder and tertiary responder – the latter with competencies in critical care (see Chart 4).

**Chart 4: Clinical response to the NEWS trigger thresholds**

NEW score	Frequency of monitoring	Clinical response
0	Minimum 12 hourly	<ul style="list-style-type: none"> <li>Continue routine NEWS monitoring</li> </ul>
Total 1–4	Minimum 4–6 hourly	<ul style="list-style-type: none"> <li>Inform registered nurse, who must assess the patient</li> <li>Registered nurse decides whether increased frequency of monitoring and/or escalation of care is required</li> </ul>
3 in single parameter	Minimum 1 hourly	<ul style="list-style-type: none"> <li>Registered nurse to inform medical team caring for the patient, who will review and decide whether escalation of care is necessary</li> </ul>
Total 5 or more Urgent response threshold	Minimum 1 hourly	<ul style="list-style-type: none"> <li>Registered nurse to immediately inform the medical team caring for the patient</li> <li>Registered nurse to request urgent assessment by a clinician or team with core competencies in the care of acutely ill patients</li> <li>Provide clinical care in an environment with monitoring facilities</li> </ul>
Total 7 or more Emergency response threshold	Continuous monitoring of vital signs	<ul style="list-style-type: none"> <li>Registered nurse to immediately inform the medical team caring for the patient – this should be at least at specialist registrar level</li> <li>Emergency assessment by a team with critical care competencies, including practitioner(s) with advanced airway management skills</li> <li>Consider transfer of care to a level 2 or 3 clinical care facility, ie higher-dependency unit or ICU</li> <li>Clinical care in an environment with monitoring facilities</li> </ul>

## Clinical competencies of responders to the NEWS

- All healthcare staff recording data or responding to the NEWS should be trained in its use.
- All staff using the NEWS should understand the significance of the scores with regard to local policies for responding to the NEWS triggers and the nature of the clinical response required.
- We recommend that for patients with medium NEWS scores (5–6), the locally agreed responder(s) must have clinical competency in the assessment and treatment of acutely ill patients and in recognising when the escalation of care to a critical care team is appropriate.
- For patients with high NEWS scores (7 or more), the locally agreed response must include staff with critical care skills, including airway management.
- The staff/team(s) with the appropriate skills and competencies to respond to medium or high NEWS triggers (ie NEWS score of 5 or above) should be identified on the local rota, and the rota should provide coverage 24/7.
- There should be a locally agreed mechanism for the timely alert of the critical care team(s) and their response should have overriding priority with regard to other duties.

**NEWS recording with continuous monitoring:** There is a potential weakness in the documentation of routine observations when patients are transferred to continuous monitoring (invasive or non-invasive). In these circumstances, it is good practice to ensure that a full dataset of vital signs continues to be charted at a 'minimum interval', eg for a patient with a prior NEWS score of 5 or more, data from a continuous monitoring device should continue to be charted on the NEWS chart at least hourly.


**Consider the 'ceiling of care':** At all NEWS scores, but particularly at scores of 7 or above, clinical staff should consider the 'ceiling of care', including the suitability for cardiopulmonary resuscitation (CPR) and invasive ventilation.

## 8 Training and implementation of the NEWS

The NEWS provides a standardised system for the education, training and credentialling of healthcare professionals.

We recommend that education, training and demonstrable competency in the use of the NEWS should be a mandatory training requirement for all healthcare staff engaged in the assessment and monitoring of acutely ill patients across the NHS.

We also recommend that the NEWS should form part of undergraduate nursing, paramedical and medical training.

 A training document and web-based educational tools to support the implementation of the NEWS in a variety of formats are available at <http://tfinews.ocbmedia.com>. These have been updated to reflect the changes in this NEWS update and include additional training modules on hypercapnic respiratory failure and the use of supplemental oxygen, the significance of new confusion, and the importance of the NEWS in the consideration of potential sepsis as a cause for acute clinical deterioration. ■



## 9 The NEWS and research opportunities



One of the major challenges in developing the NEWS was the lack of detailed systematic evaluation of existing EWS systems and their impact on clinical resources and patient outcomes. When the NEWS was launched in 2012, the NEWS Development Group highlighted the importance of research to evaluate the effectiveness of the NEWS.<sup>1</sup>

The NEWS provides the opportunity to standardise data collection across the NHS with regard to the severity of acute illness, to aid resource and infrastructure planning and service delivery organisation. This, then, provides the opportunity to link the NEWS to measures of the efficiency of clinical care and the impact on patient outcomes. Furthermore, research is needed to define the appropriate clinical outcomes against which to benchmark the effectiveness of the NEWS – is it length of stay in hospital, in-hospital mortality, or other outcome measures? Interpreting the effectiveness of the NEWS per se will be affected by many factors, including the timeliness of the clinical response, the competency of the responders, the nature of the response, the clinical environment for ongoing acute care, and the quality of training of all staff engaged in the assessment and treatment of acute illness. What is clear is that the design and conduct of future research will be facilitated by having a standardised approach, supported by national data collection, recording acute-illness severity according to the NEWS, linked to subsequent clinical outcomes. The importance of the NEWS in this regard is already evident by the number of publications evaluating the NEWS since its original launch. This, in turn, should provide the substrate for further research to evaluate the cost and effectiveness of a wide range of new clinical interventions designed to improve the outcomes of patients with acute illness, which is much needed.

