

KRITİK HASTADA ERKEN UYARI SKORLARININ KULLANILMASI

Dr Sibel Temür

Yeditepe Üniversitesi Tıp Fakültesi
Anesteziyoloji ve Reanimasyon A.D.

- ▶ Kritik hastalarda erken uyarı skorları, hastanın durumunu hızlı şekilde deęerlendirmek ve olası komplikasyonları önceden belirlemek amacıyla kullanılan önemli bir yöntemdir:

Belirli belirti ve parametreler izlenerek hastanın durumu hakkında bilgi sağlanır

Saęlık profesyonellerine zamanında müdahale imkanı sağlar

Hastanın durumu daha iyi yönetilir, olası komplikasyonların önüne geçilebilir.

- ▶ EUS, hastaların takibini ve deęerlendirilmesini iyileştirerek saęlık hizmetlerinin kalitesini artırabilir

Recommendations 2021	Recommendation Strength and Quality of Evidence	Changes From 2016 Recommendations
1. For hospitals and health systems, we recommend using a performance improvement program for sepsis, including sepsis screening for acutely ill, high-risk patients and standard operating procedures for treatment.	Strong , moderate-quality evidence (for screening) Strong , very low-quality evidence (for standard operating procedures)	Changed from Best practice statement "We recommend that hospitals and hospital systems have a performance improvement program for sepsis including sepsis screening for acutely ill, high-risk patients."
2. We recommend against using qSOFA compared with SIRS, NEWS, or MEWS as a single-screening tool for sepsis or septic shock.	Strong , moderate-quality evidence	NEW
3. For adults suspected of having sepsis, we suggest measuring blood lactate.	Weak , low quality of evidence	



SIRS criteria (two or more)	qSOFA criteria (two or more)
36 > Temperature > 38	Systolic blood pressure < 100 mmHg
Respiratory rate > 22/min	Respiratory rate > 20/min
Heart rate > 90 bpm	Glasgow Coma Scale ≤ 14
4000 > White cell count > 12,000	

SIRS: Systemic Inflammatory Response Score; qSOFA: quick Sequential Organ Failure Assessment.

MEWS & NEWS

Modified Early Warning Score

Score	3	2	1	0	1	2	3
Respiratory rate (min^{-1})		≤ 8		9-14	15-20	21-29	> 29
Heart rate (min^{-1})		≤ 40	41-50	51-100	101-110	111-129	> 129
Systolic BP (mmHg)	≤ 70	71-80	81-100	101-199		≥ 200	
Urine output (ml/kg/h)	Nil	< 0.5					
Temperature ($^{\circ}\text{C}$)		≤ 35	35.1-36	36.1-38	38.1-38.5	≥ 38.6	
Neurological				Alert	Reacting to voice	Reacting to pain	Unresponsive

Chart 1: National Early Warning Score (NEWS)*

PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration Rate	≤ 8		9 - 11	12 - 20		21 - 24	≥ 25
Oxygen Saturations	≤ 91	92 - 93	94 - 95	≥ 96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤ 35.0		35.1 - 36.0	36.1 - 38.0	38.1 - 39.0	≥ 39.1	
Systolic BP	≤ 90	91 - 100	101 - 110	111 - 219			≥ 220
Heart Rate	≤ 40		41 - 50	51 - 90	91 - 110	111 - 130	≥ 131
Level of Consciousness				A			V, P, or U

*The NEWS initiative flowed from the Royal College of Physicians' NEWSDIG, and was jointly developed and funded in collaboration with the Royal College of Physicians, Royal College of Nursing, National Outreach Forum and NHS Training for Innovation.

Table 1. The adapted NEWS tool

Element	Score						
	3	2	1	0	1	2	3
Respiratory rate	≤8		9-11	12-20		21-24	≥25
SpO ₂	≤91	92-93	94-95	≥96			
Oxygen		Yes		No			
Systolic blood pressure	≤90	91-100	101-110	111-219			≥220
Pulse	≤40		41-50	51-90	91-110	111-130	≥131
ACVPU				A			C,V,P,U
Temperature, °C	≤35.0		35.1-36.0	36.1-38.0	38.1-39.0	≥39.1	

Score ≥3: discuss with duty nurse or senior colleague; score ≥6: immediate discussion with ACT advanced practitioner or ACT doctor. Concern about patient or difficulty obtaining any single parameter should lead to escalation regardless of score.

Complete a sepsis screen on all patients with NEWS ≥3 with signs of infection.

ACT = acute clinical team; ACVPU = Alert, Confusion, Voice, Pain, Unresponsive; SPO₂ = peripheral capillary oxygen saturation; NEWS = National Early Warning Score.

