NENIC Posters 2023!

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New England Nursing Informatics Consortium

Nurses Transforming Healthcare ***Through Informatics***

NENIC Member Highlights 2023

1. Elizabeth Bryand, MSN, RN, ACCNS, BS
   - Nurse Driven Heparin Continuous Infusion Protocol Optimization with EHR Decision Support
2. Deb Furlong, MS, RN-BC and Brieanna Gacek, BSN, RN-BC
   - Nurse Proactive Rounding Utilizing a Deterioration Index Tool
3. Leslie Hutchins, MBA, BSN, RN, RN-BC, BC-NE
   - Infusion Pump Interoperability - Safety/Efficiency/Data Accuracy

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Nurse Driven Heparin Continuous Infusion Protocol Optimization with EHR Decision Support

Lifespan Corporation, Providence RI

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Project Team

- Pharmacists
  - Clinical Pharmacist Specialist
  - Medication Quality and Safety Specialist
- Nursing and Clinical Informaticists
- EHR Analysts and Builders

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Project Goals

- Optimization of heparin protocols to reduce time to therapeutic levels
- Implementation of decision support tool to reduce heparin rate/dose errors

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Optimization of Heparin Protocols

- Pharmacists performed a medication use evaluation (MUE) of patients who received continuous heparin infusions for >24 hours and identified protocol changes that were hypothesized to reduce time to first therapeutic anti-Xa value including:
  - Modifying interventions for supratherapeutic anti-Xa
  - Changing the time of lab monitoring from every 8 hours to every 6 hours
  - Reducing initial heparin bolus dose for high and low intensity protocol
  - Reducing initial infusion rate of the high intensity protocol
  - Increasing the dose cap of the initial infusion rate of the low intensity protocol

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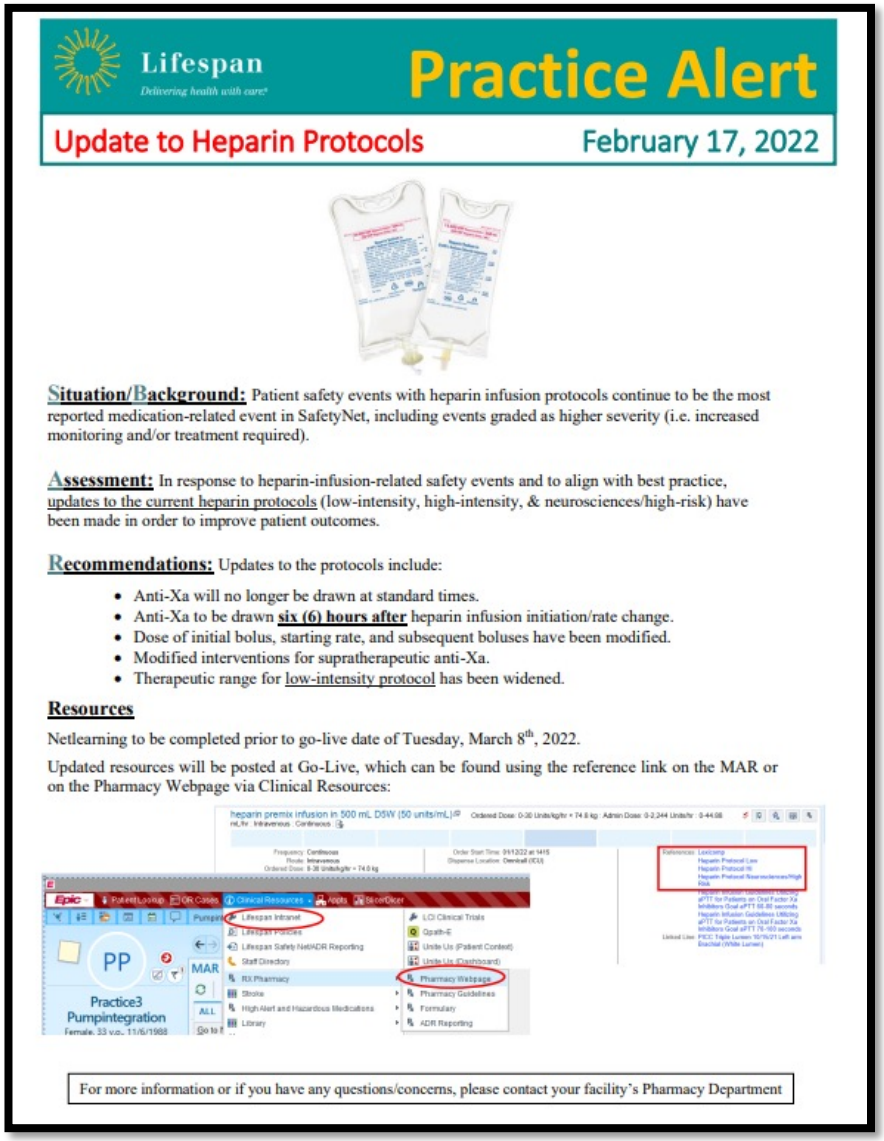
Protocol Changes – Go Live



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Practice Alert

Update to Heparin Protocols February 17, 2022

Situation/Background: Patient safety events with heparin infusion protocols continue to be the most reported medication-related event in SafetyNet, including events graded as higher severity (i.e. increased monitoring and/or treatment required).

Assessment: In response to heparin-infusion-related safety events and to align with best practice, updates to the current heparin protocols (low-intensity, high-intensity, & neurosciences/high-risk) have been made in order to improve patient outcomes.

Recommendations: Updates to the protocols include:

- Anti-Xa will no longer be drawn at standard times.
- Anti-Xa to be drawn **six (6) hours after** heparin infusion initiation/rate change.
- Dose of initial bolus, starting rate, and subsequent boluses have been modified.
- Modified interventions for supratherapeutic anti-Xa.
- Therapeutic range for low-intensity protocol has been widened.

Resources

Netlearning to be completed prior to go-live date of Tuesday, March 8th, 2022.

Updated resources will be posted at Go-Live, which can be found using the reference link on the MAR or on the Pharmacy Webpage via Clinical Resources:

For more information or if you have any questions/concerns, please contact your facility's Pharmacy Department

- March 8th, 2022

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Heparin Calculator Decision Support

- A Heparin Calculator within the EHR was reviewed, individualized, and tested by the team to provide nursing with decision support for protocol changes
- RN workflow adjusted to allow titration of heparin infusion and PRN bolus orders rather than requiring RN to modify the infusion order with each rate change and enter one time bolus orders
- Calculators were embedded within the infusion and bolus orders
- Nursing education was assigned in May of 2022 through computer-based learning (CBL) modules and a practice alert
- The Heparin Calculator went live on June 8th, 2022 and end users were provided real time support through EHR secure messaging groups, shoulder to shoulder support, and real time record auditing

