Removing systolic blood pressure from the National Early Warning Score (NEWS) for mortality prediction: an observational study

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ABSTRACT

Background Vital signs in triage are essential for effective risk stratification in the emergency department (ED). They are also increasingly used to calculate an early warning score at the time of presentation. However, obtaining a blood pressure is more time-consuming than other vital signs, potentially delaying care for subsequent patients. Additionally, studies indicate that this measure is not always collected. This study aimed to evaluate whether removing systolic blood pressure (SBP) from the National Early Warning Score (NEWS) affects the prediction of mortality.

Methods This prospective observational single-centre study included all patients presenting to triage of the General Hospital of Merano, Italy, from 1 June 2022 to 30 June 2023. Vital signs were recorded for each patient. NEWS and NEWS without SBP (NEWS-SBP) were computed. The ability of the two versions of the score to predict mortality at 48 hours, 7 days and 30 days was evaluated using the Area Under the Receiver Operating Characteristic curves (AUROC).

Results Data were recorded from 26 249 patients. For predicting 7-day and 30-day mortality, NEWS had a significantly higher AUROC than NEWS-SBP (7-day mortality: 0.84, 95% CI: 0.81 to 0.87 vs 0.83, 95% CI: 0.80 to 0.86; p=0.012, and 30-day mortality: 0.79, 95% CI: 0.77 to 0.81 vs 0.77, 95% CI: 0.75 to 0.79; p<0.001). No significant difference was found in the AUROC for the prediction of 48-hour mortality (NEWS: 0.89, 95% CI: 0.85 to 0.92 vs NEWS-SBP 0.88, 95% CI: 0.85 to 0.91; p=0.139).

Conclusion The NEWS-SBP was equivalent to the complete score for prediction of 48-hour mortality, but was less accurate in predicting medium and long-term mortality among ED patients. Further research is needed to clarify potential advantages in reducing triage time and whether these benefits outweigh the loss of prognostic accuracy.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Vital signs, including systolic blood pressure (SBP), are collected in triage to help determine priority. They are also increasingly used to determine an early warning score at the time of presentation to the emergency department (ED). However, prior research shows that this measure may be variably collected. While the National Early Warning Score (NEWS) is widely recognised for its ability to predict mortality, the specific contribution of SBP to its predictive accuracy remains insufficiently explored.

WHAT THIS STUDY ADDS

⇒ In this prospective observational study conducted in a single hospital in Italy, we found that NEWS with and without SBP had similar accuracy for predicting 48-hour mortality, but NEWS without SBP is less accurate in predicting 7-day and 30-day mortality compared with the complete NEWS.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ SBP in the NEWS enhances the accuracy of risk assessment in EDs for short-term mortality. This could guide vital sign monitoring during triage, ensuring a balance between efficiency and predictive performance.

INTRODUCTION

Triage in emergency departments (EDs) aims to rapidly assess and prioritise patients based on the severity of their condition. While clinical judgement remains central to this process, scoring systems such as the National Early Warning Score (NEWS) have been introduced as additional tools to support risk stratification.[1–3] NEWS has been validated for identifying patients at risk of deterioration, particularly those at risk of sepsis during triage.[4] Furthermore, NEWS has been shown to correlate with the risk of various adverse events, including intensive care unit admission and the need for cardiopulmonary resuscitation, regardless of presenting symptoms.[5]

One of the key limitations in triage during clinical practice is the inconsistency in the collection of vital signs.[6–8] This variability stems from the fact that vital signs are not always systematically recorded and can fluctuate depending on the perceived severity of the patient's condition or the priority code assigned during triage.[6–8] The incomplete, inconsistent and unsystematic collection of vital signs may affect the calculation and potentially compromise the prognostic accuracy of the NEWS.[9 10] Moreover, measurements of vital signs, and particularly systolic blood pressure (SBP), could increase triage duration, potentially challenging the need for rapid initial assessment in the ED.[6 10] Omitting this parameter could potentially speed up triage.

The objective of this study is to evaluate the impact of omitting the measurement of SBP from the NEWS and to determine if this can be a safe approach for patient stratification in triage. We hypothesised that removing SBP from the NEWS would not compromise its ability to predict short- and medium-term mortality.