SATÜRASYON SKALA 1	296													0
	94-95													1
	92-93													2
	591													3
SATÜRASYON SKALA 2 (KOAİ Tanısı Alan Hastaların SPO ₂ Değerlendirmesinde Kullanılır)	297 O ₂ Desteđiyle													3
	95-96 O ₂ Desteđiyle													2
	93-94 O ₂ Desteđiyle													1
	293 Oda Havaşında													0
	88-92													0
	86-87													1
	84-85													2
	583													3
ODA HAVASI/O ₂ DESTEĐİ	OH=ODA HAVASI													0
	O ₂ L/DAK													2
	OH ₂													0
(N=Nazal M=Maske H=Hazneli Maske C=CPAP NIV=Non İnvaziv Ventilatör D=Diđer İse belirtin)														

NEWS 0-2

NEWS 0-2 This score indicates the Patient is at LOW RISK

Follow organisational NEWS protocol. Consider:

- if the patient is safe to be left at home and/or
- safe to be reviewed in 4-12 hrs with safety netting
- Or if clinically appropriate, referral

NEWS 3-4

NEWS 3-4 This score indicates the Patient is at LOW RISK BUT may require secondary care assessment

Follow organisational NEWS protocol. Consider:

- Early repeat observations until NEWS improves
- Prompt Clinical review & based on judgement:
 - Hospital admission **or**
 - Planned review in 4-12 hours with open self-referral if deterioration.

*NB. knowledge of previous observations (within last 6 mths) is very important as some patients normally 'run' a low BP or hypoxia.

NEWS ≥ 5

OR Concerning Features
(see box)

NEWS ≥ 5 Patient is at MEDIUM RISK

Pt's physiological parameters indicates systemic distress & organ dysfunction
OR Concerning clinical features are present (see box)

- It is Likely that **Urgent** (1hr) hospital assessment will be required based on Clinical judgement
- Consider any existing **End of Life Care Plan / Advanced Directive**

NEWS ≥ 7

NEWS ≥ 7 Patient is at HIGH RISK Severe systemic distress likely

999 escalation with continuous monitoring until transfer

Any concerning clinical features?

- High Risk Patient (*see box)
- New Confusion
- Worry (Dr/Nurse/Pt/Carer)
- Significant Pain
- Single NEWS parameter of 3
- Mottled / ashen / cyanosis / new rash
- Not passed urine in 8 hrs
- Feeling short of breath

*High Risk Patient

- Age ≥ 75 years
- Immunosuppressed
- Chemotherapy
- IV Drug Abuse
- Surgery / Trauma <6/52
- Broken Skin
- Indwelling line / catheter in-situ
- Current / recent antibiotics

**Şüpheli enfeksiyon
varlığında NEWS ≥5 ise
SEPSİSİ DÜŞÜN!!!**



Comparison of Modified Early Warning Score (MEWS), Simplified Acute Physiology Score II (SAPS II), Sequential Organ Failure Assessment (SOFA), and Acute Physiology and Chronic Health Evaluation II (APACHE II) for early prediction of septic shock in diabetic patients in Emergency Departments

Wijitra Liengswangwong¹, Ranchana Siriwannabhorn¹, Sittichok Leela-Amornsin^{2*}, Chaiyaporn Yuksen¹, Pitsucha Sanguanwit¹, Chonthicha Duangsi¹, Nusara Kusonkhum¹ and Parntthap Saelim¹

Conclusion

SBP, SpO₂, GCS, pH, and lactate concentrations are crucial for the early prediction of septic shock in patients with diabetes. The SOFA score is a superior predictor for the onset of septic shock in patients with diabetes compared with MEWS, SAPS II, and APACHE II scores. Specifically, a cutoff of ≥ 6 in the SOFA score demonstrates high accuracy in predicting shock within 48 h post-ED visit and as early as 2 h after ED admission.

Original Investigation | Critical Care Medicine

Comparison of Early Warning Scoring Systems for Hospitalized Patients With and Without Infection at Risk for In-Hospital Mortality and Transfer to the Intensive Care Unit

Vincent X. Liu, MD, MS; Yun Lu, MD, MPH; Kyle A. Carey, MPH; Emily R. Gilbert, MD; Majid Afshar, MD, MSCR; Mary Akeel, MPH; Nirav S. Shah, MD, MPH; John Dolan, AA; Christopher Winslow, MD; Patricia Kipnis, PhD; Dana P. Edelson, MD, MS; Gabriel J. Escobar, MD; Matthew M. Churpek, MD, MPH, PhD

