Implementation of EMR-integrated Software Solution in the NICU with Minimal IT Resources

CASE STUDY

St. Bernards Medical Center ("STB"), a 440-bed acute care hospital in Jonesboro, Ark., serves as a regional referral center for 23 counties in northeast Arkansas and southeast Missouri. The hospital provides the region's only Level III Trauma Center while also housing the sole Neonatal Intensive Care Unit in the eastern half of Arkansas.

STB and Astarte Medical joined together to implement NICUtrition®, a clinical decision support tool for NICU care teams to plan and monitor adherence to preterm infant feeding protocols.

In this case study, we will discuss the clinical challenges NICUtrition® solves, some apprehensions hospitals may have related to implementing a new, innovative software solution, and the flexibility NICUtrition® offers to any EMR, such as STB's Meditech. We are documenting the STB implementation experience to help alleviate concerns and resolve technical challenges, in particular concerns around the hospital IT resources that are required to implement NICUtrition®.

Background

As survival rates for extremely preterm infants improve, attention is now being focused on improving the *quality* of survival. Adequate nutrition early in life is essential in both the physical growth and neurological development of preterm

infants. Unfortunately, nutritional inadequacies do not pose an immediate emergency and the urgency to correct deficits becomes a secondary consideration, leading to growth failure and poor cognitive development over time.

Despite the accumulating research and increased knowledge of preterm infant nutritional needs, a lack of resources, collaboration and time has inhibited the optimization of feeding practices and nutritional management in the NICU. This remains a major challenge for clinicians with increasing resource

constraints and scarcity a growing contributor. Implementing a standardized feeding strategy has been shown to improve growth outcomes and decrease co-morbidities, but most NICUs are still using paper-based feeding protocols and require dietitians to make manual calculations using pen, paper, calculators, and time. This manual process has been the standard practice for decades. Not only does this manual process provide room for error, but it also creates more work for clinical care teams and is a drain on hospital resources.

NICUtrition® interfaces with the hospital's EMR and provides an intuitive presentation of feeding, nutrition, and growth-related data. The software digitizes a hospital's own enteral feeding protocol to monitor compliance and provides real-time feedback with a focus on standardizing and optimizing feeding decisions by the NICU care team. In the event a feeding protocol is not in place, NICUtrition® will provide deep value via historical and current feeding data coupled with analytics to allow for longitudinal analysis of feeding trends and outcomes.

Implementation Overview

The implementation process began with a 5-year retrospective data extract of growth, feeding, and care data for preterm infants admitted to the NICU between 24-34 weeks gestational age at birth. This data, extracted from Meditech, was analyzed to establish a baseline of feeding and nutrition metrics for the NICU care team. Although there was no feeding protocol in place for this 5-year historical period, STB will use the data to analyze past trends in feeding volumes, feeding advancements, and nutrition components as well as the corresponding growth and outcomes during the observed period.

The next step in the implementation process was prospective data collection and the rollout of a newly developed preterm infant feeding protocol. The protocol was digitized and integrated into NICUtrition®, enabling the analysis of all prospective data for protocol adherence. Metrics related to modifications to protocol guidelines and associated outcomes are available natively within NICUtrition®. Going forward, comparisons between benchmarked historical data and prospective data captured during the use of the feeding protocol and NICUtrition® will be possible.

Flexibility Solves Technical Challenges

While NICUtrition® was built for maximum compatibility with Epic and Cerner EMRs, it is flexible and allows Astarte Medical to partner with organizations that use different EMRs, such as STB's Meditech. NICUtrition® was designed to utilize the latest versions of FHIR APIs as well as OAUTH2.0 integrated authentication. This is facilitated via an "integration harness" that sits between an external data source and NICUtrition® and can be tailored and extended to accept diverse data while presenting it in a clean and structured format in the application. The integration

harness provides profound flexibility. As a result, in addition to on demand and scheduled synchronizations, data can also be ingested by NICUtrition® on a regular basis via file transfers.

In a typical implementation, Astarte Medical would convert the knowledge gained during the retrospective analysis to implement the real-time API interfaces. Given STB was directly in the middle of a major EMR upgrade project, standard FHIR API connections were not an option. However, STB and Astarte Medical were able to establish a standardized file transfer process *without* full integration into Meditech. This daily report and file transfer is automated, running at the same time every day, prior to morning clinical rounds on the NICU floor but after end of shift charting, allowing clinicians to access up to date information for each patient.

Providing a flexible integration harness eliminated the need for the STB technical team to have to undertake a specific effort to learn and enable FHIR APIs while allowing for a full featured implementation of NICUtrition®.

Resource Requirements

At initiation of the project, Astarte Medical provided a detailed list of data elements grouped logically based upon broad understanding of how the pertinent information is charted and stored. Given the nuanced nature of this data, a brief period of refinement was expected in consultation with the clinical team on the required data location and formatting. STB's internal report writer, within an estimated 80 hours, was able to write reports to map all required data elements and extract and transfer the data to Astarte Medical.

Astarte Medical has adopted authentication best practices and supports OAUTH2.0 with a strong recommendation to utilize this industry approved protocol. NICUtrition® can facilitate the use of various authentication mechanisms depending on the infrastructure at a given organization. In this particular implementation, Astarte Medical provided a dedicated resource to work with a STB resource to identify a solution that required less than a day of technical effort, while still maintaining the highest security and authentication standards.

Benefits

NICUtrition® provides a significant amount of value by understanding and presenting nutrition data in a meaningful manner, and compiling, combining, and organizing disparate data elements from the EMR into a concise and clear presentation. For example, NICUtrition® consolidates parenteral, enteral, and oral feedings in a manner not available in any other application. This can be enhanced by presenting this data in the context of expectations from a protocol, an analysis that is simply not possible without this detailed processing step. Through this process, NICUtrition® is not only

able to provide detailed insights into delivered care over time, but it can also illuminate charting and record keeping practices (and errors). The ability to identify areas of frequent error or inconsistencies can greatly enhance the available insights WITHOUT having to make any modifications to systems.

Wrap Up

The partnership between STB and Astarte Medical has been a positive, successful experience to date. In spite of other major technical initiatives under way and limited tools and resources available, STB and Astarte Medical have efficiently worked together to implement a full-featured application to benefit the clinical care teams in the NICU and their complex little patients.

If you are interested in learning more about NICUtrition®, please visit our website at https://nicutrition.com/ or contact lia@astartemedical.com for a demo.