METHODS

Study design and setting

A prospective observational single-centre study was conducted from 1 June 2022 to 30 June 2023 at the ED of Merano Hospital, located in South Tyrol, Northern Italy. In 2021, the ED recorded a total of 54 000 patient attendances.

In the ED, all patients undergo a triage assessment using the Manchester Triage System (MTS) which has been used since 2014. The MTS assigns each patient a priority code (5-blue, 4-green, 3-yellow, 2-orange, 1-red) with 1-red being the most acute and highest priority. Each triage code is associated with a maximum waiting time for medical attention.[11]

All nurses in our ED perform triage after having at least 2 years of experience in the ED, completing a specific 2-day MTS training course and undergoing a mentorship period with an experienced nurse. The ED employs 47 nurses, 26 of whom work in triage.

Participants

All patients who required an ED evaluation for any symptom or clinical presentation were considered for inclusion in the study. Patients were excluded from the study if they were under the age of 18, directed to Fast Track (meaning direct referral from triage to a specialist clinic), non-residents of the district (as their clinical follow-up data were not available, making it impossible to accurately assess study outcomes), pregnant women and patients with incomplete or incorrectly recorded NEWS vital sign data.

Incorrect data were defined as values outside of physiologically plausible ranges or as obvious typographical errors. Specifically, we considered values as incorrect if they exceeded the expected physiological limits (eg, heart rate <30 or >250 beats per minute, respiratory rate <5 or >80 breaths per minute, systolic blood pressure <50 or >300 mm Hg, temperature <30°C or >45°C, oxygen saturation <30% or >100%). These thresholds were established based on clinical plausibility and previous studies evaluating data quality in electronic health records.

A formal sample size calculation was not performed. Hence, instead of recruiting a predefined number of patients based on a pre-specified calculation, we included every eligible patient who met the criteria for participation in the study, during the study period (consecutive enrolment).

Study protocol

Our ED implemented a procedure aimed at improving patient stratification by mandating the collection of all vital signs comprising the NEWS. This initiative, introduced in January 2022 as part of a broader quality improvement effort in the ED, was already in place when the study started in June 2022. The NEWS parameters included respiratory rate, oxygen saturation, body temperature, SBP, heart rate, level of consciousness using the AVPU scale and administration of oxygen through the percentage of inspired oxygen for all patients evaluated at triage.[12]

The ongoing O2 therapy administered to the patient arriving at the ED by ambulance or using oxygen due to pre-existing conditions and present in the ED was considered as an alteration of O2. Any subsequent O2 therapy administered to the patient was not considered as part of the patient's vital signs at presentation.

All triage nurses were instructed to adhere to the collection of NEWS data for all patients managed in the central ED. This initiative was communicated as part of an effort to improve clinical performance. However, the nurses were not informed of the study hypothesis to prevent any bias in their practice.

Anonymised data from all patients were extracted from the ED database for analysis, including detailed information regarding ED outcomes. While adherence to the standardised NEWS collection procedure was strongly encouraged, it was not enforced due to operational constraints. In some emergency situations, obtaining all vital signs was not feasible, as immediate patient care took priority. Additionally, the ED electronic record system did not have mandatory fields for each parameter, allowing triage nurses to document only the available measurements when a full set of vital signs could not be recorded.

Variables

From the anonymised database, we extracted the clinical and baseline characteristics of patients evaluated in triage. This included age, assignment to the treatment area, urgency code assigned by the MTS, mode of arrival (autonomous, by ambulance, via medicalised team or air ambulance) and time of arrival categorised as day or night (categorised as either 'day' (08:00 to 20:00) or 'night' (20:00 to 08:00) based on the 12-hour shift schedule of the triage nurses.

For each patient, the NEWS was calculated by the investigators based on the collected vital signs. Additionally, the NEWS-SBP, which excludes SBP from the NEWS calculation, was computed.

All relevant clinical data, including triage chart information and ED access documentation, were recorded in a pre-specified anonymised electronic dataset. Mortality data were automatically retrieved from the regional registry office and integrated into the same anonymised dataset.

Outcomes

The primary outcome was defined as the ability of NEWS and NEWS-SBP to predict death within 48 hours. The secondary outcome assessed the ability of NEWS and NEWS-SBP to predict death at 7 and 30 days.

