

SHORT REPORT

Distribution of the National Early Warning Score (NEWS) in care home residents

ROBERT OLIVER BARKER¹, RACHEL STOCKER¹, SIÂN RUSSELL¹, ANTHONY ROBERTS², ANDREW KINGSTON¹, JOY ADAMSON¹, BARBARA HANRATTY¹

¹Population Health Sciences Institute, Newcastle University

²Academic Health Science Network North East and North Cumbria

Address correspondence to Robert Oliver Barker, Institute of Health & Society, Newcastle University, Level 2, Newcastle Biomedical Research Building Campus for Ageing and Vitality, Newcastle upon Tyne NE4 5PL, UK.

Tel: (+44) 191 2083648. Email: robert.barker@newcastle.ac.uk

Abstract

Background: the National Early Warning Score (NEWS) is a tool based on vital signs that aims to standardise detection of, and response to, clinical deterioration in adults. NEWS has been adopted in hospitals but not adapted for other settings. This study aimed to explore the feasibility of measuring the NEWS in care homes and describe the distribution of NEWS readings amongst care home residents.

Methods: descriptive analysis of all NEWS readings recorded in a 30-month period (2016–19) across 46 care homes in one Clinical Commissioning Group in England. Comparisons were made between measurements taken as a routine reading and those prompted by concern about acute illness.

Results: a total of 19,604 NEWS were recorded from 2,424 older adults (≥ 65 years; mean age 85). Median NEWS was 2. Two thirds (66%) of residents had a low NEWS (≤ 2), and 28% had a score of 0. Of the total NEWS readings, 6,277 (32%) were known to be routine readings and 2,256 (12%) were measured because of staff concerns. Median NEWS was 1 for routine and 2 for concern recordings. Overall, only 12% of NEWS were high (≥ 5), but a higher proportion were elevated when there were concerns about acute illness (18%), compared with routine recordings (7%).

Conclusions: use of NEWS in care homes appears to be feasible. The majority of NEWS were not elevated, and the distribution of scores is consistent with other out-of-hospital settings. Further work is required to know if NEWS is triggering the most appropriate response and improving care home resident outcomes.

Keywords: care homes, track and trigger systems, National Early Warning Score, older people

Key points

- Identifying acute illness amongst older adults in care homes can be difficult, and opportunities to initiate appropriate care may be missed, if illness is not recognised promptly.
- The NEWS has an established role in recognition and response to acutely deteriorating patients in hospital settings.
- NEWS is being implemented in care homes despite a lack of validation in this setting. Our analysis of approximately 19,500 scores suggests that measurement of the NEWS in care homes is feasible.
- The majority of NEWS amongst care home residents were not elevated, but care home staff concern about a resident was associated with a higher NEWS.
- Further work is required to assess if NEWS in the care home setting triggers the most appropriate response and the impact on care home resident outcomes.

Introduction

The value of early warning scores and other track and trigger systems, in recognising and responding to acute illness in hospitalised patients, is well established. The National Early Warning Score (NEWS) is used in hospitals and by paramedics in the UK and elsewhere [1]. NEWS requires the measurement of six parameters: temperature, pulse, systolic blood pressure, respiratory rate, oxygen saturation and level of consciousness. New-onset confusion was added into the 2017 update (NEWS2), along with adjustment for patients on oxygen. A score of 0–3 is given to each parameter, and the component scores are summed to produce the NEWS. The overall NEWS triggers a response, ranging from repeating the NEWS within a specific time frame to initiating an emergency medical response [1]. In hospital settings, the ability of different NEWS thresholds to predict adverse health outcomes has been established [2], and there are standardised response charts [1].

The use of NEWS in care homes and other community settings is now widely advocated, as a standardised system for recognising and communicating acute illness between all health care workers [1]. Implementation of the NEWS into care homes is already underway across multiple sites in the UK [3, 4]. Care home residents are some of the most complex patients in primary care [5, 6] with a high rate of unplanned hospital transfer [7], over half of which may be avoidable [8]. The absence of overt signs to indicate deterioration amongst older adults may be a contributing factor. Identifying acute illness and communicating this information to health services may be particularly challenging for care home staff without nurse training. Establishing the role of NEWS in care homes is important, as this has the potential to promote early recognition of illness, aid triage and enhance communication between care home staff and the National Health Service (NHS). This would support the delivery of appropriate medical care plans that are tailored to the individual, which could include ongoing treatment in the care home setting or escalation to hospital. The theoretical underpinning is detailed in the [Supplementary Material Figure 1](#).