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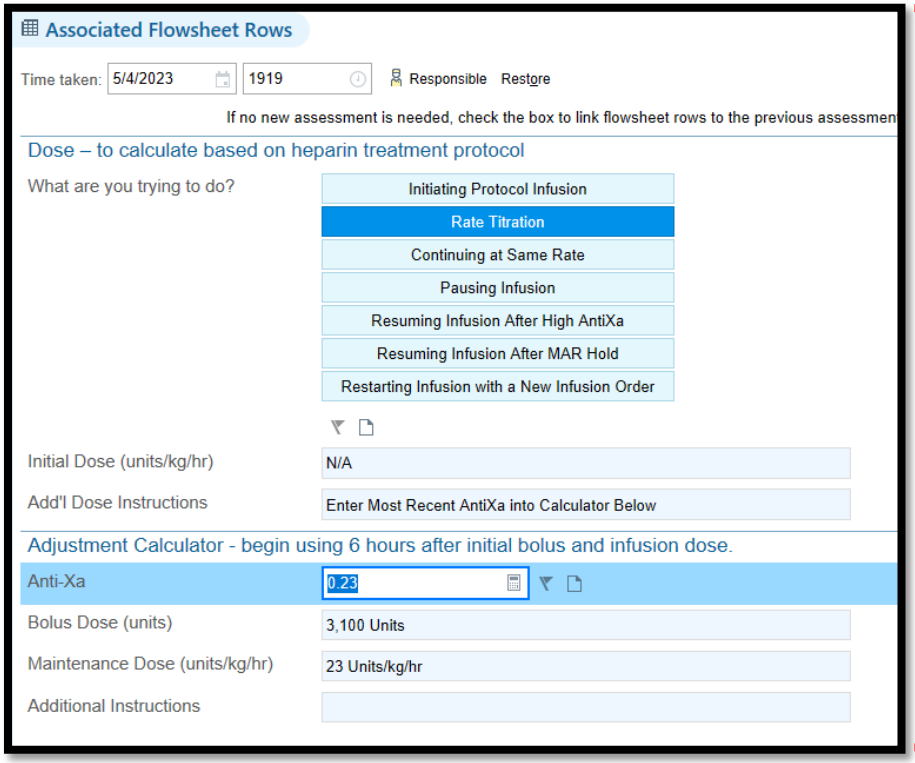
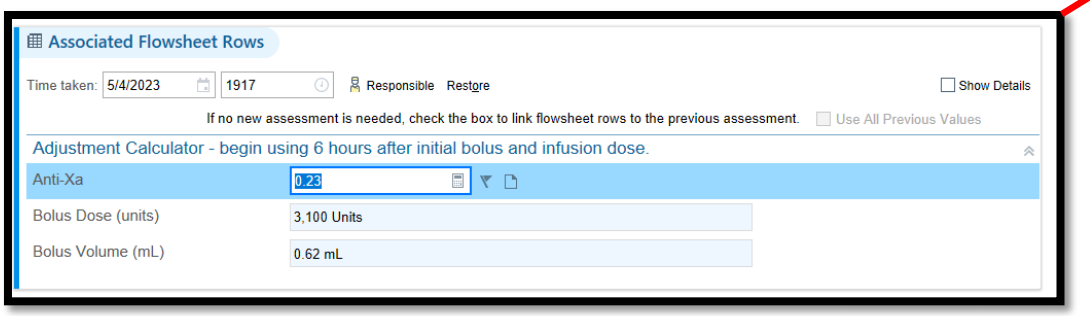
Heparin Calculator



Heparin Infusion Calculator

Heparin Bolus Dose



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Results: Adherence to the Protocol Throughout Infusion

Pre: 34.4% vs. Post: 52%, P = 0.004

- Protocol adherence includes:
  - Selecting correct protocol intensity based on the indication for anticoagulation
  - Correct initial starting rate
  - Appropriate rate titrations based on protocol
  - Appropriate supplemental boluses per protocol
  - Correctly timed anti-Xa laboratory values
  - When infusion is held, holding the infusion for the correct amount of time

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Results

- Post implementation, Pharmacists performed a MUE and found:
  - Decrease in the time to therapeutic anti-Xa

Hours from Start of Heparin Infusion to Second Consecutive Lab in Therapeutic Range:

Low Intensity Protocol*

	Pre (0.3 – 0.5)	Post (0.3 – 0.5)	P-value
Overall (h)	33.7	26.1	0.017
Bolus (h)	32.1	25.4	0.115
No Bolus (h)	35.3	27.2	0.052

High Intensity Protocol

	Pre	Post	P-value
Overall (h)	36.2	41.2	.359
Bolus (h)	37.1	39.5	.726
No Bolus (h)	33.5	45.6	.210

* the therapeutic range for the low intensity protocol was widened from 0.4 – 0.5 in the Pre cohort to 0.3 – 0.5 in the Post cohort, one would expect a reduced time to therapeutic in the Post cohort. To make a fair comparison for this outcome, the Pre cohort was analyzed as if the therapeutic range was 0.3 – 0.5 and is represented below as Pre (0.3 – 0.5).

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Results

- Decrease in average number of lab draws before reaching therapeutic anti-Xa
  - **Pre:** 6.63 vs. **Post:** 5.16, **P = 0.004**
- Minimum annual laboratory cost avoidance from reduction in number of laboratory draws: **$128,441**
  - Cost per anti-Xa lab about $15
  - Number of patients who received a heparin infusion for >24 hours last year was 5,825

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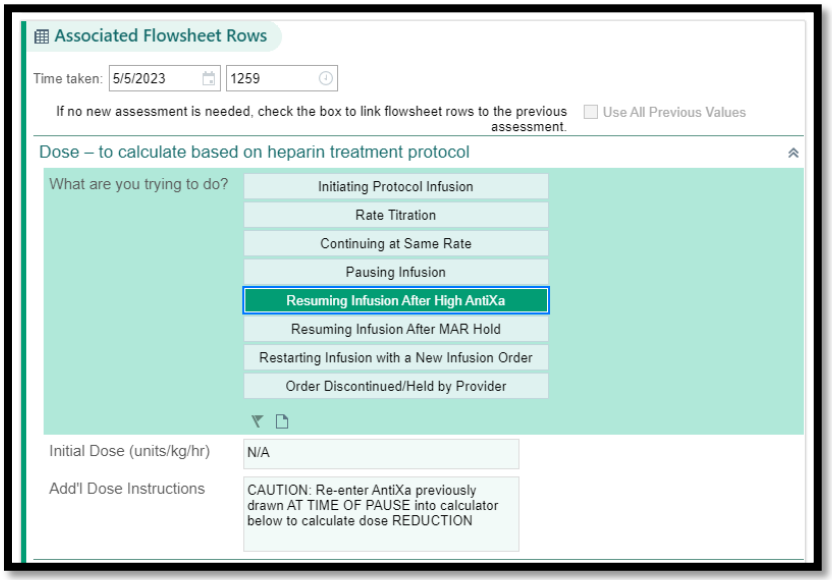
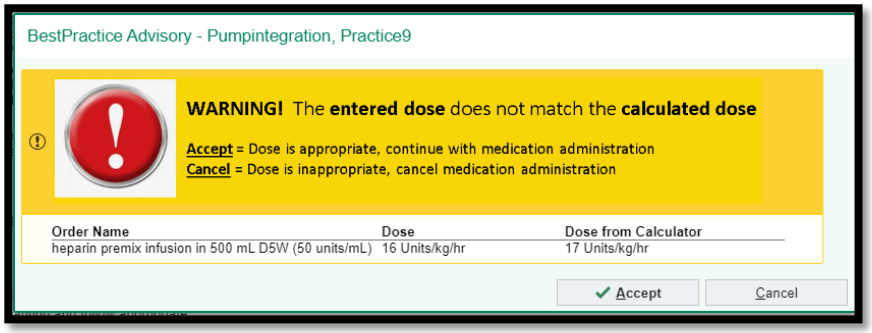
Lessons Learned / Next Steps

- Nurses initially found the workflow confusing / not intuitive
- Since go-live, modifications to the Heparin calculator display have been made including wording adjustments and addition of action buttons to reduce confusion
- Best Practice Advisory was implemented post go-live to alert RNs when the admin rate does not match the suggested rate in the heparin calculator
- Future plans are to review provider driven aPTT protocols and determine possible transition to nurse driven protocols with calculator decision support





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Thank you!

Nurse Proactive Rounding Utilizing a Deterioration Index Tool

Deb Furlong MS, RN-BC
Nursing Program Director, Informatics

Brieanna Gacek BSN, RN-BC
ICU Float Pool, Code RR Team

Brigham and Women's Hospital

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D

About Brigham and Women's Hospital

Brigham and Women's Hospital is a teaching affiliate of Harvard Medical School. With more than 800+ inpatient beds, approximately 50,000 inpatient stays, and 2.25 million outpatient encounters annually.

Employs > 3500 nurses
ANCC Magnet Designated

BWH is part of the Mass General Brigham (MGB) a single integrated healthcare system that consists of 16 member institutions and maintains one instance of the Epic Electronic Health Record for all hospitals within the 16 member MGB System

D

Proactive Rounding Project

BWH initiated a clinical pilot where STAT nurses would identify, assess, and direct treatment to patients at risk prior to deterioration utilizing the Epic Deterioration Index Predictive Model (EDI).