Statistical analysis

The distribution of continuous variables was assessed visually using histograms, given the large volume of available data. Continuous variables were reported as mean and SD or median and IQR, depending on the distribution. Univariate comparisons of continuous and discrete data were conducted using the Mann-Whitney test. Categorical variables were presented as absolute numbers and percentages and were compared using Fisher's exact test or χ^2 test.

Receiver operating curves (ROC) were created to assess the predictive ability of both NEWS and NEWS-SBP scores for death at 48 hours, 7 days and 30 days. Model calibration was evaluated using Harrell's C-index (C-statistic) for 48 hours mortality, providing a measure of the agreement between predicted probabilities and observed outcomes. The predictive ability of NEWS and NEWS-SBP was reported using the area under the ROC (AUROC), with their corresponding 95% CIs. The 95% CIs for the AUROCs were calculated using asymptotic methods based on standard errors. Comparisons of AUROCs for the NEWS and NEWS-SBP for each outcome were performed using DeLong's test for correlated ROC curves, and p values were reported to

Table 1 Characteristics of patients included in the study

Variables	
Age, years, median (IQR)	62 (43–78)
Triage priority code, n (%)	
Blue	2066 (7.9)
Green	15 812 (60.2)
Yellow	5712 (21.79)
Orange	2542 (9.7)
Red	117 (0.4)
Arrival mode, n (%)	
Self-presented	15 606 (59.4)
Ambulance	9257 (35.3)
Ambulance with physician or helicopter	1386 (5.3)
Vital signs, median (IQR)	
Heart rate (beats per minute)	83 (72–95)
Respiratory rate (breaths per minute)	16 (15–18)
Fraction of inspired oxygen (%)	21.0 (21.0–21.0)
Oxygen saturation (%)	98 (97–99)
Temperature (°C)	36.3 (36.0–36.7)
Systolic blood pressure (mm Hg)	128 (122–155)
Presentation day, n (%)	
Weekday	19 081 (72.7)
Weekend	7168 (27.3)
Arrival time, n (%)	
Day (08:00 to 20:00)	19 675 (74.9)
Night (20:00 to 08:00)	6574 (25.1)

indicate statistically significant differences between the curves. Subgroup analyses were performed as part of a post hoc exploratory approach to explore potential variability in the predictive accuracy across different patient populations. The subgroups included patients categorised by triage code (blue/green vs yellow/orange/red), age (≥65 years vs <65 years) and hospital disposition (hospitalised vs discharged). These analyses aimed to further evaluate predictive ability. 2×2 contingency tables were generated for dichotomised NEWS and NEWS-SBP, allowing for the calculation of sensitivity, specificity, positive predictive value (PPV) and negative predictive value, along with their respective 95% CI. NEWS and NEWS-SBP were divided into two groups based on classical cut-offs: patients with scores from 0 to 4 were classified as 'low-risk', while those with scores above 4 were considered 'moderate or high risk'.

Statistical testing was two-tailed and results were considered significant at p value<0.05. All analyses were performed using Stata V.16.1 (StataCorp, College Station, Texas, USA) and R V.4.3.3 (R Foundation for Statistical Computing, Vienna, Austria) statistical software, with the packages 'gtsummary' (V.2.0.4) and 'pROC' (V.1.18.5).

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, reporting or dissemination of this research.

RESULTS

Participants

During the study period, 66 801 patients accessed the ED. Of these, 39 563 were non-residents or referred to other ED facilities or fast-track units. Additionally, 989 patients were excluded due to incomplete or incorrect vital sign data, resulting in a study cohort of 26 249 patients.

Clinical characteristics are reported in detail in table 1. The median age of the cohort was 62 years (IQR: 43–78). Most patients were categorised as green codes (60.2%), followed by yellow (21.79%), orange (9.7%), blue (7.9%) and red (0.4%) (table 1).

Regarding arrival mode, 59.4% of patients self-presented, while 35.3% arrived via ambulance, and 5.3% required ambulance transport with a physician or helicopter. The majority of patients arrived during weekday shifts (72.7%), and 74.9% of arrivals occurred during the daytime (08:00 to 20:00) (table 1).

Vital sign distribution showed a median heart rate of 83 beats per minute (IQR: 72–95), a respiratory rate of 16 breaths per minute (IQR: 15–18), an oxygen saturation of 98% (IQR: 97–99) and a temperature of 36.3°C (IQR: 36.0–36.7) (table 2). The median systolic blood pressure was 128 mm Hg (IQR: 122–155).