To date, evidence for improved patient outcomes in out-of-hospital settings is limited [9], and the NEWS system has not been modified or validated for use in care homes. Concerns have been expressed that the NEWS scoring system may be inappropriate for this population because a high proportion of care home residents are aged and living with frailty, multimorbidity and polypharmacy, which may influence the NEWS [10]. Scott *et al.* [11] have recently described the distribution of NEWS in out-of-hospital settings in emergency department attendees. There are no similar data from individuals who are living in their own homes or other community settings. This is important as community-dwelling populations should contain a higher proportion of people who need no attention from healthcare professionals, compared with hospital attendees and inpatients.

It is particularly important to understand the feasibility of the NEWS system in care homes as staff roles and expertise are different to other settings. A majority of care home staff do not have nursing or medical qualifications, and the quality of staff training varies across the sector. Measurement of vital signs is not part of daily work for most staff and may represent a time-consuming, new and potentially challenging task. This study presents novel data on NEWS readings in care home residents, aiming to answer the following key questions: (i) Is the measurement of NEWS in the care home setting feasible? and (ii) What is the profile of NEWS in care home residents?

Methods

The intervention was implemented by a Clinical Commissioning Group (CCG) in England. The data presented in this study form part of a service evaluation of this intervention. The CCG delivered training to care home staff to take specific clinical observations and to enter the readings on a computer tablet, which automatically calculates a NEWS ([Supplementary Material Figure 2](#)). All NEWS measurements from September 2016 to February 2019 were obtained. The computer tablet was updated in November 2017 to prompt staff to choose one of two reasons for measuring the NEWS, either (i) a routine (or baseline) measurement or (ii) because of concern about a deterioration in health status.

Frequencies for different values of NEWS were produced using STATA 15. The distribution of scores was compared for routine and concern measures. There are no standard response charts for out-of-hospital settings, so the recordings were grouped into four categories (low, intermediate, high, critical), shown in [Table 1](#). This incorporates the thresholds that are employed pragmatically in current community practice [3], those used by Scott *et al.* [11] and the nationally recognised NEWS2 thresholds used in hospitals [1]. These data do not incorporate the NEWS2 modifications to maintain consistency over the period of the evaluation.

Approvals for this service evaluation were obtained from a university research ethics committee (ref. 0150/8084). A data sharing agreement was signed between the care homes, the data processor and the CCG to permit the transfer of de-identified data to the evaluation team.

Findings

Over 30 months (2016–19), 20,643 NEWS measurements were performed on older adults (over 65 years) across 46 care homes. Approximately 5% of readings were excluded as they were not valid; either implausible measurements or the NEWS had been calculated using at least one reading that was not contemporaneous. A total of 19,604 NEWS observations remained for analysis. The mean age of the 2,424 residents was 85 years. Gender was available for only 1,632 (8%) recordings. Following the introduction of a

Table 1. NEWS category with trigger thresholds (all responses are guided by level of concern)

NEWS reading	NEWS category	Pragmatic community response	NEWS2 hospital system ¹	
			Clinical risk	Response
0-2	Low	Monitoring within the care home setting	Low	Ward-based response
3-4	Intermediate	Discussion with external healthcare professionals		
5-6	High	Urgent response from external healthcare professional	Medium	Key threshold for urgent response
≥7	Critical	Emergency response e.g. ambulance call	High	Urgent or emergency response

prompt for care home staff to enter the reason for recording, this was recorded in approximately 90% of cases. The reason was known for 8,533 NEWS readings; 6,277 (74%) were routine readings and 2,256 (26%) were measured because of staff concerns.

The overall median NEWS reading was 2, interquartile range (IQR) 3 and range 0–13. The median in the routine recordings was 1, IQR 2 and range 0–12. The median NEWS in the recordings prompted by concerns was 2, IQR 4 and range 0–12. 12,997 (66%) of the total 19,604 NEWS observations were categorised as low NEWS (2 or less), and 5,453 (28%) had a score of 0 (Box 1). The proportion of low NEWS was higher in the routine measurements (75%) than in the measurements prompted by concern (62%). The proportion of scores within the intermediate category (NEWS 3–4) was 22% for all NEWS measurements, 18% in the routine group and 21% in the staff concern group. Overall, only 9% of scores were in the high range (NEWS 5 or 6) and 4% critically high (NEWS ≥7). High and critically high scores were more common in the measures prompted by staff concern (11% high, 6% critically high) compared with the routine group (5% high, 2% critically high).

A score of 3 within an individual parameter (temperature, blood pressure, etcetera) represents an extreme variation. It contributes to a raised NEWS, but a score of 3 will also trigger an urgent response on its own, irrespective of total NEWS. The scoring for individual parameters, and the proportion of scores of 3 across the whole dataset, can be found in the [Supplementary Material Table 2](#).