2006-2018, kohort design, 2020 CCM

773477 hasta Kaliforniya, 713786 hasta Illinois

NEWS, MEWS, BTF, qSOFA, SIRS

Hastanede mortalite, Yoğunbakıma transfer/mortalite

NEWS en etkin skorlama olarak gözlenmiş

Serious adverse events in a hospital using *early warning score* – What went wrong?☆



John Asger Petersen^{a,*}, Rebecca Mackel^a, Kristian Antonsen^b, Lars S. Rasmussen^c

^a Department of Anaesthesia and Intensive Care, Bispebjerg Hospital, University of Copenhagen, Bispebjerg Bakke 24, 2400 Copenhagen NV, Denmark

^b Board of Directors Bispebjerg Hospital, University of Copenhagen, Bispebjerg Bakke 24, 2400 Copenhagen NV, Denmark

^c Center of Head and Orthopedics, Rigshospitalet, University of Copenhagen, Blegdamsvej 9, 2100 Copenhagen Ø, Denmark

Erken uyarı skoru düşük olan hastada ani gelişen durumlarda hekimlerin müdahil olmasında sorun yaşanabildiğine dikkat çekiliyor.

Erken uyarı skoru kullanan hastanelerde bu konuda duyarlılık için vurgu yapılıyor

BMJ Open Early warning scores for detecting deterioration in adult hospital patients: a systematic review protocol

Stephen Gerry,¹ Jacqueline Birks,¹ Timothy Bonnici,² Peter J Watkinson,³ Shona Kirtley,⁴ Gary S Collins¹

Early warning scores for detecting deterioration in adult hospital patients: systematic review and critical appraisal of methodology

Stephen Gerry,¹ Timothy Bonnici,² Jacqueline Birks,^{1,3} Shona Kirtley,¹ Pradeep S Virdee,¹ Peter J Watkinson,⁴ Gary S Collins^{1,3}

13171 referans, 95 makale

Methodoloji, validasyon açısından zayıf

Öneriler; popülasyon analizleri, örnek sayıları, eksik data tanımı, uygun istatistiksel method kullanımı,

Belirli bir EUS önerisi yok.

EUS istatistiksel verilerden çok klinik konsensusa dayalı.



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Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation



Rapid response systems

Evaluating the performance of the National Early Warning Score in different diagnostic groups



Connor Price^{a,}, David Prytherch^a, Ina Kostakis^{a,b}, Jim Briggs^a*

Abstract

Background: The National Early Warning Score (NEWS) is used in hospitals across the UK to detect deterioration of patients within care pathways. It is used for most patients, but there are relatively few studies validating its performance in groups of patients with specific conditions.

Methods: The performance of NEWS was evaluated against 36 other Early Warning Scores, in 123 patient groups, through use of the area under the receiver operating characteristic (AUROC) curve technique, to compare the abilities of each Early Warning Score to discriminate an outcome within 24hrs of vital sign recording. Outcomes evaluated were death, ICU admission, or a combined outcome of either death or ICU admission within 24 hours of an observation set.

Results: The National Early Warning Score 2 performs either best or joint best within 120 of the 123 patient groups evaluated and is only outperformed in prediction of unanticipated ICU admission. When outperformed by other Early Warning Scores in the remaining 3 patient groups, the performance difference was marginal.

Conclusions: Consistently high performance indicates that NEWS is a suitable early warning score to use for all diagnostic groups considered by this analysis, and patients are not disadvantaged through use of NEWS in comparison to any of the other evaluated Early Warning Scores.

Keywords: Adverse events, Early warning scores, Intensive care unit admission, Mortality, Rapid response systems

A Systematic Review: Early Warning System for Hospital Wards

Priyo Sasmito^{1*}, Salim Aljufri², Leli Mulyati³, Dina Rasmita⁴, Yetti Syafridawita⁵, Elina Deviana⁶, Elis Komariah⁷, Sri Wahyuni Gayatri⁸, Nisa Arifani⁹

Table 2. EWS parameter specification

Early Warning Systems	Parameter Specification										Tech. added	
	RR	SpO2	BT	HR	AVPU	SBP	DBP	O2 +	CVPU	Lab		Clin
NEWS	√	√	√	√	√	√						No
NEWS 2/Compass/NHS NEWS	√	√	√	√	√	√		√	√			No
I-EWS	√	√	√	√	√	√					√	No
MEWS	√	√	√	√	√	√	√				√	No
CT MEWS	√	√	√	√	√	√	√			√	√	No
MEWS+Cont VS	√	√	√	√	√	√	√	√				Yes
DEWS	√		√	√	√	√	√				√	Yes
DI + BTF	√	√		√	√	√	√	√		√		Yes
CRT + EWS (10 SOV)	√	√	√	√	√	√	√			√	√	No