Both the median NEWS and NEWS-SBP scores were 1 (IQR: 0–2). Most patients had a normal AVPU score (91.9%), and 98.7% did not require supplemental oxygen at presentation. Mortality rates were 0.5% (122/26 249) within 48 hours, 1% (265/26 249) within 7 days and 2.4% (643/26 249) within 30 days (table 2).

AUROC comparisons

The Harrell's C-index for 48-hour mortality was 0.885 for NEWS and 0.891 for NEWS-SBP, indicating a high level of agreement between predicted probabilities and observed outcomes, with no significant difference in AUROCs between the two scores: (NEWS AUROC: 0.89, 95% CI: 0.85 to 0.92 vs NEWS-SBP AUROC 0.88, 95% CI: 0.85 to 0.91; p=0.139; figure 1A). However, for 7-day mortality, NEWS significantly outperformed NEWS-SBP (AUROC: 0.84, 95% CI: 0.81 to 0.87 vs 0.83, 95% CI: 0.80 to 0.86; p=0.012; figure 1B) and 30-day

Table 2 Distribution of vital signs in the study population based on National Early Warning Score categories

	3	2	1	0	1	2	3
Parameter, n (%)							
Any supplemental oxygen	–	–	–	25 917 (98.7)	–	332 (1.3)	–
AVPU score	–	–	–	24 115 (91.9)	–	–	2134 (8.1)
Heart rate	–	57 (0.2)	232 (0.9)	18 030 (68.7)	6290 (24.0)	1218 (4.6)	422 (1.6)
Oxygen saturation	791 (3.0)	758 (2.9)	2101 (8.0)	22 599 (86.1)	–	–	–
Respiratory rate	–	24 (0.1)	162 (0.6)	23 667 (90.2)	1264 (4.8)	1132 (4.3)	–
Systolic blood pressure	352 (1.3)	706 (2.7)	1120 (4.3)	23 985 (91.4)	86 (0.3)	–	–
Temperature	–	311 (1.2)	8825 (33.6)	16 291 (62.0)	677 (2.6)	145 (0.6)	–

AVPU, Alert, Verbal, Pain, Unresponsive.

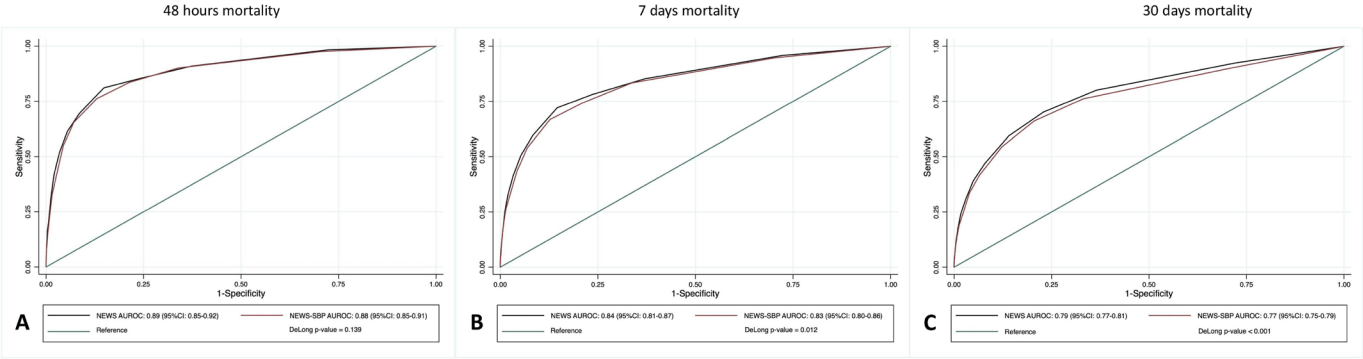

Figure 1 Comparison of predictive abilities of NEWS and NEWS-SBP for 48-hour, 7-day and 30-day mortality. AUROC, area under the receiver operating curve; NEWS, National Early Warning Score; NEWS-SBP, NEWS without SBP.

mortality (AUROC: 0.79, 95% CI: 0.77 to 0.81 vs 0.77, 95% CI: 0.75 to 0.79; p<0.001; figure 1C).

