

ABSTRACT: 2015 ELAM Institutional Action Project Poster Symposium

Project Title: Harnessing the Electronic Medical Record to Identify Patients at Risk for In-Hospital Complications

Name and Institution: Mary T. Hawn MD, MPH University of Alabama at Birmingham

Collaborators: Robert H Hollis, Laura A Graham, John P Lazenby, Daran M Brown, Benjamin B Taylor, Martin J Heslin, Loring W Rue,

Background, Challenge or Opportunity: Abnormal vitals often precede inpatient complications providing an opportunity for early identification and intervention..

Purpose/Objectives: We examined whether a validated early warning score (EWS) calculated from vital signs could predict complications in surgical patients

Methods/Approach:

Inpatient general surgery procedures with NSQIP data from 2013-2014 were matched with enterprise data on vital signs and neurologic status to calculate the EWS for each postoperative vital set measured on the ward. Outcomes of complications, ICU transfer, and medical emergency team (MET) activation were classified using the Clavien system as grade I-IV. Relationship between EWS and timing of first complication was assessed using Kruskal-Wallis test and linear regression accounting for clustering with generalized estimating equation.

Outcomes and Evaluation Strategy:

Among 552 patients admitted to the ward post-surgery, 70 (12.7%) developed at least one grade I-III complication and 60 (10.9%) developed a grade IV (life-threatening) complication. The mean maximum EWS was significantly higher in the 48 hours preceding grade IV complications (6.65) or grade I-III complications (4.46) compared to patients without complications (3.34; $p < 0.001$). EWS significantly increased in the three days preceding grade IV complications ($P < 0.001$) and declined in patients without complications in the three days prior to discharge ($P < 0.001$). A threshold EWS of six predicted occurrence of grade IV complications with a sensitivity of 62%, a specificity of 94% and a positive predictive value of 55%.

Life-threatening postoperative complications are preceded by rising EWS. The EWS has promise for early identification and intervention to reduce severity of post-operative complications for surgical patients.