Discussion

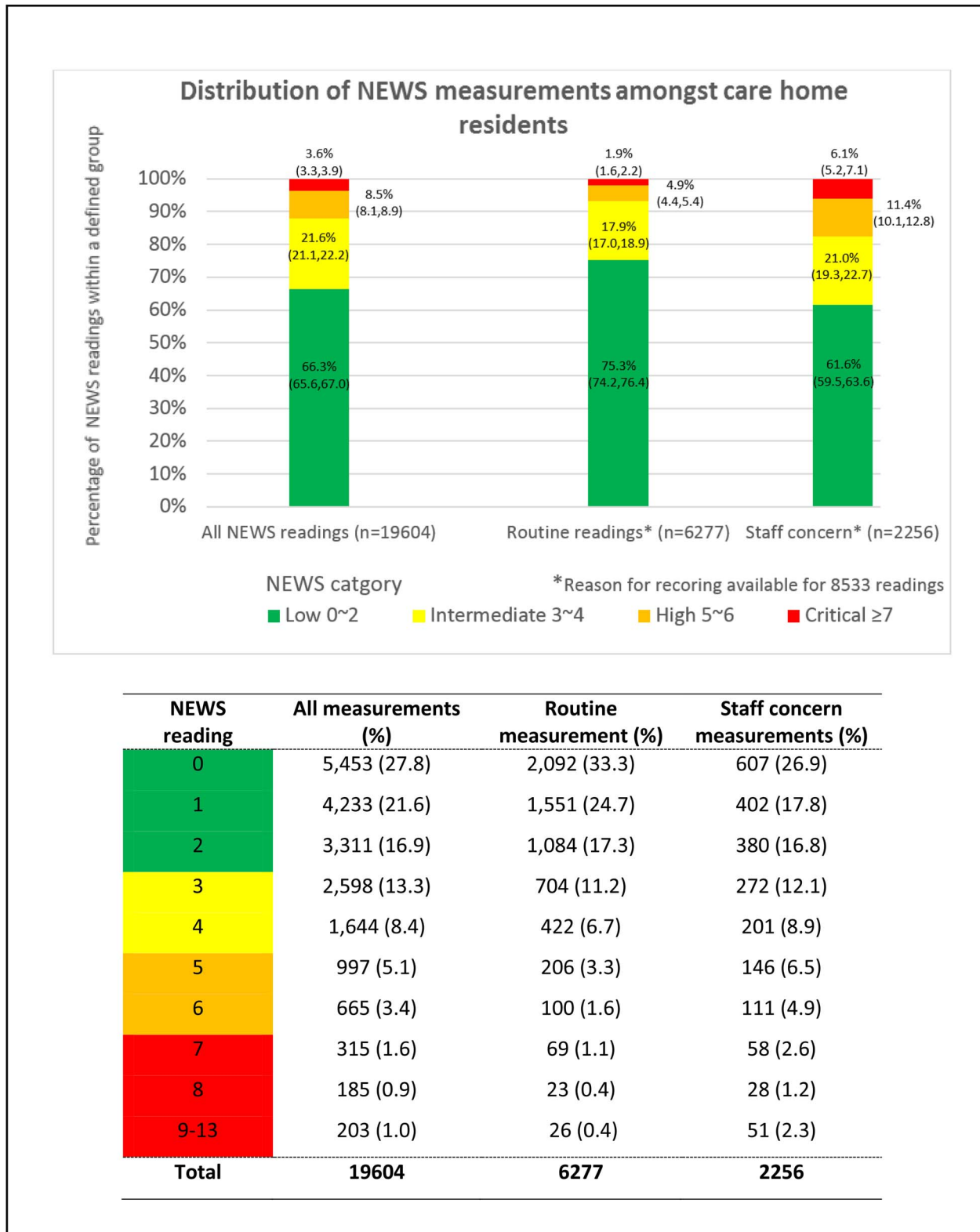
This article presents novel data on the distribution of NEWS readings in care home residents and suggests that use of the NEWS in the care home setting is feasible. The majority of

NEWS were not elevated, but concern amongst care home staff that prompted a NEWS recording was associated with higher NEWS readings.

To the best of our knowledge, these data are the first published NEWS from care homes. Consistency with out-of-hospital NEWS has been demonstrated [11], but neither the accuracy nor reproducibility of NEWS measurements by care home staff is known. The data were collected from all care homes in one CCG area, which produced a sample that varied by home size, type of care provided and socioeconomic circumstances. However, the care homes most actively engaged with the initiative did contribute a higher proportion of NEWS to the dataset, so we have little insight into how the feasibility of NEWS varies between care homes.