Subgroup analysis

In post hoc analyses, NEWS outperformed NEWS-SBP across all triage categories (table 3). For 48-hour mortality, NEWS showed better predictive accuracy in blue and green code patients (AUROC: 0.86, 95% CI: 0.75 to 0.98 vs NEWS-SBP AUROC: 0.78, 95% CI: 0.61 to 0.95; p=0.049). For higher acuity patients (yellow, orange and red codes), NEWS also showed a higher, but not statistically significant, predictive accuracy compared with NEWS-SBP (AUROC: 0.83, 95% CI: 0.79 to 0.86 vs NEWS-SBP AUROC: 0.82, 95% CI: 0.79 to 0.86; p=0.471).

For 7-day mortality, NEWS was slightly, but significantly better than NEWS-SBP in yellow, orange and red categories (AUROC: 0.80, 95% CI: 0.77 to 0.83 vs 0.79, 95% CI: 0.76 to 0.82; p=0.047). Among patients aged 65 and older, NEWS demonstrated higher accuracy for predicting mortality at 7 and 30 days (AUROC: 0.81, 95% CI: 0.78 to 0.84 for 7 day; AUROC: 0.75, 95% CI: 0.73 to 0.78 for 30-day) compared with NEWS-SBP (AUROC: 0.80, 95% CI: 0.77 to 0.83 for 7 day; AUROC: 0.74, 95% CI: 0.72 to 0.76 for 30-day; p<0.001). No significant difference was observed for 48-hour mortality (p=0.088).

For 30-day mortality, NEWS consistently outperformed NEWS-SBP, with a statistically significant advantage in hospitalised patients (AUROC: 0.73, 95% CI: 0.70 to 0.75 vs 0.71, 95% CI: 0.69 to 0.74; p<0.001), whereas the difference among discharged patients was not statistically significant (p=0.100; table 3).

For 48-hour mortality, NEWS demonstrated higher sensitivity (69.7% vs 65.6%), while NEWS-SBP showed improved specificity (92.9% vs 91.4%) and a higher PPV (4.1% vs 3.6%) (table 4). A similar pattern was observed for 7-day mortality, where NEWS-SBP had slightly lower sensitivity (53.9% vs 59.6%) but greater specificity (93.1% vs 91.7%) and PPV (7.4% vs 6.8%). For 30-day mortality, NEWS-SBP maintained a higher specificity (93.5% vs 92.1%) and PPV (13.8% vs 12.9%), although at the cost of reduced sensitivity (41.7% vs 46.9%; table 4).

Table 3 AUROC of NEWS and NEWS-SPB for 48-hour, 7-day and 30-day mortality according to patient characteristics

Group of patients	NEWS	NEWS-SBP	P value
48-hour mortality			
Blue and green	0.86 (0.75 to 0.98)	0.78 (0.61 to 0.95)	0.049
Yellow, orange and red	0.83 (0.79 to 0.87)	0.82 (0.79 to 0.86)	0.471
≥65 years of age	0.86 (0.83 to 0.90)	0.86 (0.82 to 0.89)	0.088
<65 years of age	0.81 (0.64 to 0.99)	0.82 (0.66 to 0.99)	0.077
Hospitalised patients	0.83 (0.79 to 0.87)	0.82 (0.78 to 0.86)	0.095
Discharged patients	0.77 (0.66 to 0.87)	0.76 (0.66 to 0.87)	0.691
7-day mortality			
Blue and green	0.76 (0.69 to 0.84)	0.73 (0.65 to 0.81)	0.072
Yellow, orange and red	0.80 (0.77 to 0.83)	0.79 (0.76 to 0.82)	0.047
≥65 years of age	0.81 (0.78 to 0.84)	0.80 (0.77 to 0.83)	0.020
<65 years of age	0.84 (0.76 to 0.93)	0.81 (0.71 to 0.91)	0.212
Hospitalised patients	0.78 (0.75 to 0.81)	0.77 (0.74 to 0.80)	0.015
Discharged patients	0.73 (0.66 to 0.80)	0.72 (0.65 to 0.79)	0.477
30-day mortality			
Blue and green	0.68 (0.64 to 0.73)	0.64 (0.60 to 0.69)	0.001
Yellow, orange and red	0.76 (0.74 to 0.78)	0.75 (0.72 to 0.77)	0.002
≥65 years of age	0.75 (0.73 to 0.78)	0.74 (0.72 to 0.76)	<0.001
<65 years of age	0.84 (0.79 to 0.89)	0.81 (0.74 to 0.87)	0.105
Hospitalised patients	0.73 (0.70 to 0.75)	0.71 (0.69 to 0.74)	<0.001
Discharged patients	0.71 (0.67 to 0.75)	0.70 (0.66 to 0.74)	0.100

AUROC, area under the receiver operating curve; NEWS, National Early Warning Score; NEWS-SBP, NEWS without systolic blood pressure.