Abbreviations: EWS, Early Warning Systems; NEWS, National Early Warning Score; MEWS, Modified Early Warning Score; CT MEWS, Cape Town Modified Early Warning Score; Cont VS, Continuous Vital Sign; I-EWS, Individual Early Warning Score; DEWS, Deep-learning Early Warning Score; DI, Deterioration Index; BTF, Between the Flag; CRT, Capillary Refill Time; 10 SOV, 10 Signs of Vitality; RR, Respiratory Rate; SpO2, Oxygen saturation; BT, Body Temperature; HR, Heart Rate; AVPU, Alert/Voice/Pain/Unresponsive; SBP, Systolic Blood Pressure; DBP, Diastolic Blood Pressure; O2 +, supplementary oxygen; CVPU, new confusion/Voice/Pain/Unresponsive; UO, urine output; Hb, Hemoglobin; WBC, White Blood Count; Ur, Urea; Cr, Creatinin; EMR, Electronic Medical Record; AI, Artificial Intelligence. The yellow color indicates the original parameter used in EWS.

Table 3. Summarize of various EWS performances

EWS	Mortality	Unplanned ICU admission	RRS activation	IHCA	LOS	Protocol compliance	Freq. of measurement
NEWS	Good predict	Good predict	N/A	Poor predict	N/A	N/A	Not reduced
NEWS 2/ NHS NEWS	Good predict	Good predict	N/A	Poor predict	N/A	N/A	Not reduced
I-EWS	Good predict	Good predict	N/A	Poor predict	N/A	N/A	Reduced
MEWS	Fairly	Fairly	N/A	Weak	Not reduced	Poor	N/A
CT MEWS	Fairly	Fairly	N/A	Weak	Not reduced	Good	Not reduced
MEWS + Cont. VS	Reduced	Reduced	Reduced	Weak	Not reduced	Good	Reduced
DEWS	Good predict	N/A	Reduced	Good predict	N/A	Good	Reduced
DI + BTF	Reduced	Reduced	N/A	N/A	Reduced	Good	N/A
CRT + EWS (10 SOV)	Good predict	Good predict	N/A	N/A	Reduced	Poor	Not Reduced

RESEARCH

Open Access

Dynamic early warning scores for predicting clinical deterioration in patients with respiratory disease



Sherif Gonem^{1,2*}, Adam Taylor³, Graziela Figueredo^{3,4}, Sarah Forster², Philip Quinlan³, Jonathan M. Garibaldi⁴, Tricia M. McKeever² and Dominick Shaw^{1,2}

Background: The National Early Warning Score-2 (NEWS-2) is used to detect patient deterioration in UK hospitals but fails to take account of the detailed granularity or temporal trends in clinical observations. We used data-driven methods to develop dynamic early warning scores (DEWS) to address these deficiencies, and tested their accuracy in patients with respiratory disease for predicting (1) death or intensive care unit admission, occurring within 24 h (D/ICU), and (2) clinically significant deterioration requiring urgent intervention, occurring within 4 h (CSD).

Methods: Clinical observations data were extracted from electronic records for 31,590 respiratory in-patient episodes from April 2015 to December 2020 at a large acute NHS Trust. The timing of D/ICU was extracted for all episodes. 1100 in-patient episodes were annotated manually to record the timing of CSD, defined as a specific event requiring a change in treatment. Time series features were entered into logistic regression models to derive DEWS for each of the clinical outcomes. Area under the receiver operating characteristic curve (AUROC) was the primary measure of model accuracy.

Results: AUROC (95% confidence interval) for predicting D/ICU was 0.857 (0.852–0.862) for NEWS-2 and 0.906 (0.899–0.914) for DEWS in the validation data. AUROC for predicting CSD was 0.829 (0.817–0.842) for NEWS-2 and 0.877 (0.862–0.892) for DEWS. NEWS-2 ≥ 5 had sensitivity of 88.2% and specificity of 54.2% for predicting CSD, while DEWS ≥ 0.021 had higher sensitivity of 93.6% and approximately the same specificity of 54.3% for the same outcome. Using these cut-offs, 315 out of 347 (90.8%) CSD events were detected by both NEWS-2 and DEWS, at the time of the event or within the previous 4 h; 12 (3.5%) were detected by DEWS but not by NEWS-2, while 4 (1.2%) were detected by NEWS-2 but not by DEWS; 16 (4.6%) were not detected by either scoring system.

