



Early Warning Scoring - A digital solution in this digital age: subject reading

Evidence and Evaluation for Improvement Team
(EEvIT)
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This is a reading list to accompany the first SPSP Acute Adult - Deteriorating Patient Webinar Series on *Early Warning Scoring: A digital solution in this digital age*. A search of key biomedical databases on the subject found 41 publications. The citation and full-text links for these publications are listed below in reverse chronological order (newest first).

References

- Albutt A, O'Hara J, Conner M, Lawton R. [Can Routinely Collected, Patient-Reported Wellness Predict National Early Warning Scores? A Multilevel Modeling Approach](#). Journal of patient safety. 2020.
- Mau KA, Fink S, Hicks B, Brookhouse A, Flannery AM, Siedlecki SL. [Advanced technology leads to earlier intervention for clinical deterioration on medical/surgical units](#). Applied nursing research : ANR. 2019;49:1-4.
- Lilly CM, Mickelson JT. [Evolution of the Intensive Care Unit Telemedicine Value Proposition](#). Critical care clinics. 2019;35(3):463-77.
- Lang A, Simmonds M, Pinchin J, Sharples S, Dunn L, Clarke S, *et al*. [The Impact of an Electronic Patient Bedside Observation and Handover System on Clinical Practice: Mixed-Methods Evaluation](#). JMIR medical informatics. 2019;7(1):e11678.
- Kramer AA, Sebat F, Lissauer M. [A Review of Early Warning Systems for Prompt Detection of Patients at Risk for Clinical Decline](#). The journal of trauma and acute care surgery. 2019.
- Faisal M, Richardson D, Scally AJ, Howes R, Beatson K, Speed K, *et al*. [Computer-aided national early warning score to predict the risk of sepsis following emergency medical admission to hospital: A model development and external validation study](#). CMAJ. 2019;191(14):E380-E1.
- Escobar GJ, Gupta NR, Walsh EM, Soltesz L, Terry SM, Kipnis P. [Automated early detection of obstetric complications: theoretic and methodologic considerations](#). American journal of obstetrics and gynecology. 2019;220(4):297-307.
- Dyson J, Marsh C, Jackson N, Richardson D, Faisal M, Scally AJ, *et al*. [Understanding and applying practitioner and patient views on the implementation of a novel automated Computer-Aided Risk Score \(CARS\) predicting the risk of death following emergency medical admission to hospital: Qualitative study](#). BMJ Open. 2019;9(4):e026591.
- Delahanty RJ, Alvarez J, Flynn LM, Sherwin RL, Jones SS. [Development and Evaluation of a Machine Learning Model for the Early Identification of Patients at Risk for Sepsis](#). Annals of Emergency Medicine. 2019;73(4):334-44.
- Churpek MM, Carey KA, Dela Merced N, Prister J, Brofman J, Edelson DP. [Validation of Early Warning Scores at Two Long-Term Acute Care Hospitals](#). Critical Care Medicine. 2019;47(12):e962-e5.
- Bedoya AD, Clement ME, Phelan M, Steorts RC, O'Brien C, Goldstein BA. [Minimal Impact of Implemented Early Warning Score and Best Practice Alert for Patient Deterioration](#). Critical care medicine. 2019;47(1):49-55.
- Bartkowiak B, Snyder AM, Benjamin A, Schneider A, Twu NM, Churpek MM, *et al*. [Validating the Electronic Cardiac Arrest Risk Triage \(eCART\) Score for Risk Stratification of Surgical Inpatients in the Postoperative Setting: Retrospective Cohort Study](#). Annals of surgery. 2019;269(6):1059-63.

Arnold J, Davis A, Fischhoff B, Yecies E, Grace J, Klobuka A, *et al.* [Comparing the predictive ability of a commercial artificial intelligence early warning system with physician judgement for clinical deterioration in hospitalised general internal medicine patients: a prospective observational study.](#) *BMJ Open.* 2019;9(10):e032187.

Villegas N, Moore LJ. [Sepsis Screening: Current Evidence and Available Tools.](#) *Surgical Infections.* 2018;19(2):126-30.

Green M, Lander H, Snyder A, Hudson P, Churpek M, Edelson D. [Comparison of the Between the Flags calling criteria to the MEWS, NEWS and the electronic Cardiac Arrest Risk Triage \(eCART\) score for the identification of deteriorating ward patients.](#) *Resuscitation.* 2018;123:86-91.

Faisal M, Scally AJ, Jackson N, Richardson D, Beatson K, Howes R, *et al.* [Development and validation of a novel computer-aided score to predict the risk of in-hospital mortality for acutely ill medical admissions in two acute hospitals using their first electronically recorded blood test results and vital signs: A cross-sectional study.](#) *BMJ Open.* 2018;8(12):e022939.

Subbe CP, Duller B, Bellomo R. [Effect of an automated notification system for deteriorating ward patients on clinical outcomes.](#) *Critical Care.* 2017;21(1):52.

Staples S, Noel S, Watkinson P, Murphy MF. [Electronic recording of transfusion-related patient observations: a comparison of two bedside systems.](#) *Vox Sanguinis.* 2017;112(8):780-7.

Pullinger R, Wilson S, Way R, Santos M, Wong D, Clifton D, *et al.* [Implementing an electronic observation and early warning score chart in the emergency department: A feasibility study.](#) *European Journal of Emergency Medicine.* 2017;24(6):e11-e6.