The EDI identifies patients at risk for deterioration utilizing clinical data from the Electronic Medical Record (EMR) and was available on all BWH adult Inpatients.

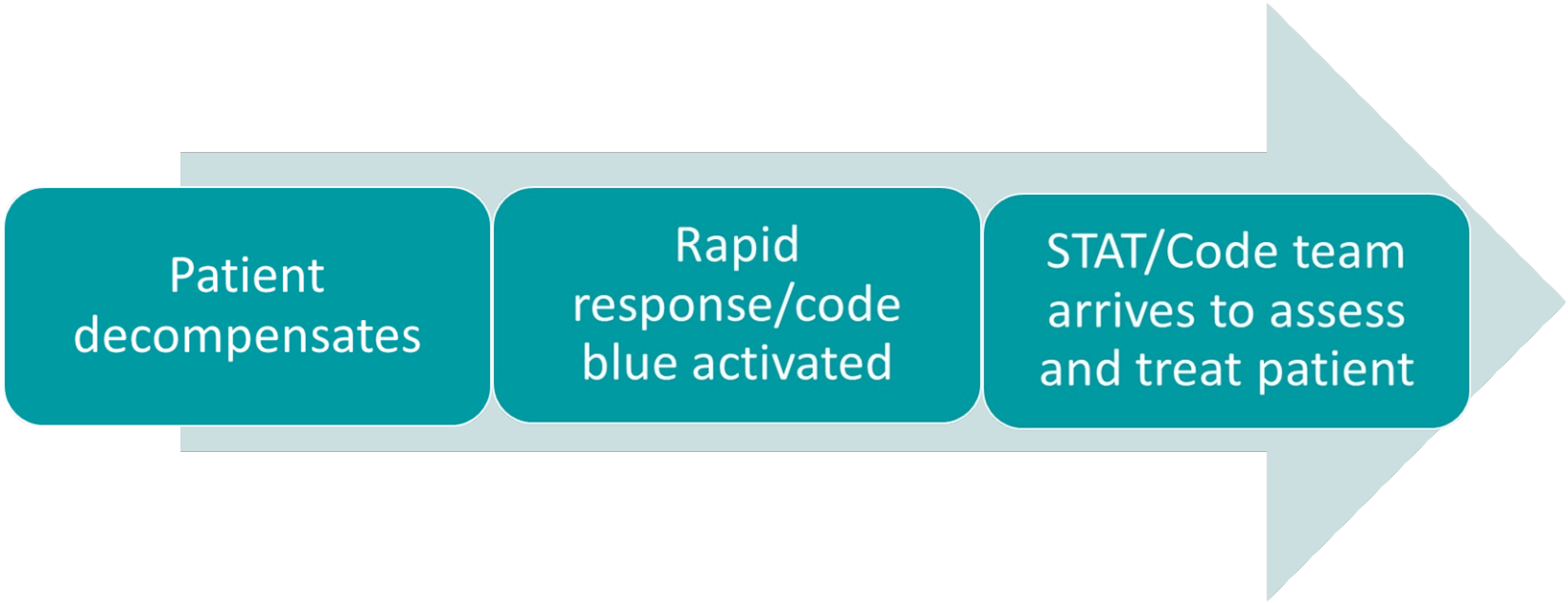
D

24/7 Inpatient STAT RN Role Prior to Proactive Rounding

- Responds to all inpatient Rapid Responses & Code Blue calls
- Travels with patients who require high/moderate risk telemetry monitoring
- Administers & monitors procedural sedation performed on inpatient units
- Act as a clinical resource to the intermediate and oncology floors throughout the hospital

B

Stat Nurses Workflow Prior to Proactive Rounding



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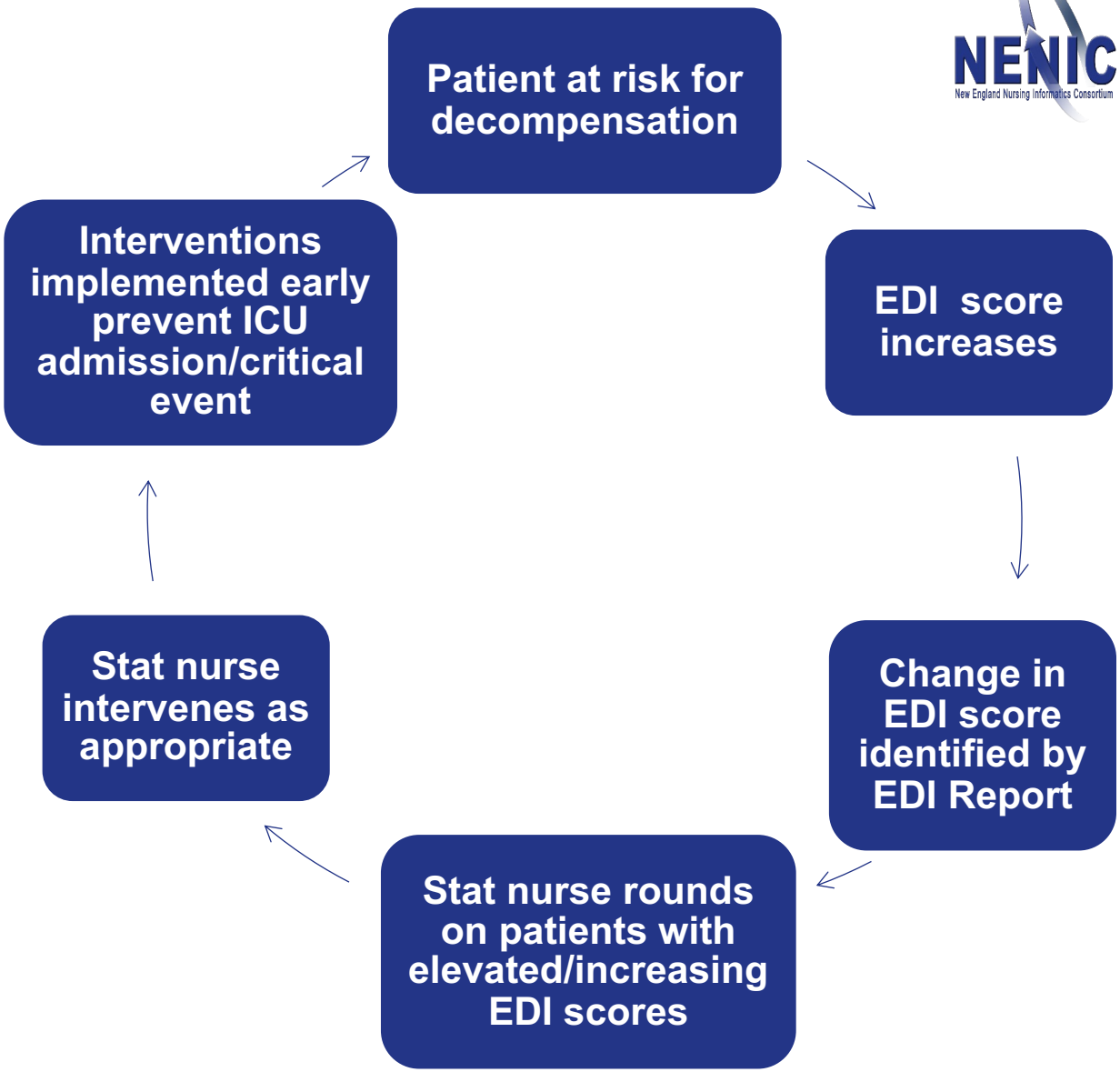
Implementation of the Epic Deterioration Index Predictive Model (EDI) into the STAT Nurses Role



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Utilizing the Epic Deterioration Index tool – EDI To Identify Patients at Risk for Clinical Detrioration