Conclusion: We have developed DEWS that display greater accuracy than NEWS-2 for predicting clinical deterioration events in patients with respiratory disease. Prospective validation studies are required to assess whether DEWS can be used to reduce missed deteriorations and false alarms in real-life clinical settings.

Original Investigation | Health Informatics

Early Warning Scores With and Without Artificial Intelligence

Dana P. Edelson, MD, MS; Matthew M. Churpek, MD, MPH, PhD; Kyle A. Carey, MPH; Zhenqi Lin, PhD; Chenxi Huang, PhD; Jonathan M. Siner, MD; Jennifer Johnson, MSN, APRN; Harlan M. Krumholz, MD, SM; Deborah J. Rhodes, MD

Table 2. AUROC for Identifying Intensive Care Unit Transfer or Death Within 24 Hours by Hospital Campus

Hospital campus	Encounters, No.	AUROC (95% CI)					
		MEWS	EDI	RI	NEWS	NEWS2	eCART
All	362 926	0.757 (0.750-0.764)	0.808 (0.802-0.812)	0.828 (0.823-0.834)	0.829 (0.824-0.835)	0.831 (0.826-0.836)	0.895 (0.891-0.900)
A	63 783	0.788 (0.773-0.800)	0.836 (0.824-0.847)	0.852 (0.842-0.863)	0.848 (0.837-0.861)	0.846 (0.837-0.861)	0.903 (0.895-0.912)
B	32 352	0.806 (0.786-0.827)	0.856 (0.838-0.872)	0.881 (0.869-0.897)	0.870 (0.853-0.888)	0.874 (0.862-0.892)	0.931 (0.919-0.945)
C	40 562	0.740 (0.722-0.754)	0.784 (0.771-0.797)	0.796 (0.783-0.807)	0.796 (0.783-0.807)	0.801 (0.789-0.816)	0.881 (0.871-0.891)
D	10 130	0.720 (0.696-0.752)	0.773 (0.741-0.795)	0.792 (0.770-0.813)	0.798 (0.775-0.822)	0.795 (0.769-0.817)	0.871 (0.850-0.888)
E	62 457	0.747 (0.723-0.765)	0.800 (0.783-0.818)	0.813 (0.795-0.829)	0.831 (0.815-0.851)	0.829 (0.813-0.846)	0.885 (0.872-0.898)
F	10 944	0.736 (0.716-0.752)	0.727 (0.710-0.742)	0.746 (0.729-0.763)	0.784 (0.768-0.801)	0.780 (0.763-0.797)	0.866 (0.853-0.882)
G	142 698	0.744 (0.730-0.755)	0.814 (0.806-0.823)	0.834 (0.828-0.843)	0.828 (0.816-0.838)	0.831 (0.822-0.841)	0.894 (0.887-0.902)

NEWS 0-2

NEWS 0-2 This score indicates the Patient is at LOW RISK

Follow organisational NEWS protocol. Consider:

- if the patient is safe to be left at home and/or
- safe to be reviewed in 4-12 hrs with safety netting
- Or if clinically appropriate, referral

NEWS 3-4

NEWS 3-4 This score indicates the Patient is at LOW RISK BUT may require secondary care assessment

Follow organisational NEWS protocol. Consider:

- Early repeat observations until NEWS improves
- Prompt Clinical review & based on judgement:
 - Hospital admission **or**
 - Planned review in 4-12 hours with open self-referral if deterioration.

*NB. knowledge of previous observations (within last 6 mths) is very important as some patients normally 'run' a low BP or hypoxia.

NEWS ≥ 5

OR Concerning Features
(see box)

NEWS ≥ 5 Patient is at MEDIUM RISK

Pt's physiological parameters indicates systemic distress & organ dysfunction
OR Concerning clinical features are present (see box)

- It is Likely that **Urgent** (1hr) hospital assessment will be required based on Clinical judgement
- Consider any existing **End of Life Care Plan / Advanced Directive**

NEWS ≥ 7

NEWS ≥ 7 Patient is at HIGH RISK Severe systemic distress likely

999 escalation with continuous monitoring until transfer

Any concerning clinical features?

- High Risk Patient (*see box)
- New Confusion
- Worry (Dr/Nurse/Pt/Carer)
- Significant Pain
- Single NEWS parameter of 3
- Mottled / ashen / cyanosis / new rash
- Not passed urine in 8 hrs
- Feeling short of breath

*High Risk Patient

- Age ≥ 75 years
- Immunosuppressed
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- IV Drug Abuse
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- Broken Skin
- Indwelling line / catheter in-situ
- Current / recent antibiotics

**Şüpheli enfeksiyon
varlığında NEWS ≥5 ise
SEPSİSİ DÜŞÜN!!!**