Applying Predictive Analytics to Support Transitions of Care

Christine Sullivan, MS, BSN, RN-BC

Nursing Informatics Specialist

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SINAI HOSPITAL
A LifeBridge Health Center
CARE BRAVELY

Significance

- Timely escalation to critical care improves the chance of survival[1]
- Patients in critical care who are stabilized can be transitioned to a lower level of care, freeing up essential resources
- Graphic display improves situational awareness of nurses and providers

1. Sankey, McAvay, Siner, Barsky & Chaudhry, 2016. Deterioration to door time: An exploratory analysis of delays in escalation of care for hospitalized patients, Journal of General Internal Medicine, 31(8); 895-900. doi: 10.1007/s11606-016-3654-x.

Learning Objectives

- Participants will be able to:
  - Describe how applying predictive analytics can support transitions of care
  - Recognize the importance of timely, accurate nursing documentation in the use of predictive analytics
  - Identify use cases for predictive analytics in their organization
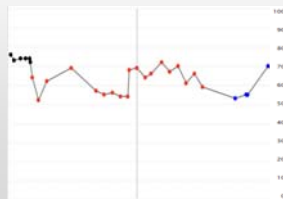

How does it work?

- Disease-agnostic – does not take into account the patient's diagnosis
- Evaluates 26 components (vital signs, general lab results and the nursing system assessment) to create a universal patient score.
- The lower the score, the greater the risk of mortality
- Real-time information displays in a graph, showing trends
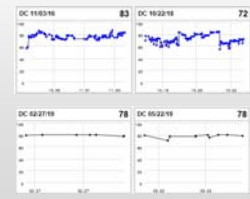- Drill-down into details

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Background

- Large community hospital (400+ beds) in urban area
- Identified an opportunity to reduce mortality
- Analyzed three cases to evaluate the predictive analytics tool
- Confirmed in all three cases, the tool would have identified patient decline earlier than current methods

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Example: Patient Graphs

Graph

Historical Graphs

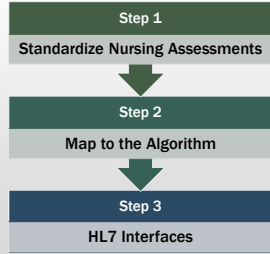## Example: Grid and Drill Down

Interface with the Electronic Health Record (EHR)

Warning Lanes

- Very High = Score < 20
  - Indicates high risk of mortality

- High = Score fell 50% in 12 hours
  - Indicates acute decline

- Medium = Score fell 40% in 24 hours
  - Indicates a more subtle decline
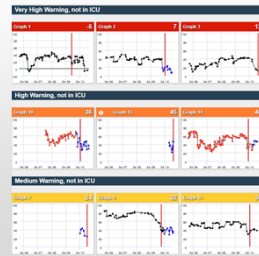
Clinical and Provider Work Groups

- Direct care and leaders from nursing and medicine collaborated to develop:
  - Work Flow
  - Communication Plan
  - Education Plan

Goals of the Project

- **Reduce Mortality (overall and sepsis-related)**

- **Mitigate Failure to Rescue**

- **Place patients at the right level of care - ICU or IMC or Med/Surg?**

- **Support Transitions of Care**

Work Flow – Identifying Decline

Communication - SBAR

- Describe "what's changed" when calling the provider:
  - S: "I'm very concerned about Joe Smith, Room 4001, who has had a change in mental status. Of note, his score has dropped from 73 to 52 in the past several hours."
  - B: "Patient was admitted with CHF and shortness of breath."
  - A: "Previously, Mr. Smith was alert and oriented X4 and his vital signs and labs were stable. Now he is weak, confused and his respiratory rate has steadily increased over the past several hours. Breath sounds were clear and now they are diminished."
  - R: "Could you come and assess Mr. Smith?"

Use Cases

- Clinical Integration into Shift Report and Rounds
  - Early identification leads to early intervention
- Goals of Care Discussions
  - Family meetings
  - Palliative care referrals
- Evaluate for transitions of care
  - Stable or upward trend – consider discharge/transfer to lower level of care
  - Downward trend – consider RRT/transfer to higher level of care

Education

- Providers were educated by the physician champion
  - Received emails with attachments describing the work flow
  - Created videos accessible via smart phone

- Nurses in the pilot received information during competencies
  - Handouts describing the "who, what, when, where, how and why"
  - Work flow diagram and SBAR

- Nurses in acute care and rehab participated in one-on-one training
  - Most effective because the nurses looked at their actual patients

Results

- Mortality
  - Mortality Rate: 2.42% (Jan 2018) to 1.86% (June 2018)
  - Sepsis Mortality Rate: 25.49% (Jan 2018) to 18% (June 2018)
- Mitigate Failure to Rescue
  - Trending up in RRT calls comparing January 2018 (47) to June 2018 (65)
- Unplanned Transfer Rate
  - 2017: 3.30%
  - 2018: 2.07% (37% decrease)
- Readmission Rate
  - 2017: 16.19%
  - 2018: 9.99% (38% decrease)
- Average Length of Stay
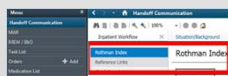 - 2017: 6.83
  - 2018: 6.71 (2% decrease)

Deployment

- Placed large-screen kiosks on all Critical Care, Acute Care and Rehab units to provide visibility

- Created links in the EMR to access graphs

Opportunities

- Continue to hardwire clinical integration with nurses and providers
  - Routine part of daily conversations

- Greater attention to patients in the medium warning lane
  - Greatest opportunity to turn around decline, avoid RRT

- Utilize filters for palliative care consults
  - LOS > 5 days and score <40

Thank you for your kind attention

Questions?

Contact:
chsulliv@lifebridgehealth.org