Improving Sepsis Screening by Using the NEWS2 Screening Tool: A Quality Improvement Initiative

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PROBLEM STATEMENT

• Sepsis is a major health problem in the United States. It is among the most expensive conditions treated in hospitals and a leading cause of death.

• The average length of stay for patients diagnosed with sepsis is 75% greater when compared to other health conditions and it increases with severity of sepsis.

• The timing of a sepsis diagnosis is critical and has been correlated with poor outcomes when treatment is delayed.

• Early recognition and management of sepsis through the use of a screening tool and care bundles is key to optimizing patient outcomes.

• In many institutions, the SIRS criteria is used as a means for identifying patients at risk for sepsis; this screening process places an emphasis on inflammation, which is non-specific and manifests in many health conditions.

• A screening tool based on SIRS criteria is outdated and with poor accuracy causing an influx of alerts, leading to alert fatigue and decrease compliance with completing the tool delaying initial treatment.

PROJECT PURPOSE

• The ultimate goal for this project is to provide safe, accurate, and efficient care to adult patients admitted into an acute care setting by implementing a screening tool proven to better identify patients at risk for sepsis and improve clinical outcomes.

• Evidence supports that the NEWS2 is a validated screening tool that uses six physiological parameters and generates a score to appropriately identify these patients at risk.

• The clinical question proposed was; among adult patients admitted to the hospital, does applying the NEWS2 screening tool for sepsis have a higher positive predictive value when compared to the current SIRS screening criteria?

MODEL/NURSING THEORY

• For this quality improvement initiative (QII), the Donabedian conceptual model was used because of its structure-process-outcome approach.

• The change model chosen to implement the proposed evidence-based practice was the Stetler model, which focuses on critical thinking, current evidence, and describes a step by step process to implementation.

METHODS

Subjects
• Sample size of 150 patients.
• The average age of the sample size was 59.3 years old; 58% were females and 42% were males. The leading race was white at 53%. The average BMI was 28.4 and 61% of the population had greater than 2 comorbidities.

Setting
• The project took place at an acute care facility in central Florida.
• The facility contains 295 inpatient beds with 10 adult inpatient units.

Tools
• For all newly admitted patients on admission and at 24 hours of admission, both a SIRS score and NEWS2 score were calculated manually.
• Patients who score 2 or greater using the SIRS criteria indicate they are at risk for sepsis.
• Patients who score 5 or greater using the NEWS2 criteria indicate they are at risk for sepsis.

Intervention and Data Collection
• Data was collected over 2 months.
• Both SIRS and NEWS2 scores were calculated on all newly admitted patients to a medical surgical/telemetry unit.
• For each patient, the age, gender, race, comorbidities, height and weight, and documented diagnosis in the chart were logged.
• 150 patients scores were collected and analyzed for sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy.

RESULTS

NEWS2 on Admission

Statistic	Value	95% CI
Sensitivity	95.65%	78.05% to 99.89%
Specificity	97.64%	93.25% to 99.51%
PPV	88.00%	70.49% to 95.75%
NPV	99.20%	94.80% to 99.88%
Accuracy	97.33%	93.31% to 99.27%

SIRS on Admission

Statistic	Value	95% CI
Sensitivity	78.26%	56.30% to 92.54%
Specificity	54.33%	45.26% to 63.19%
PPV	23.68%	18.89% to 29.25%
NPV	93.24%	86.21% to 96.82%
Accuracy	58.00%	49.68% to 66.00%

NEWS2 24 hours of Admission

Statistic	Value	95% CI
Sensitivity	47.83%	26.82% to 69.41%
Specificity	99.21%	95.69% to 99.98%
PPV	91.67%	59.86% to 98.78%
NPV	91.30%	87.65% to 93.95%
Accuracy	91.33%	85.64% to 95.30%

SIRS 24 hours of Admission

Statistic	Value	95% CI
Sensitivity	39.13%	19.71% to 61.46%
Specificity	76.38%	68.03% to 83.46%
PPV	23.08%	14.16% to 35.30%
NPV	87.39%	83.12% to 90.70%
Accuracy	70.67%	62.69% to 77.81%

DISCUSSION

• In this QII, the NEWS2 on admission and at 24 hours of admission proved to be superior in identifying patients with sepsis when compared to SIRS.

• Also it was found that the NEWS2 had a higher NPV in ruling out those patients without sepsis when compared to SIRS scoring.

• The low PPV seen in the SIRS score during this QII could contribute to decrease compliance of sepsis bundles and ultimately a delay in treatment.

• Key stake holders were receptive with the NEWS2 and are moving forward with further testing to adopt this screening tool into their practice to improve patient outcomes.

• Limitations of the QII included time frame, and generalizability of the population.

IMPLICATIONS FOR ADVANCED PRACTICE NURSING

• A sepsis screening process based on the SIRS criteria alone is outdated and proven ineffective to identify the patients at risk for sepsis.

• The evidence supports that the NEWS2 is a robust screening tool that can be used accurately to identify patients at risk for sepsis.

• With the use of the NEWS2 screening tool, it deploys the most current evidence-based practice to improve clinical outcomes.

SUSTAINABILITY

• Additional data collection is recommended to determine the NEWS2 effect on patient outcomes such as length of stay and mortality with sepsis.

• The proposed evidence-based practice change for the acute care facility is to implement the NEWS2 in lieu of the SIRS criteria for identifying patients at risk for sepsis.

REFERENCES
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The NEWS2 proved to be an *accurate* and *efficient* screening tool in identifying patients at risk for sepsis in an acute care setting.

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