MEDICAL DECISION NETWORK, LLC
2220 Ivy Road, Suite 403 | Charlottesville, VA 22903
866-791-6108 | http://mdnllc.net/

ACUITY 2019 Provides Fully Automated Data Capture for Critical Care Severity Scoring

It's no secret that the major complaint about existing severity scoring algorithms is the amount of manual data collection that's required. This particularly applies to all the APACHE® retrospective benchmarking tools as well as the 2016 release of Medical Decision Network's (MDN) ACUITY equations. Although MDN had reduced many of the manual data elements in their ACUITY 2016 equations, there still was a need for fully automating data capture of the following manual items:

- Patient type (medical, elective surgical, emergency surgical)
- Immunosuppression chronic health indication
- Admitting diagnosis.

The Steps to Fully Automated Data Capture

MDN asked Prescient Healthcare Consulting (Prescient) to:

1. Conduct a study that eliminated the first two items given above
2. Come up with an alternative to manually collecting the reason for admission to the ICU (i.e. admitting diagnosis).

For the latter, MDN used ICD-10 codes for DRGs that came across electronically. This also included APR-DRGs and MS-DRGs if those were the DRGs format captured.

Prescient used de-identified data on admissions from 10/1/2015 until 9/30/2018.

- The data were split 65:35 into development and validation data sets respectively.
- ACUITY 2016 equations were recalibrated by removing patient type, immunosuppression, and reason for ICU admission, but adding DRG group.
- Added equations for ICU mortality and hospital length of stay.

The resultant equations are called ACUITY 2019 and form the principal analytic tools found in MDN's new solution; Phoenix. Their accuracy is amazing and form the most contemporary set of ICU predictive equations available. For example, observed hospital mortality was 12.1% and observed hospital mortality was 12.1% in the validation data set! Further, the area under the ROC curve was 0.87. These results compare quite favorably with those obtained for ACUITY 2016 and suggest that the ACUITY 2019 prediction of hospital mortality will be quite accurate.

Similarly, equations were constructed for hospital LOS and ICU mortality, with convincing results. Along with the prediction of duration of mechanical ventilation the suite of ACUITY 2019 predictive equations are powerful analytic tools in Phoenix. And with no required manual data entry, there is a reduction of support personnel, making the total cost of ownership much lower than competitors to Phoenix. These equations will be used in the upcoming ACUITY 2019 release.

MEDICAL DECISION NETWORK, LLC
2220 Ivy Road, Suite 403 | Charlottesville, VA 22903
866-791-6108 | http://mdnllc.net/

What's Coming on the Horizon? SIGNIPHY™

Retrospective equations are excellent tools for comparing an ICU's performance over time and versus similar ICUs. However, they are not precise enough and too latent to use for clinical decision support tools. Clinical decision report tools are algorithms that receive continuous information on a patient's physiology and send an alert if these values are indicative of a poor result in the future. Some clinical decision report tools are based on rules for discerning when a physiologic value has crossed a certain threshold. These rules are too simplistic and result in "alarm fatigue", i.e. too many false positive alarms.

Track and trigger systems continually analyze physiologic parameters and assign weights for each if they are outside the normal range. Early Warning Scores (EWS) such as MEWS, NEWS, and eCART have been in use for some time now. None have proven to be exceptional in both their sensitivity and specificity.

MDN has been collaborating with Prescient on the latter's EWS known as SIGNIPHY™ (patent approval pending). SIGNIPHY™ is a revolutionary kind of EWS that matches time segments of vital signs against patterns that have been shown to be linked to adverse events. If a number of deleterious patterns occur, an alert will be sent to clinicians caring for that patient. It's unique. It's timely and it's powerful.