The clinical and operational management of acute illness is a hugely important aspect of the work of the NHS, and is greatly valued by patients. Despite this, there has been a negligible national research focus and inadequate investment in acute care research. This in part reflects the challenges in undertaking research in this fast-paced environment; however, this is a rich environment for research with high patient flow, with the opportunity to assess the effectiveness of novel interventions over a relatively short timescale and a clear potential to positively influence health policy and patient outcomes. The NEWS will help to standardise the recording of patient risk to facilitate such research, ranging from early-phase investigation of new therapeutic interventions and devices, through to health services research evaluating strategies for implementation, impact of organisational change, and patient experience and outcomes. This is also an area of research in which patient and public involvement could and should play a key role in helping to define research priorities, methodology and communication of practice-changing research outcomes. In this regard, it is essential that funding agencies build on the potential of the widespread uptake of the NEWS, better recognise the huge potential of this untapped resource for impactful research, and help to build the much-needed academic leadership and capacity to deliver research in the acute care of patients.

We recommend that future research be directed towards evaluating the efficiency of the NEWS in improving clinical response times and clinical outcomes in patients with acute illness.

We recommend that the NEWS be used to catalyse an expansion of research into the effectiveness of novel interventions, diagnostics and care pathways in acute care in the NHS. ▀

## 10 Review process for the NEWS

After the original launch of the NEWS in 2012, a review of the NEWS was scheduled for 2015. This report (NEWS update / NEWS2) is the product of that review.

Following this update of the NEWS, the RCP encourages feedback and suggestions about how the NEWS could continue to be improved (please email [NEWS@rcplondon.ac.uk](mailto:NEWS@rcplondon.ac.uk)). When appropriate, the NEWS FAQ section will continue to be updated in response to specific questions considered to be of general interest. Formal review of the NEWS is scheduled for 2022.

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## 12 Abbreviations

ABCDE	Airway, Breathing, Circulation, Disability, Exposure
ACVPU	Alert, new Confusion, Voice, Pain, Unresponsive
AUC	area under the curve
AUROC	area under receiver operating curve
AVPU	Alert, Voice, Pain, Unresponsive
BTS	British Thoracic Society
CI	confidence interval
CNS	central nervous system
COPD	chronic obstructive pulmonary disease
CPAP	continuous positive airway pressure
CPR	cardiopulmonary resuscitation
CQC	Care Quality Commission
DH	Department of Health
ED	emergency department
EWS	early warning score
GCS	Glasgow Coma Scale
HDU	high-dependency unit
ICU	intensive care unit
MET	Medical Emergency Team
NCEPOD	National Confidential Enquiry into Patient Outcome and Death
NEWS	National Early Warning Score
NEWS score	National Early Warning score (individual value)
NEWSDIG	NEWS Development and Implementation Group
NICE	National Institute for Health and Care (previously Clinical) Excellence
NIV	non-invasive ventilation
qSOFA	quick Sepsis-related Organ Failure Assessment
RCEM	Royal College of Emergency Medicine
RCP	Royal College of Physicians
RoW	rest of the world
SIGN	Scottish Intercollegiate Guidelines Network
SIRS	Systemic Inflammatory Response Syndrome
SOFA	Sequential Organ Failure Assessment
UAE	United Arab Emirates