Picker D, Dans M, Heard K, Bailey T, Chen Y, Lu C, *et al.* [A Randomized Trial of Palliative Care Discussions Linked to an Automated Early Warning System Alert.](#) *Critical care medicine.* 2017;45(2):234-40.

Parrish WM, Hravnak M, Dudjak L, Guttendorf J. [Impact of a Modified Early Warning Score on Rapid Response and Cardiopulmonary Arrest Calls in Telemetry and Medical-Surgical Units.](#) *Medsurg nursing.* 2017;26(1):15-9.

Churpek MM, Snyder A, Sokol S, Pettit NN, Edelson DP. [Investigating the Impact of Different Suspicion of Infection Criteria on the Accuracy of Quick Sepsis-Related Organ Failure Assessment, Systemic Inflammatory Response Syndrome, and Early Warning Scores.](#) *Critical care medicine.* 2017;45(11):1805-12.

Blankush JM, Freeman R, McIlvaine J, Tran T, Nassani S, Leitman IM. [Implementation of a novel postoperative monitoring system using automated Modified Early Warning Scores \(MEWS\) incorporating end-tidal capnography.](#) *Journal of clinical monitoring and computing.* 2017;31(5):1081-92.

Schwartz SM. [Can an automated early warning system derived from continuous physiologic monitoring prevent disaster?](#) *Journal of Thoracic and Cardiovascular Surgery.* 2016;152(1):3-4.

Kipnis P, Turk BJ, Wulf DA, LaGuardia JC, Liu V, Churpek MM, *et al.* [Development and validation of an electronic medical record-based alert score for detection of inpatient deterioration outside the ICU.](#) *Journal of biomedical informatics.* 2016;64:10-9.

Kang MA, Churpek MM, Zdravetz FJ, Adhikari R, Twu NM, Edelson DP. [Real-Time Risk Prediction on the Wards: A Feasibility Study.](#) *Critical care medicine.* 2016;44(8):1468-73.

Granich R, Sutton Z, Kim YS, Anderson M, Wood H, Scharf JE, *et al.* [Early detection of critical illness outside the intensive care unit: Clarifying treatment plans and honoring goals of care using a supportive care team.](#) *Journal of Hospital Medicine.* 2016;11(Supplement 1):S40-S7.

Dummett BA, Adams C, Scruth E, Liu V, Guo M, Escobar GJ. [Incorporating an Early Detection System Into Routine Clinical Practice in Two Community Hospitals.](#) *Journal of hospital medicine.* 2016;11 Suppl 1:S25-S31.

Schmidt PE, Meredith P, Prytherch DR, Watson D, Watson V, Killen RM, *et al.* [Impact of introducing an electronic physiological surveillance system on hospital mortality.](#) *BMJ Quality and Safety.* 2015;24(1):10-20.

Rose MA, Hanna LA, Nur SA, Johnson CM. [Utilization of electronic modified early warning score to engage rapid response team early in clinical deterioration.](#) *Journal for nurses in professional development.* 2015;31(3):E1-7.

Bates DW, Zimlichman E. [Finding patients before they crash: the next major opportunity to improve patient safety.](#) *BMJ Quality & Safety.* 2015;24(1):1.

- Taenzer AH, Pyke J, Herrick MD, Dodds TM, McGrath SP. [A comparison of oxygen saturation data in inpatients with low oxygen saturation using automated continuous monitoring and intermittent manual data charting](#). Anesthesia and Analgesia. 2014;118(2):326-31.
- Finlay GD, Rothman MJ, Smith RA. [Measuring the modified early warning score and the Rothman Index: Advantages of utilizing the electronic medical record in an early warning system](#). Journal of Hospital Medicine. 2014;9(2):116-9.
- Clare L. [Care at just a touch](#). Nursing standard. 2013;27(44):22-3.
- Bonnici T, Tarassenko L, Clifton DA, Watkinson P. [The digital patient](#). Clinical Medicine. 2013;13(3):252-7.
- Nwulu U, Westwood D, Edwards D, Kelliher F, Coleman JJ. [Adoption of an electronic observation chart with an integrated early warning scoring system on pilot wards: A descriptive report](#). CIN - Computers Informatics Nursing. 2012;30(7):371-9.
- Jones S, Mullally M, Ingleby S, Buist M, Bailey M, Eddleston JM. [Bedside electronic capture of clinical observations and automated clinical alerts to improve compliance with an Early Warning Score protocol](#). Crit Care Resusc. 2011;13(2):83-8.
- Albert BL, Huesman L. [Development of a modified early warning score using the electronic medical record](#). Dimensions of critical care nursing : DCCN. 2011;30(5):283-92.
- Prytherch DR, Smith GB, Schmidt PE, Featherstone PI. [ViEWS-Towards a national early warning score for detecting adult inpatient deterioration](#). Resuscitation. 2010;81(8):932-7.
- Preston R, Flynn D. [Observations in acute care: evidence-based approach to patient safety](#). British journal of nursing. 2010;19(7):442-7.
- Prytherch DR, Smith GB, Schmidt P, Featherstone PI, Stewart K, Knight D, *et al.* [Calculating early warning scores—A classroom comparison of pen and paper and hand-held computer methods](#). Resuscitation. 2006;70(2):173-8.