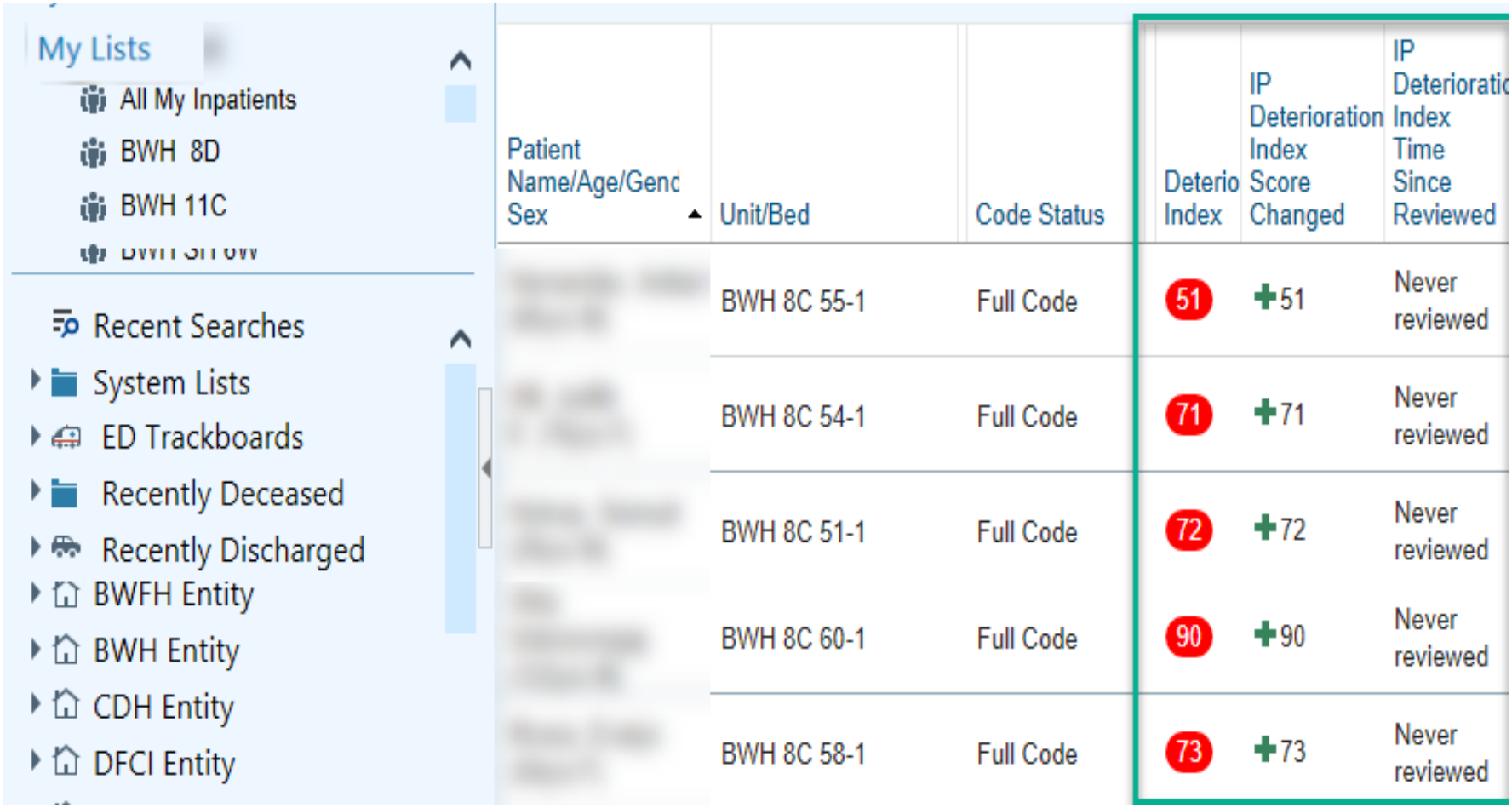
- A report was developed to list Inpatients excluding CMO, ICU, Procedural, ED and Women and Newborns with an EDI >45
- Handheld mobile devices would have been ideal but were not available for the STAT nurse to view the EDI.
- The same content from the report was built as a system list in EPIC that the nurses would consult when at an available computer and utilized to document on those patients
- The report was printed at the beginning of the shift

  STAT nurses huddled with the current and prior shift to identify and prioritize the patients

  They also communicated with the Code Leader/ ICU Physician lead

B

Patient list with Epic Deterioration Index EDI elements



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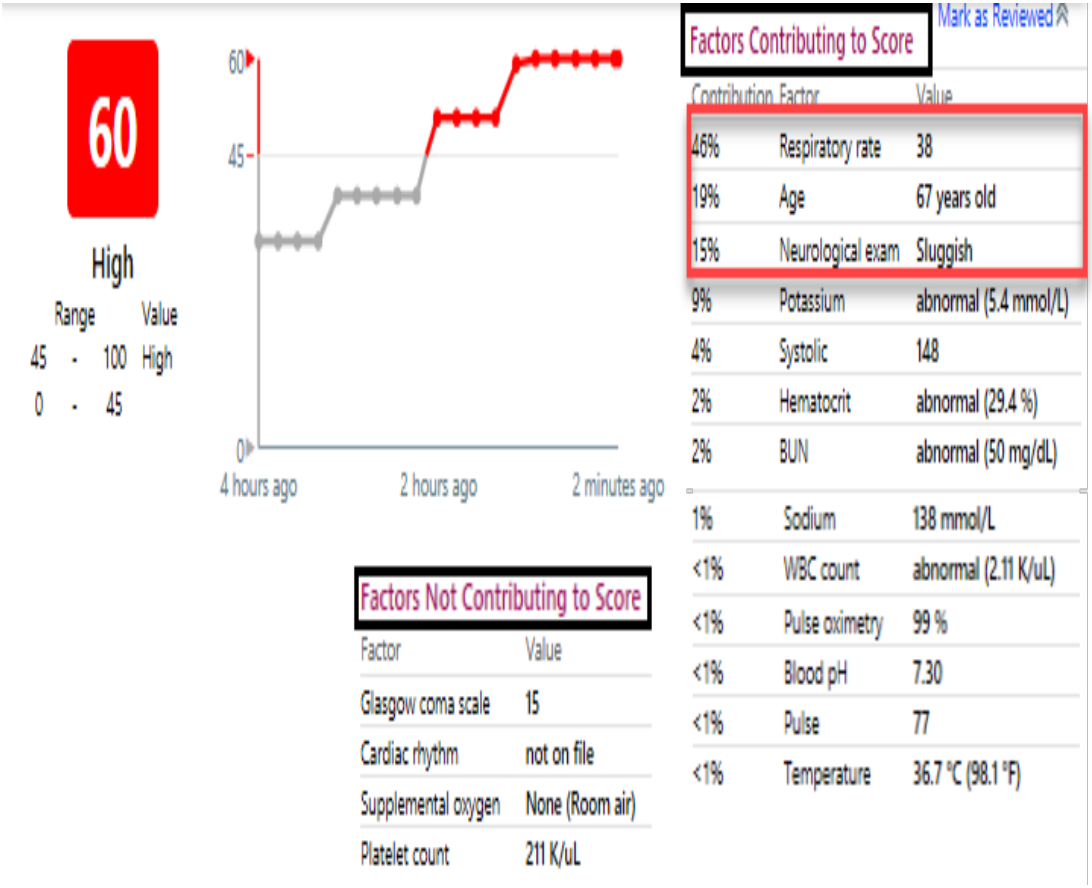
Example of a single Patient view with a progressively increasing Epic Deterioration Index- EDI over 4 hours

All factors that are included in the EDI predictive model are listed by those contributing and not contributing

In this example heavily weighted factors were the Resp Rate, Age and Neurological Exam



