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Pam Carlock, RN
Database Administrator
Children's Healthcare of Atlanta
Atlanta, GA

Building a Comprehensive, Customizable STS Congenital Heart Surgery Database Module to Improve Patient Care

Children's Healthcare of Atlanta Highlights

- **Evidence-Based Medicine.** The Congenital Heart Surgery Database Module improves the quality of patient care through the use of STS National Database benchmarks and evidence-based medicine.

- **Complete Congenital Solution.** By adding additional fields to those defined by STS, Children's has a more complete, patient focused congenital database.

- **Patient Snapshot.** Physicians can view procedures, surgeries, and demographic data in one place, using Web-based technology.

- **Customize for Efficiency.** Data collection forms are adjusted to work with the heart center's normal workflow, not the other way around.

- **Facilitate Research.** Staff can query database easily, finding outcomes and demographic data needed for research and follow-up.

Building a STS Congenital Heart Surgery Module

When the STS National Database began to collect statistical data on congenital surgery, Children's Healthcare of Atlanta recognized the benefit of participation: to improve the quality of patient care through the use of data integration and industry benchmarks. "For many years we tried to create a home grown database that would involve the different aspects of cardiac services. When the pediatric portion of the STS came out, our surgeons got behind it," explained Pam Carlock, nurse and database manager for the CT surgeons.

"We really want to know about outcomes. We want to know about specific numbers and demographic information, especially with the staged surgeries the physicians do. We'll be able to compare ourselves to the STS averages. I think it will help our quality and assessment,

because I believe that we'll have concrete data and benchmarks. One example is re-intubation: Was the patient re-intubated? If so, why? Time of day? The ease of being able to pull information together gives us a better foundation for quality improvements."

Finding a Solution to Encompass the Entire CV Service Line

Children's Healthcare of Atlanta decided to seek out a database solution that would not only enable them to participate in STS, but encompass all of the cardiovascular service line. They wanted a solution with interfaces to their legacy echo and cath systems to pull information into a central database. Cardiologists, surgeons, staff in the OR, and other departments could then access patient history, cath, echo, and surgical data. Children's also needed query and report capabilities to support their research.

"In our initial search, we didn't see anything out there that was already built, that we liked, and met our needs," says Michelle Glanville, clinical system administrator. So Children's chose to work with LUMEDX's Custom Solutions team led by Jim Morris, manager of technical services, to develop a brand new Congenital STS module, integrated with the Apollo Advance cardiovascular data repository.

Developing a Complete, Customized Solution

Pam, Michelle, Michael Clifford, and the LUMEDX team worked together to build a module that would capture comprehensive patient data. "Using the STS National Database, we would have the bones of the database already defined," said Pam. "The procedures and diagnosis would be the basic backdrop, and then we could add to that."

To choose additional fields to be captured, Pam says she went back using her nursing experience and looked through other areas she thought they may want to research in the future-other aspects not covered strictly by STS – those that are more patient focused. "So, we planned for the future by adding other disease aspects, enabling us to collect the information from the start," Pam said.

Custom Forms Improve Efficiency While Maintaining Workflow

Pam started by looking at the Data Collection Form she developed for Children's. Using that structure, she worked to ensure that the STS and additional data were collected efficiently in the normal workflow. Pam went through her Data Collection Form and the required STS fields piece by piece, and determined how the form works on paper, and how it should work in an electronic format. Pam paid particular attention to her workflow, customizing the flow to ensure that it worked with the data and charts that they already had. "For the person who is doing the data entry and pulling it from the chart itself, it needs to be in a certain order so you don't spend a lot of time flipping through the chart or going back and forth to

get different items. In STS, a field might not have been on a certain page, but we moved it to work with our charts."

Pam worked with her team on several drafts of the forms, each meeting getting closer to what they wanted. Michelle created a PowerPoint to show the layout of each form. Once they were satisfied, they put the information on the spreadsheet provided by Jim, including the name of the field, the caption, the type of information in the field and other critical details. The comprehensive list was over 30 pages long.

Jim developed a first draft of the module and sent screenshots back to Children's. LUMEDX and Children's worked together, going over screenshots, making suggestions, tweaking the product, until the completed product met the form and function needed.

Customization did not stop at product delivery, however. Once the module was in practice, Children's found that a certain field didn't work right; it was on form 5, but needed to be on form 3. So Michael Clifford, their database administrator, used the Apollo Toolkit to rearrange fields. Because Apollo is very customizable, Children's has flexibility. So, in the future Children's can add fields to track any data they wish to add and adjust fields to optimize efficiency.

Patient History: All in One Place, Anywhere on the Network

With the completed module, Children's can track data throughout the life of the patient, from the initial surgery to follow-up caths and echos. Interfaces to cath and echo systems allow users to see all procedures, surgical and demographic data for a patient in one place.

"Apollo is a place where we can store and access our cardiac patients' data. It's a one-stop shop where you can quickly find as much information as is available. Recently we had great reviews on the Patient Summary Report. It's not specifically for congenital, but it shows all of the available cardiac procedures, including their echo and cath, along with their surgery dates. We find that surgeons really like the ability to get a summary snapshot: For example, this patient was admitted back in January, and at that time, he had two echos, one cath, one surgery and these are the dates. We've had really good response to those reports," says Pam.

Web-Based Technology

"Because the system is web-based we can access it from multiple sites. You're not locked into one specific location for input," says Michelle. Children's staff and physicians can work from home to access the application, as well as from their offices. "That's been one of the advantages to the way we deployed the application. Because we didn't do local installs, users are better able to get to the application. For the echo piece, we have users in Athens and Columbus in remotes sites who can access the data when a patient had surgery, what procedure they had, and the date."

User Types Promote Efficiency

Children's Healthcare has created specific user types, so that users do not have open access to all patient information in Apollo. Users have limited access to patient data based on their security user group. This allows ancillary departments access to their patients' echo results in Apollo, while restricting access to other patient data.

Facilitating Research & Improving Patient Care

Pam went back and entered patient information from 2002—over 800 patients—into the Apollo database so they would have a base of information that they could query right away. "Echo reports are the number one thing users look up. However, when we get requests for queries, it's the surgical information that they are looking at, whether they are looking at vent times, re-intubation times, etc."

Moving Forward by Solving Data "Problems"

Since implementing the STS module, Children's has integrated additional data into the Apollo database and now reports to the ACC NCDR® IMPACT Registry® utilizing LUMEDX software. The hospital continues to offer cutting edge pediatric cardiac care, with LUMEDX as its pediatric data repository solution.