Innovative Technology to Improve Response to Early Signs of Clinical Deterioration

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Background

On busy medical/surgical units at a community hospital, nurses did not always recognize subtle signs of deterioration, resulting in missed opportunities for early intervention and stabilization.

Early warning systems (EWS) facilitate recognition of abnormal, physiological parameters in deteriorating patients, alerting to need for intervention and increasing the likelihood of preventing patient harm and improving outcomes.

Implementing an EWS addressed only one facet of a multifactorial problem that included:
- Delegation of vital signs to nursing assistants
- Timeliness of vital sign entry
- Lack of notification of abnormal vital signs
- Segregation of data in electronic medical record (EMR) making it difficult to visualize trends and data as whole

Purpose

Design an innovative IT workflow combining an EWS with EMR enhancements to improve recognition and response to early signs of clinical deterioration on medical/surgical units
- Utilize simple EWS (4 parameters: systolic BP, pulse, respiratory rate, SpO2)
- Display aggregated clinical data to providers without logging into the EMR
- Leverage real-time risk stratification using an EWS to drive clinical intervention
- Build operational tools to ensure early warning scores are acted on
- Utilize smartform technology to organize data in one location
- Capture data discretely for outcome / quality review

Reportable Outcomes

- 40% decrease in hours spent at higher acuity
- Increase in RRT calls; decrease in RRT events occurring within 1st 24 hours after admit
- 52% decrease in time to reassessment of vital signs following an acute change

Methods

Collaborative Approach

Medina Hospital
- Nursing Leadership
- Physician champions
- Clinical support
- Staff nurses

Cleveland Clinic Nursing Institute
- Nursing Quality
- Nursing Informatics
- Nursing Education

Cleveland Clinic Information Technology
- Clinical Solutions Center
- Clinical Systems Office
- Marketing

Project Goal
Utilize closed-loop workflow to leverage existing resources within EMR

Visible ↔ Actionable ↔ Reportable

Visible
- Pre-login screen to improve situational awareness and prioritization
- Report feature to aggregate key clinical data

Previous Pre-login Screen   New Pre-login Screen

EMR Report Feature

Actionable
- Intervention algorithm to encourage critical thinking and drive intervention
- Marked as Reviewed function to increase accountability for viewing vital signs and acting on changes

Intervention Algorithm

Marked as Reviewed Function

Pre/Post Implementation Patient Hours at Higher Acuity Levels (≥3)

2014
2015

Rapid Response Team Calls per 1000 Patient Days

	Q3	Q4	Q1	Q2	Q3
Event/1000 pt days	3.98	3.52	4.66	6.42	6.79
	2014		2015		

Clinical Implications

- Improved communication/collaboration
- Increased situational awareness - EWS scores considered when determining:
  – Admission level of care
  – Staffing and patient assignments
- Increased frequency of vital signs, reassessment and interventions for elevated EWS scores may prevent and/or reverse clinical deterioration
- Additional EMR Enhancements may allow for:
  – Population-specific customization of EWS
  – Identification of SIRS/sepsis criteria within EWS

References

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