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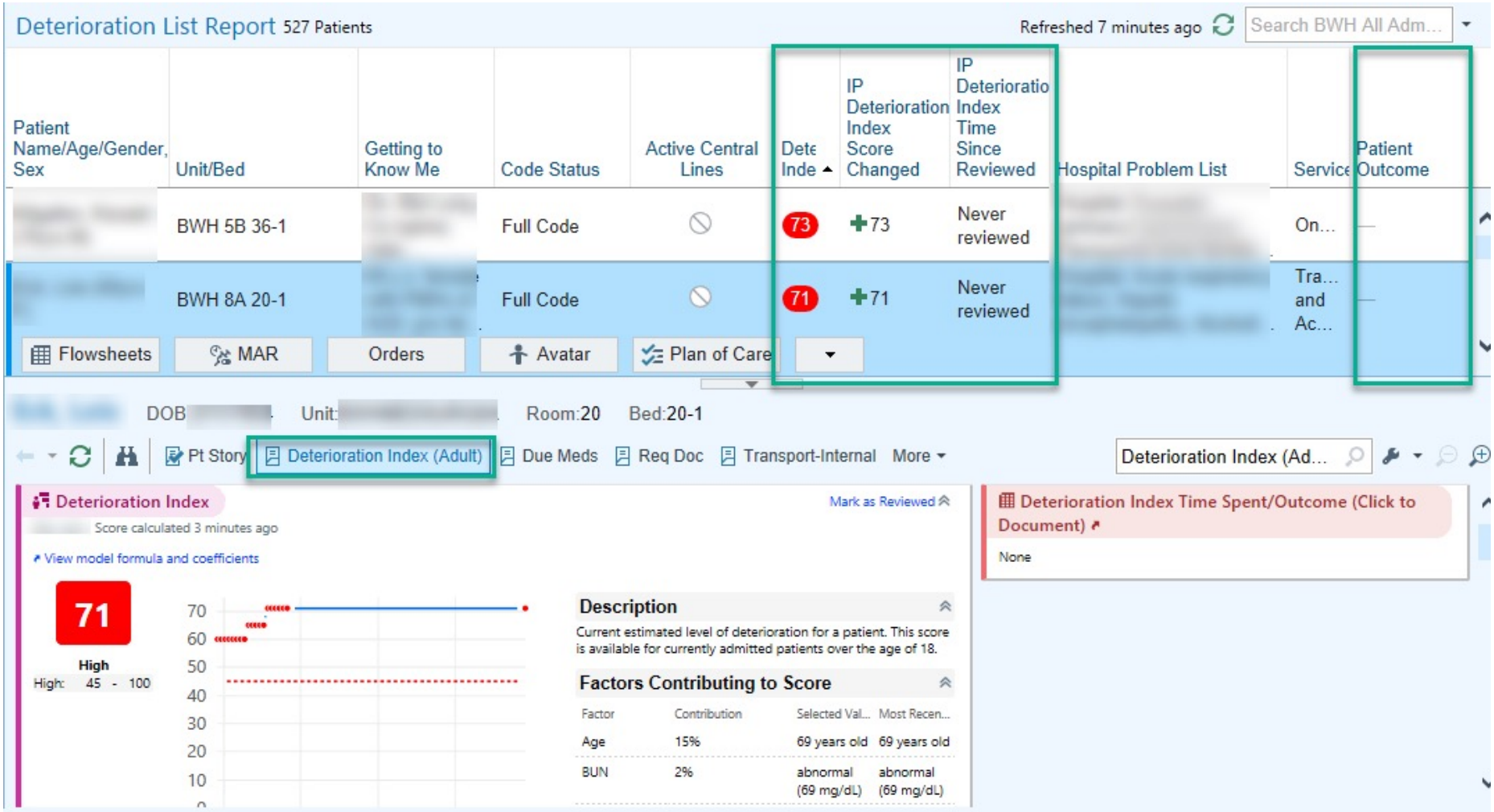
Patient List with EDI elements and link to details and documentation



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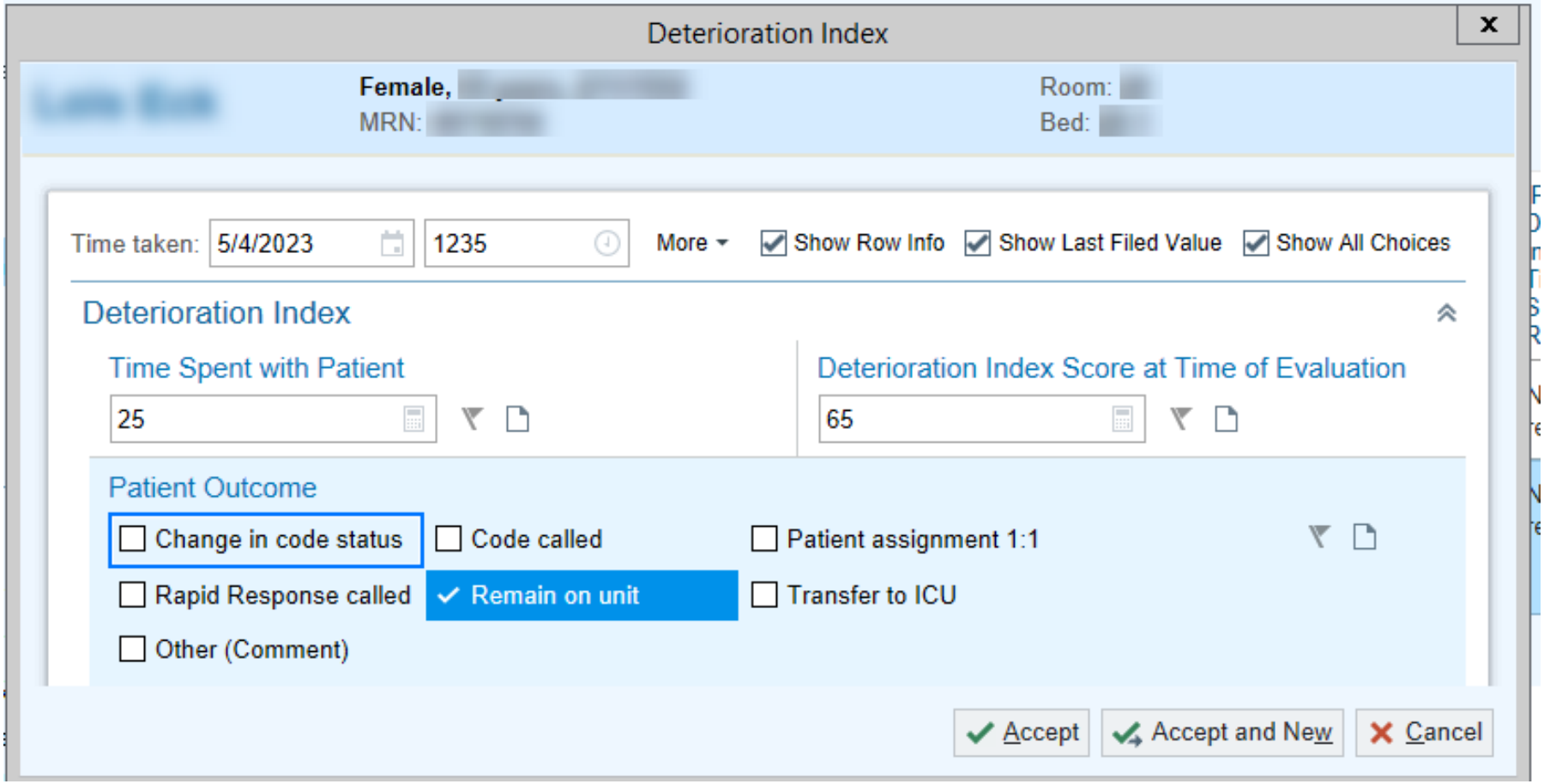
EDI documentation



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Performance of the EDI Tool

The Proactive rounding started in February 2021.