DISCUSSION

This study evaluated the impact of excluding SBP from the NEWS in prediction of mortality, in an effort to simplify vital sign collection during triage. We found that removing SBP significantly reduced the predictive performance of NEWS at 7 and 30 days, although the two scores were equivalent at 48 hours.

Although the results were derived from a sizable patient cohort, the low mortality rate within 48 hours may have limited the ability of both NEWS and NEWS-SBP to effectively distinguish between patients at varying risk levels. The scarcity of outcome events within 48 hours could have reduced the predictive power, making it more challenging to determine which scoring system is better at identifying patients at risk for short-term mortality. Nevertheless, this endpoint aligns with prior ED studies using assessment tools such as NEWS and NEWS-2.[12–14] Hence, the observed low mortality rate in our study aligns with prior investigations that reported similarly low event rates (<5%), ensuring comparability with the present findings.[4 12–14]

Our findings highlight the importance of standardised vital sign collection in identifying patients at risk of adverse events. Although predicting mortality at 7 or 30 days is not the primary goal of vital sign collection in the ED, it has been shown that

Table 4 2×2 contingency tables for all study outcomes for NEWS and NEWS-SBP

	48-hour mortality			48-hour mortality	
	No	Yes		No	Yes
NEWS 0–4	23 888	37	**NEWS-SBP 0–4**	24 267	42
NEWS≥5	2239	85	**NEWS-SBP≥5**	1860	80
Sensitivity: 69.7% (69.1–70.2)			Sensitivity: 65.6% (65.0–66.1)		
Specificity: 91.4% (91.1–91.8)			Specificity: 92.9% (92.6–93.2)		
PPV: 3.6% (3.4–3.9)			PPV: 4.1% (3.9–4.3)		
NPV: 99.8% (99.8–99.9)			NPV: 99.8% (99.8–99.9)		
	7-day mortality			**7-day mortality**	
	No	Yes		No	Yes
NEWS 0–4	23 818	107	**NEWS-SBP 0–4**	24 187	122
NEWS≥5	2166	158	**NEWS-SBP≥5**	1797	143
Sensitivity: 59.6% (59.0–60.2)			Sensitivity: 53.9% (53.4–54.6)		
Specificity: 91.7% (91.3–92.0)			Specificity: 93.1% (92.8–93.4)		
PPV: 6.8% (6.5–7.1)			PPV: 7.4% (7.0–7.7)		
NPV: 99.5% (99.5–99.6)			NPV: 99.5% (99.4–99.6)		
	30-day mortality			**30-day mortality**	
	No	Yes		No	Yes
NEWS 0–4	23 584	341	**NEWS-SBP 0–4**	23 934	375
NEWS≥5	2022	302	**NEWS-SBP≥5**	1672	268
Sensitivity: 46.9% (46.3–47.6)			Sensitivity: 41.7% (41.1–42.3)		
Specificity: 92.1% (91.8–92.4)			Specificity: 93.5% (93.2–93.8)		
PPV: 12.9% (12.6–13.4)			PPV: 13.8% (13.4–14.2)		
NPV: 98.6% (98.4–98.7)			NPV: 98.5% (98.3–98.6)		

The cut-off used to categorise NEWS and NEWS-SBP follows international indications, where scores from 0 to 4 classify the patient as non-urgent, and scores of 5 and above classify the patient as urgent.
NEWS, National Early Warning Score; NEWS-SBP, NEWS without systolic blood pressure; NPV, negative predictive value; PPV, positive predictive value.