Demonstrating the profile of NEWS amongst care home residents is an important step in validating the system in this setting. The risk of adverse health outcomes associated with particular NEWS thresholds has been established in hospitalised patients [2], and this determines the degree of urgency of the response. The next step is to link NEWS in care homes with data on patient outcomes, in order to formalise the response in care homes, and from the wider health service, for example with ambulance calls. With this information, we should be able to determine whether the NEWS is triggering the most appropriate response and improving patient outcomes. An elevated score in conjunction with carer concern may help staff to communicate their concern to external healthcare providers and support the delivery of medical plans appropriate for the individual care home resident. However, it is also possible that low scores could provide false reassurance to care home staff and clinicians, and high scores may generate unnecessary clinical contacts. It is important to emphasise that NEWS should be used as an adjunct to the care provided in the care home and not replace the judgement of care home staff.

Box I. Distribution of all NEWS readings (September 2016 to February 2019) and by measurement type (November 2017 to February 2019) - routine or prompted by concern. Percentages with confidence interval in brackets.



At a national level in England, NEWS was modified to NEWS2 [1] during this work, so we have been careful to present the NEWS findings in a way that allows comparison with NEWS2. Future work should incorporate the updated NEWS2 system because the increased emphasis on new onset confusion is likely to be important in prioritising the prompt detection of delirium in this population. Future examination of linked and national datasets of NEWS2 from different sites and settings across the UK will enhance our understanding of the impact of this initiative on older adult care. The NEWS system is expected to roll out across all community settings in the NHS in England, so an understanding of the impact on care homes and people who live and work in them is essential.

Supplementary Data: Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

Declaration of Conflicts of Interest: All authors confirm that they have no conflicts of interest.

Declaration of Funding: R.B. is funded by a National Institute for Health Research In-Practice fellowship for this research.

Ethical Approval: Approvals for this service evaluation were obtained from the Newcastle University Research Ethics Committee (ref. 0150/8084). A data sharing agreement was signed between the care homes, the data processor and the CCG to permit the transfer of de-identified data to the evaluation team.

Acknowledgements: We would like to thank the Academic Health Science Network North East and North Cumbria, Sunderland Clinical Commissioning Group and the participating care homes for their support and help in accessing the data.

References

1. Royal College of Physicians. National Early Warning Score (NEWS) 2 standardising the assessment of acute-illness severity in the NHS (2017). Available at: <<https://www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2>> (accessed 15 May 2019).
2. Downey CL, Tahir W, Randell R, Brown JM, *et al.* Strengths and limitations of early warning scores: a systematic review and narrative synthesis. *Int J Nurs Stud* 2017; 76: 106–19.
3. West Hampshire Clinical Commissioning Group. RESTORE2: recognise early soft-signs, take observations, respond, Escalate (2019). Available at: <<https://www.westhampshireccg.nhs.uk/restore2-training-and-resources>> (accessed 15 May 2019).
4. Hodgson P, Cook G, Thompson J, Abbott-Brailey H. Assessment and clinical decision making of the acutely ill older care home resident: implementation of NEWS in Gateshead Care Homes (2017). Available at: <https://static1.squarespace.com/static/5893239037c581b39142e013/t/59dddeccd2b8572f2c11bd5/1507712721712/NEWS+REPORT+FINAL_2.pdf> (accessed 15 May 2019).
5. British Geriatrics Society. Quest for quality: an inquiry into the quality of healthcare support for older people in care homes: a call for leadership, partnership and improvement (2011). Available at: <<https://www.bgs.org.uk/blog/a-quest-for-quality-in-care-homes>> (accessed 15 May 2019).
6. Matthews FE, Bennett H, Wittenberg R, Jagger C, *et al.* Who lives where and does it matter? changes in the health profiles of older people living in long term care and the community over two decades in a high income country. *PLoS One* 2016; 11: e0161705.
7. Smith P, Sherlaw-Johnson C, Ariti C, Bardsley M. Quality watch: focus on hospital admissions from care homes (2015). Available at: <https://www.health.org.uk/publications/qualitywatch-focus-on-hospital-admissions-from-care-homes> (accessed 15 May 2019).
8. Harrison JK, McKay IK, Grant P, Hannah J, *et al.* Appropriateness of unscheduled hospital admissions from care homes. *Clin Med* 2016; 16: 103–8.
9. Patel R, Nugawela MD, Edwards HB, Richards A, *et al.* Can early warning scores identify deteriorating patients in pre-hospital settings? A systematic review. *Resuscitation* 2018; 132: 101–11.
10. Smith GB, Prytherch DR, Schmidt PE, Featherstone PI, *et al.* Should age be included as a component of track and trigger systems used to identify sick adult patients? *Resuscitation* 2008; 78: 109–15.
11. Scott LJ, Redmond NM, Garrett J, Whiting P, *et al.* Distributions of the National Early Warning Score (NEWS) across a healthcare system following a large-scale roll-out. *Emerg Med J* 2019; 36: 287–29.

Received 16 May 2019; editorial decision 20 August 2019