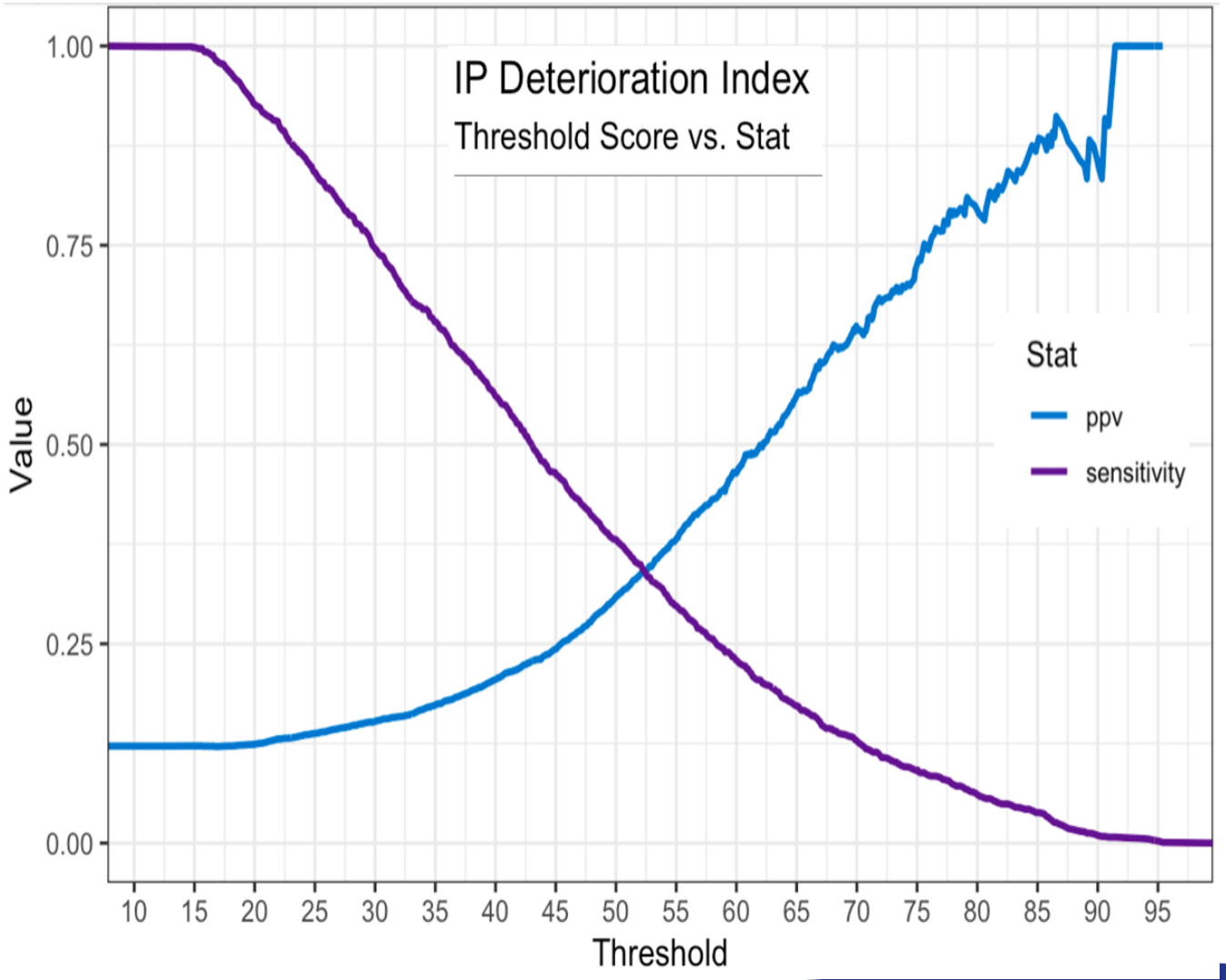
Patient records were reviewed for the 2nd month of the project March 2021 that had a documented Rapid Response and an EDI >45.

The results of the review revealed that the EDI had a 30% sensitivity in predicting deterioration of patients that required a Rapid Response.

The sensitivity was similar to the sensitivity of 33% for an EDI >53 for 3 months on 10,711 BWH encounters to evaluate performance of the tool.

D

Analysis of the Deterioration Index Tool as the EDI increased the Sensitivity increased at the Threshold of 53 Sensitivity =.326 Specificity =.916



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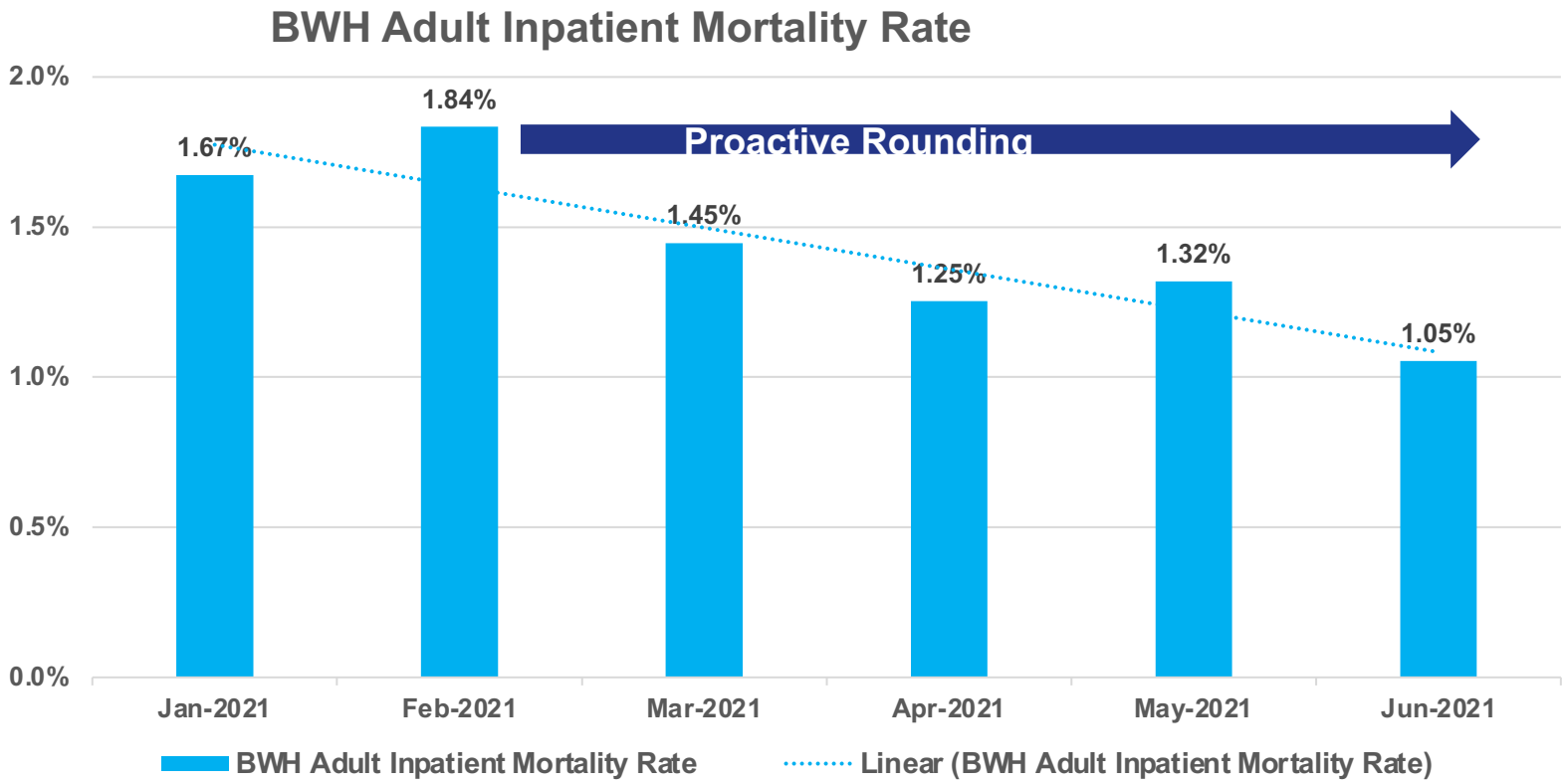
Inpatient Mortality declined from 1.85% February to 1.45% in March and 1.25% in April after the proactive rounding was initiated.