# 13 Appendices

## Appendix A

### The original NEWS Development and Implementation Group (2008–2012)

<b>Professor Bryan Williams</b> (chair)	Professor of medicine and (honorary) consultant physician, University College London and University College London Hospitals NHS Trust
<b>Professor Sir George Alberti</b>	National clinical director for emergency access (September 2002 – March 2009), Imperial College London
<b>Dr Carol Ball</b>	Critical care nurse consultant, The Royal Free Hospital NHS Trust
<b>Professor Derek Bell</b>	Professor of acute medicine, Imperial College London
<b>Ms Rachel Binks</b>	Nurse consultant, Airedale Hospitals NHS Trust; Chair, Royal College of Nursing Critical Care and Flight Nursing Forum (2007–2011)
<b>Ms Lesley Durham</b>	Chair, National Outreach Forum (2005–2010); NEWS lead, National Outreach Forum Executive Board (2010 to date); Director and lead nurse, North of England Critical Care Network
<b>Dr Jane Eddleston</b>	Clinical adviser on critical care, Department of Health; Consultant in intensive care medicine, Manchester Royal Infirmary
<b>Mr Nigel Edwards</b>	CEO, NHS Confederation (May 2010 – August 2011); Senior fellow, The King's Fund
<b>Mr David Evans</b>	RCP Patient and Carer Network; Safety engineer and occupational hygienist
<b>Dr Mike Jones</b>	Vice president, Royal College of Physicians of Edinburgh
<b>Dr Daryl Mohammed</b>	London Ambulance Service
<b>Dr Ruth Patterson</b>	Practice development nurse, acute medicine
<b>Dr Jonathan Potter</b>	Clinical director, Clinical Effectiveness and Evaluation Unit (RCP)
<b>Ms Tracy Scollin</b>	Working party administrator, Royal College of Physicians, London
<b>Professor Gary Smith</b>	Consultant in critical care medicine, Portsmouth Hospitals NHS Trust (until March 2011); Visiting professor, Bournemouth University
<b>Dr Keith Steer</b>	Acute medicine representative; Lead consultant, emergency adult medicine, London North West Healthcare NHS Trust
<b>Dr Chris Subbe</b>	Consultant in acute and intensive care medicine, Ysbyty Gwynedd, Bangor



Mr John Welch                      National Outreach Forum and consultant nurse, University College  
London Hospitals

Ms Niamh Wilson                      NHS London Programme for IT

**Stakeholders consulted in the original development of NEWS**

Academy of Medical Royal Colleges

British Thoracic Society

Intensive Care National Audit & Research Centre

The King's Fund

London Programme for IT

Professor the Lord Darzi, Parliamentary under-secretary of state, Department of Health (June 2007 –  
July 2009)

National Patient Safety Agency

National Confidential Enquiry into Patient Outcome and Death

National Institute for Health and Clinical Excellence

Royal College of Nursing

Society for Acute Medicine

National Outreach Forum

Resuscitation Council (UK)

Intensive Care Society

London Ambulance Service

## Appendix B

### Frequently asked questions and responses from the NEWS Review Group

- 1 **Has formal validity of NEWS already been established?**  
Yes – this has been published and is discussed in detail in the NEWS2 document. In addition, the NHS in England is setting out a national ambition to standardise the use of NEWS in acute and ambulance settings during 2018/19.
- 2 **Can patient weight be added to the chart?**  
No – this has been considered by the NEWS group, and weight should be recorded on other charts. Patients should be weighed routinely, but weight will not influence the NEWS.
- 3 **Currently we do not use a general score for patients in ICU / high-dependency unit (HDU), and the score is only calculated on step-down to ward areas. Could this be clarified?**  
It is recommended that the NEWS score be part of handover for patients stepping down from a higher-dependency area.
- 4 **'Alert, Voice, Pain, Unresponsive' (AVPU) goes against our trust recommendations – please clarify.**  
This has been clarified in the NEWS review. AVPU works very well and is part of consistent training. If a patient is not alert, then the Glasgow Coma Scale (GCS) chart should be used. The management of patients at night and AVPU / monitoring consciousness have been clarified in the updated report and have been amended to ACVPU, where C represents 'new confusion' or any other acute alteration in mental state.
- 5 **Patients at risk of hypercapnia may be stable on 2 L oxygen to maintain SATS between 88 and 92%, but would automatically trigger a score of 4. Is it the need for oxygen or increasing incremental oxygen support that is more significant? The actual saturation recording may be inaccurate owing to poor peripheral perfusion.**  
This is an educational issue and is covered in the NEWS e-learning tool. The NEWS chart has been updated with a new section specifically designed to record oxygen saturations for patients with hypercapnic respiratory failure who have been prescribed a desired oxygen saturation range of 88–92%.
- 6 **I work on a community intermediate care unit for people aged over 60. Monitoring urine output is often not possible or applicable in our patient group; would it be acceptable for us to use the NEWS documentation with this minor modification?**  
Urine output is not part of the NEWS scoring system. Yes the NEWS chart can be used in this patient group. It is important to note, however, that the recording of urine output is often important clinically to monitor fluid balance but it is not required for the NEWS.
- 7 **Our trust has a separate EWS for women admitted to obstetric wards, but uses the general score for pregnant women admitted to general wards. Could this be clarified?**  
The NEWS is not intended for use during pregnancy. The NEWS can be used for women who are up to 20 weeks pregnant, but after 20 weeks, a specific obstetric score (eg the Maternity Early Warning Score) should be used.