NEWS calculated based on triage data can be predictive of deterioration.[4 5] This could enhance risk stratification and improve the efficiency of triage processes, ensuring that patients receive the appropriate level of care during their hospital stay, based on their individual risk profiles.[12 14]

Our results confirm that removing SBP from NEWS can negatively impact its performance across diverse patient categories. While this study explored an innovative approach to simplify triage assessments, the loss of prognostic accuracy underscores the critical role of SBP in predicting adverse outcomes. In subgroup analyses, NEWS consistently outperformed NEWS-SBP across all triage categories. The most significant differences were observed in blue and green codes for 48-hour mortality, where NEWS showed superior predictive accuracy (AUROC: 0.86 vs 0.78; p=0.049). Similarly, among patients aged ≥65 years, NEWS demonstrated better accuracy at predicting 7-day and 30-day mortality (p=0.020 and p<0.001, respectively). For hospitalised patients, NEWS maintained a predictive advantage for 30-day mortality (AUROC: 0.73 vs 0.71; p<0.001), while differences among discharged patients were not statistically significant. These findings highlight the importance of SBP in risk stratification, particularly in vulnerable populations.

Although the role of SBP in predicting severe conditions like cardiovascular emergencies, sepsis and trauma is well established, its specific impact on NEWS performance in the triage setting remained uncertain.[4 5] Our study aimed to quantify this effect and determine whether NEWS could maintain acceptable predictive accuracy even without SBP. The results confirm that SBP plays a critical role in maintaining the prognostic performance of NEWS, particularly in certain patient subgroups.

Future approaches could integrate machine learning to enhance triage assessment. A study on machine learning in triage showed that e-triage outperforms the Emergency Severity Index in patient stratification.[15] Within e-triage, vital signs are dynamically selected based on patient-specific characteristics using the random forest technique, rather than applying a fixed set of measurements to all patients.[15 16] This contrasts with the more static approach of traditional scores like NEWS, which require the same parameters for every patient regardless of individual risk factors. This alternative presents a more practical solution than refining a static score such as NEWS.[15 16]

Although SBP is well recognised as a strong predictor for cardiovascular and infectious conditions, its specific contribution to the prognostic accuracy of NEWS in the triage setting had not been fully quantified.[12 17 18] Given the need for rapid decision-making in triage, our study aimed to evaluate whether omitting SBP could streamline patient assessment without significantly compromising predictive accuracy.[12 17–19] The findings confirm that while SBP enhances NEWS performance, its exclusion might be considered in scenarios where speed is a priority, although with a trade-off in risk stratification.

Our study has a few limitations. It was conducted at a single centre, limiting the generalisability of the findings. However, the substantial number of patients bolsters the significance of the results. Additionally, the cohort included patients with relatively low acuity, which likely contributed to the observed low mortality rates and may not accurately represent patient populations in other EDs with different acuity levels; however, no specific patient selection was performed, ensuring that the data reflect routine clinical practice at our ED.

We also used mortality at 48 hours, 7 days and 30 days as clinical outcomes. While these are not ideal endpoints, they were chosen to maintain consistency with previous studies.[13] We acknowledge that these outcomes involve a small subset of patients and may be influenced by various other factors. However, we deliberately chose not to use hospitalisation as a primary outcome, as it is heavily influenced by numerous variables, including the clinician's decision, the patient's chronic conditions or the severity of the acute event that cannot be managed at home. We emphasise the need for further studies to evaluate alternative outcomes that better reflect the complexity of ED patients.

CONCLUSIONS

The study highlights potential concerns regarding the removal of SBP from NEWS in triage settings, particularly its impact on the accurate stratification of patients at risk of medium-term mortality. However, further evidence and better-defined outcomes are needed to determine whether this approach is both practical and effective. Additionally, future research should assess whether the time saved by omitting SBP measurement during triage provides a meaningful advantage without compromising patient care.

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Contributors AZ is responsible for the overall content (as guarantor). AZ: Conceptualisation, Methodology, Investigation, Formal analysis. FB: Supervision, Writing—Original draft preparation. GB: Formal analysis. SS: Writing—Original draft preparation. MP: Supervision. NP: Supervision, Resources. GT: Conceptualisation, Methodology.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The study was conducted in accordance with local ethics committees (Ethics Committee for Clinical Research, South Tyrol Health Authority, Bolzano, Italy, approval number 84-2022) and was conducted according to the Declaration of Helsinki principles for ethical medical research involving human subjects. As the study was based on an internal clinical improvement project, patients were not informed about the study. Additionally, since anonymised data were extracted from the ED database, no written informed consent was required. This approach ensured compliance with ethical guidelines while preserving patient confidentiality.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. Data available on request due to privacy/ethical restrictions.

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