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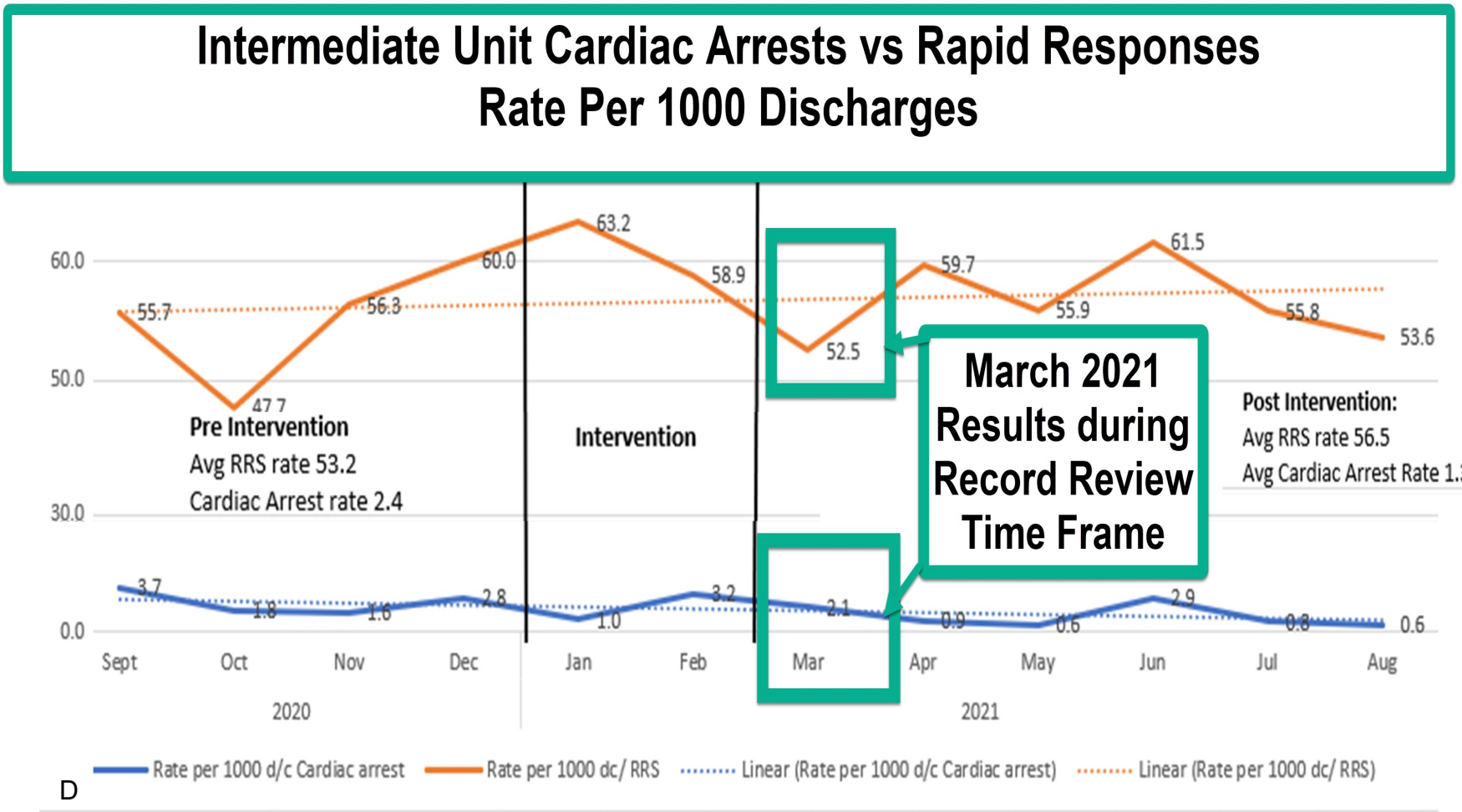
Cardiac Arrest Rate decreased from an average of 2.4 prior to the project to 1.3 after implementation
Rapid Responses increased from an average of 53.2 prior to 56.5 after implementation



D

Results of Proactive Rounding Project

- Many clinically stable, long term care patients of advanced age with altered neuro status had an EDI>45.
- The combination of proactive rounding on units guided by the EDI >45 and the discussion with the charge nurse on each unit resulted in additional patients without an EDI>45 being identified as at risk and receiving assessment and/or treatments which may have prevented further deterioration.
- Improved outcomes were likely a result of the proactive rounding by the STAT nurses on intermediate units.
- The EDI tool had a less significant impact on identifying at risk patients.

B

Results of Proactive Rounding Project

Ultimately the EDI was not an optimal tool for use as an early warning score due to the low sensitivity

The chart review validated the STAT nurse's feedback that the EDI was inadequate in identifying a large percentage of the patients at risk for deterioration.

- Positive feedback from the intermediate nurses about the STAT nurse proactive rounding.
- Nurses appreciated the additional resource to discuss and evaluate patients.
- The STAT nurses felt that with rounding throughout the intermediate floors they were able to identify patients that had potential to decompensate and were able to intervene sooner.
- Currently the STAT nurses continue to proactively round throughout BWH and find that overall as a result of improved communication between the STAT nurses and Code Leader/ ICU Physician patients are identified sooner and results in earlier intervention.

B

Thank You
Any Questions?

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Infusion Pump Interoperability

Safety – Efficiency – Data Integrity

May 2023

Leslie Hutchins MBA, BSN, RN, RN-BC, NE-BC
Chief Nursing Information Officer – Yale New Haven Health

What does Infusion Pump Interoperability Provide?

Safety – Efficiency – Data Integrity

- ✓ Patient safety with medication administration and reducing infusion pump manual programming errors
- ✓ Nursing workflow efficiency by reducing keystrokes during infusion pump programming by 50%
- ✓ Reduce time spent documenting rates and volumes
- ✓ Improve Pharmacy/Nursing collaboration through Pharmacy & Nursing Data Dashboards/Reports

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It takes a Village

Nursing
Pharmacy
Informatics
ITS Analysts & Trainers
Clinical Engineering
Supply Chain
Materials Management
E.H.R Vendor
Pump Vendor

ITS=Information Technology Services

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Health

Infusion Pump Interoperability

Set up for Success:

- ✓ Live on E.H.R. > 3 months
- ✓ Live on Smart Infusion Pumps > 3 months
- ✓ Nurses use the MAR for documentation in the electronic health record
- ✓ High BCMA Compliance rate (> 90% BCMA Compliance)
- ✓ Bedside Nurse Leader Engagement