- 8 Do physiotherapists and occupational therapists who work in the community need to inform a registered nurse if the NEWS score is between 1 and 4? This would limit efficiency of our team.**

In teams where the physiotherapists, occupational therapists and others carry out the assessment, they should be the staff to instigate escalated care. The e-learning tool has been developed further to clarify this.

- 9 Can we add a space for healthcare assistants to initial that they have notified a registered nurse of an abnormal score?**

This is included in the chart.

- 10 Is the NEWS designed for use by the ambulance service?**

Yes, it has been validated as a useful tool to stratify illness severity by the ambulance services. The NEWS is now used by many ambulance services across the UK. There is also a strong recommendation from the Royal College of Emergency Medicine for the NEWS to be used by all emergency departments. This would ensure that the NEWS is used across the emergency care pathway, facilitating safe and more effective and timely triage and safe handover of patients.

- 11 Can NEWS be used by the independent sector?**

Yes. It is already being used in some areas of the private healthcare sector in the UK and in many hospitals internationally. This is important for interoperability.

- 12 Has the NEWS been adopted by teams working in the community? If so, what has their experience been?**

Yes – there has been a steady uptake of the NEWS in the community sector (eg community hospitals and nursing homes). Some of the teams have asked the NEWS group representatives to visit and give presentations on the NEWS. New exemplars have been added to the e-learning to assist these teams.

- 13 Can we use the name ‘NEWS’ if we alter the parameters?**

No. This would defeat the object of trying to embed a standardised system across the NHS to improve communication of illness severity and response to acute illness. If the scoring system or chart are altered, then the prior validations of the NEWS are no longer valid and the system is no longer the NEWS. This would be a retrograde step. Some colleagues have fed back that they wanted to change the thresholds as they felt that they were sometimes too sensitive. The response to the NEWS should be decided locally, but this doesn't require any change to the scoring system or the charts.

- 14 Is there a Microsoft Word version available rather than a PDF, so that we can make changes?**

No – as it is a standardised chart, changes cannot be made.

- 15 Can we add our hospital name or personalise the chart?**

Yes – it is anticipated that, in many cases, the NEWS chart will be embedded into a larger chart at the bedside that allows additional information about the patient, eg urine output, pain scores, GCS etc to be recorded, alongside the NEWS chart.

- 16 Can we move the rows around on the chart?**

No – they are prioritised for specific reasons. In the updated NEWS2 chart, the order of the rows has been changed to be consistent with the ABCDE order of physiological recording as recommended by the Resuscitation Council (UK).

- 17 Will there be competence-based assessments to support the online training?**

This is the responsibility of the educational provider at each organisation – some may wish to add this.

- 18 Would adapting the chart to a different patient group affect copyright? Is it possible to change the size of the chart?**

Any adaptation would mean that it can no longer be called 'NEWS'. It is important that the NEWS chart remains visually consistent.

- 19 Should people complete the e-learning before using the chart? For example, agency staff and locums may not have been trained.**

The vacancy rates in emergency nursing are currently high, so the Royal College of Nursing is clear about the training given to agency nurses – it is recommended that all emergency nurses complete the e-learning, as well as all other members of staff who have contact with patients on wards, not forgetting the areas in the community where acute and emergency work happens.

- 20 Can we quote from the NEWS report?**

Yes – the official citation is: Royal College of Physicians. *National Early Warning Score (NEWS) 2: Standardising the assessment of acute-illness severity in the NHS*. Updated report of a working party. London: RCP, 2017.

- 21 Is there an app for NEWS?**

An app is being developed and should be available for testing soon. Information will be available on the RCP website when the app is released.

- 22 Will NEWS be rolled out across the UK?**

Sir Richard Thompson, past president of the RCP, stated that it had been the most effective initiative from the RCP in terms of rapid take-up into the healthcare system UK-wide. NHS England has endorsed and recommended the use of the NEWS as the early warning system for use across the NHS in England, replacing other early warning systems for adults (but not children or pregnant women who have their own dedicated scoring systems).

- 23 Is NEWS being used outside the UK?**

Yes, we have had enquiries and information on take-up from several European and Far Eastern countries, and the USA.

- 24 How do we get hold of mass-produced NEWS charts?**

The local NHS trust has responsibility for producing NEWS charts for individual organisations. Some trusts have already moved to electronic systems that are embedding the NEWS.

- 25 What is the copyright situation if NEWS is converted for use in an electronic system?**

There is no difference – please acknowledge the RCP.

- 26 Is it permissible for me to laminate the NEWS tool for posting at each bedside?**

Yes.

- 27 Could the boxes in the chart be enlarged so that they can be read more easily?**

The chart has been redesigned to include all the necessary information and the new NEWS2 chart has a larger format. Electronic systems in the future will resolve this.



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