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MEWS as a Triage Factor

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Background

- A new streamlined admission protocol was introduced in February of 2019 at Lehigh Valley Health Network using MEWS as the triage determiner of usage for this protocol.
- The new protocol allowed the Emergency Department to place the admission order for patients with a low-risk MEWS score of 0 to 1 and move the patients to the directly to the inpatient floors instead of the hospital medicine team.
- MEWS are composite scales which consider patients' vital signs, specifically respiratory rate (RR), oxygen saturation (SpO₂), temperature, blood pressure (BP), and heart rate (HR).
- Modified Early Warning Scoring (MEWS) is used widely throughout many different settings in the hospital as an objective measure to predict mortality and clinical deterioration.^{1,2,3}
- This scoring system is primarily used in the hospital setting to assess changes in a patients' clinical status over time and an increasing score is associated with the need for treatment escalation with the possibility of transfer to a higher level of service (low level telemetry, ICU).^{4,5}

Problem Statement

- This quality improvement project studied how implementation of a new streamlined admission order set using MEWS affected the rates of Rapid Response Team (RRT) calls and rates of "changes in status" for patients admitted through this protocol as compared to before protocol implementation.

Methods

- In a 'before and after' assessment, this project is a retrospective analysis of aggregate, de-identified data of patients admitted to LVHN-CC and LVHN-M from 1/1/2018 through 7/3/2019. The new protocol being evaluated was established on 2/19/2019.
- An existing Epic Team built QI database was utilized with data abstraction in accordance with Table 1. Inclusion criteria included patients between the ages of 18 and 84 years of age that presented the ED at LVHN-CC or LVHN-M and were subsequently admitted during the time period of 1/1/2018 through 7/3/2019. Analysis was done using general descriptive statistics in the form of frequencies and percentages.
- "Changes in status" is defined as any transfer of a patient to a higher or lower level of service.

Table 1 - Data Abstraction Template

Variable	Variable Type
MEWS score	Integer
Rapid Response Team Call	y/n
Transfer order/Change in status	y/n

Results

Table 2 – MEWS Scoring

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 (°C)		≤ 35	35.1-36	36.1-38	38.1-38.5	≥ 38.6	
Neurological			Alert	React to voice	React to pain	Unresponsive	

MEWS Scoring – Higher scores are associated with increased mortality, clinical deterioration, and need for treatment escalation to higher level of service.

Table 3 - Before and After Streamline Admission Protocol Implementation

	Before	After
Total Encounters	20431	7356
Number with MEWs (0-1)	12657	4583
Percent with MEWS (0-1)	61.90%	62.30%
Number with Transfers	3047	536
Percent with Transfers	14.91%	7.29%
Number with RRT	349	98
Percent with RRT	1.71%	1.33%
MEWS 0-1 Transfer Number	1601	267
MEWS 0-1 Transfer Percent	12.65%	5.83%
MEWS 0-1 RRT Number	159	38
MEWS 0-1 RRT Percent	1.26%	0.83%

Statistics – Comparison of before and after streamline protocol implementation. Number and percent of transfers and RRT is compared overall and in the subset of patients with MEWS 0-1.

Discussion

- There was a decrease in percent of transfers overall and in admissions that were done using the new streamlined admission protocol.
- There was also a decrease in the rate of RRT calls overall and in admissions that were done using the new streamlined admission protocol.
- A major limitation of this study is that it assumed 100% usage of the streamlined admission protocol by providers, assuming that all admissions with MEWS 0 or 1 were done using the new protocol.
- MEWS is a fluid, ever-changing score and scores used in this project were taken at the time of admission and this project did not take into account the possibility of large changes in MEWS prior to admission decision
- Patient demographics and diagnoses were not studied in this project and represent an opportunity for subset analysis.
- Future studies should investigate the variable of time throughout the admission process when using the streamlined admission protocol.
- As with all quality improvement projects, the monitoring of these trends should continue. It is possible that these trends may change over time, especially as providers become less conscientious and aware of ongoing study.
- This represents that Study portion of the PDSA cycle and demonstrates how system process changes can improve patient safety and healthcare quality.

Conclusion

- This quality improvement project was able to demonstrate that the usage of MEWS as a triage factor for admission protocols can reduce the rate of RRT calls and the rate of intra-hospital transfers.
- The project provides evidence that the use of MEWS as a triage factor can be safe and improve system efficiency and quality of care
- This study was limited in scope with respect to patient demographics and diagnoses and future studies should address this.
- Future study and observation of these same factors may produce fluctuations as providers adapt to a new protocol.

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