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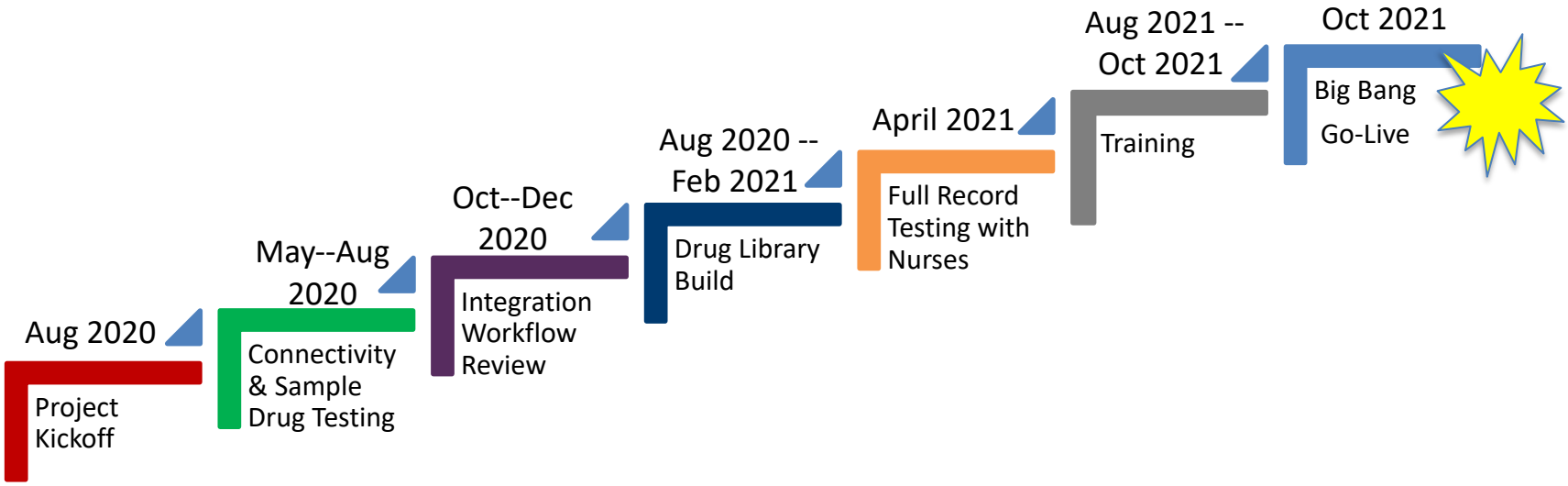
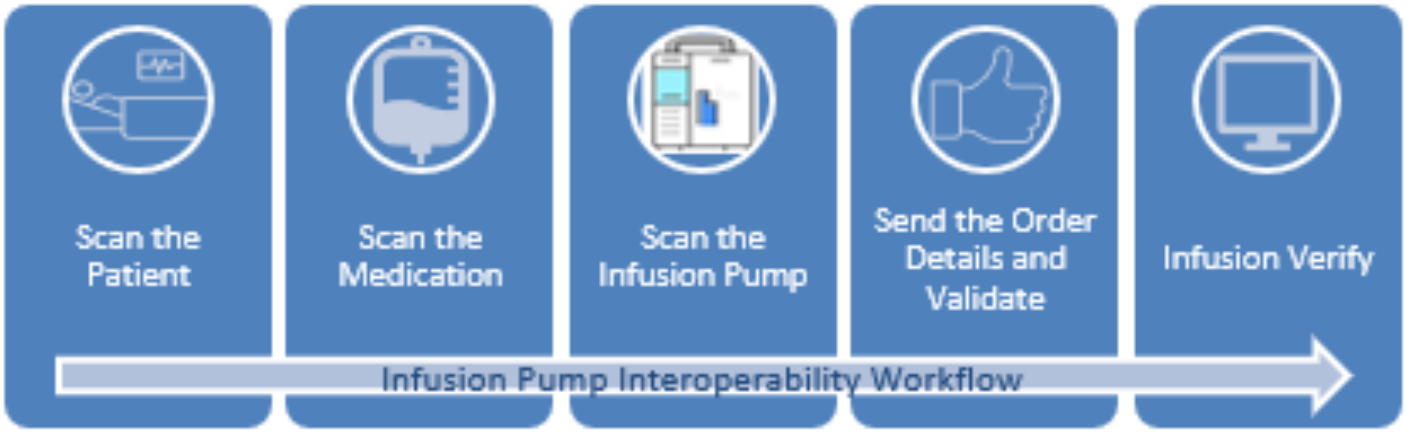
Project Milestones:





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Champion Model (Train-the-Trainer)

Champion Education:

- Complete LMS Training Modules
- In-person practice scenario testing (1 hour)

Champion Responsibilities:

- Lead and reinforce standard workflows and best practices
- Provide at-the-elbow support for users within your department, clinic, unit
- Mentor staff by being approachable and available
- Prioritize patient care safety at all times
- Assist to resolve workflow or application issues
- Contact the ITS Service Desk with any issues for review and resolution

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Champion Model Support

Champions to support Cutover and first 2 days of Go-Live:

Critical Care: 2 Champions/shift/no patient assignment

Non-Critical Care: 1 Champion/shift/no patient assignment

Champion Support beginning Day 3:

Critical Care: 2 Champions/shift/light patient assignment

Non-Critical Care: 1 Champion/light patient assignment

Discuss opportunity for resource sharing

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Staff Training During a Pandemic

Training Curriculum/Strategy:

- LMS interactive training modules (two 15-minute modules) assigned to staff
- Reference Guide/Tip Sheets
- Champion/Super User In-services
- Staff hands-on practice with training cart/pump availability at the unit level that included a self guided training packet

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Go-Live Support:

Bedside Nurse Leader Unit Champions

Virtual Command Center access via Zoom call or QR Code
- 24 coverage for the first 24 hours
- 6am to 12:30am Monday—Friday
- ITS Service Desk 24/7

Rounding Teams at each hospital for the Go-Live Week:
- ITS/ Analysts & Trainers
- Clinical Engineering
- Pump Vendor Representatives
- Pharmacy
- Nursing

Compliance Tracking Reports

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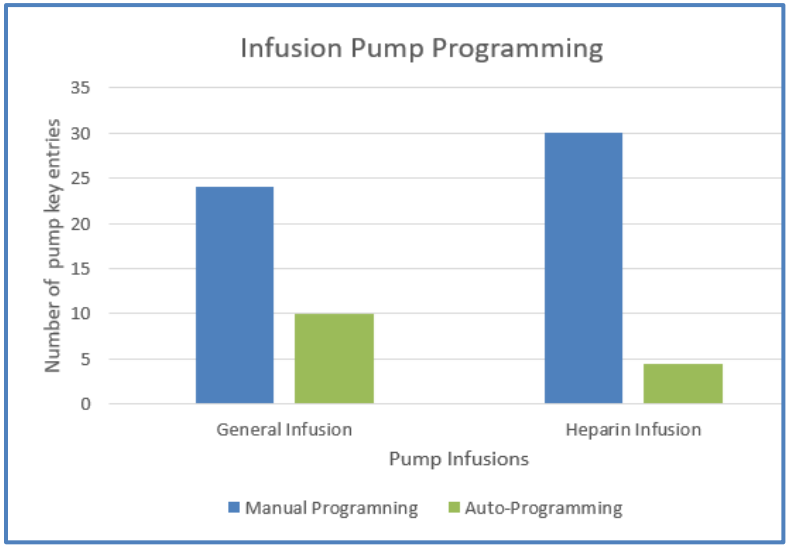
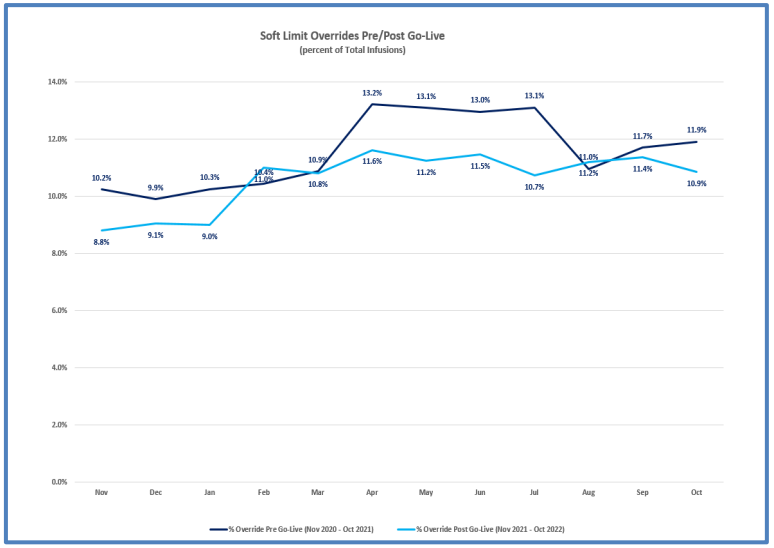
Results/Lessons Learned/Sustainability:

Results:

- Nurse efficiency improved, with an overall reduction of pump programming clicks by 50%

- The adoption of Infusion Pump Interoperability reduced manual pump programming errors. Soft-Limit alerts on the pump decreased with the use of interoperability and minimized clinician cognitive burden.





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Lesson's Learned/Future Opportunities

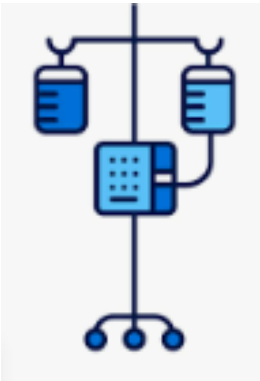
Evaluate barriers/opportunities for improvement and workflow adoption
- Infusion Verify Documentation
- Dual sign workflow
- OB and ED adoption

Monitor and Share Barcode Scanning compliance
- Nurse Manager/Nurse Impact Dashboard

Monitor infusion pump medication errors

Future opportunities for the implementation of infusion pump interoperability with:
- Pediatric Oncology Pumps
- Syringe Infusion Pumps
- Patient Controlled Analgesia

NOTE: Infusion Pump Interoperability is one of the key elements that will be a factor in determining future vendor solutions



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Questions

Thank you!

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