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**Integrating Interventional Services Pre-Procedural
Process at OhioHealth Riverside Methodist Hospital**

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Integrating Interventional Services Pre-Procedural Process at OhioHealth Riverside Methodist Hospital

Multiyear project requires process improvements to align departments

Riverside Methodist Hospital Interventional Heart and Vascular Services consist of three departments — interventional cardiology (six labs), electrophysiology (four labs), and vascular interventional radiology (five labs) — located in geographically separate towers on the Riverside campus. With disparate locations, there was potential for adverse impacts to healthcare value:

- *Increases overall cost structure:* The locations duplicate resources, such as pre- and post-labor, intra-procedural labor, supplies and inventory, call coverage, and support staff.
- *Inhibits clinical standardization:* There was potential for care variation through the prep, procedure, and recovery processes.
- *Decreases patient/family experience:* Patients needed to deal with separate service departments, each with their own methods.

One of Riverside’s interventional cardiologists, Dr. Gary Ansel, was aware that Baptist Health South Florida had integrated its interventional heart and vascular services. He took a team of administrators and clinicians to Miami to see what occurred, the benefits achieved, and the lessons the Florida provider learned from that process. The group brought back ideas and benchmarks to Columbus, and Riverside leadership believed they could similarly increase the value of interventional services through integration. Leadership set a goal to integrate interventional cardiology (CVL), electrophysiology (EP), and vascular interventional radiology (VIR) into a single location on the second floor of the hospital’s Red Tower.

Riverside’s three-year strategy was to execute approved capital projects in Phase I and move the VIR labs into the Red Tower in Phase II. Many different specialties came together in Phase I to develop the floor plan and identify the best location for integration, recalls Cari Ice, Manager, Interventional Heart & Vascular Services (CVL/EP), and they chose to physically co-locate VIR into the existing space where CVL and EP currently reside. The effort to integrate the three interventional departments (I3 project) would:

- Align with the hospital’s vision to be a tertiary center by creating a space that promotes an interdisciplinary approach and the performance of advanced procedures.
- Differentiate OhioHealth in the market by creating a technology profile that is state-of-the-art.
- Increase the value of care by standardizing quality protocols, enhancing patient and family experiences, and lowering the cost structure for interventional services.

OhioHealth Riverside Methodist Hospital

OhioHealth Riverside Methodist Hospital in Columbus, Ohio, is the largest member of OhioHealth’s 12-hospital network. The 1,026-bed teaching hospital offers medical and surgical facilities to approximately 46,100 annual admissions. Riverside conducts more than 23,000 total surgeries, has more than 88,000 annual emergency room visits, and services approximately 834,600 outpatient visits.* Riverside is recognized locally, regionally, and nationally for quality healthcare, and was named to the top 50 list of America’s “Best Hospitals” for neurology and neurosurgery by *U.S. News and World Report* magazine for three consecutive years.

*FY16 statistics

An operational and process challenge for the integration project was that clinical workflows varied among the interventional services. For example, some physicians have a rounding service for their inpatients, while others do not. In addition, CVL and EP take inpatients directly to the procedural table, while VIR holds patients in a pre-procedural bay. “There was a true understanding of the differences in process among the areas that were coming together,” says Ice.

During Phase II, a cross-functional project team was formed (I3 Operations Team) to begin the implementation of the integration. They, too, recognized the varied approaches by the departments. Riverside’s Director of Operations, Tyler Kocher, “noticed and identified some of the struggles the team was having with standardized processes, integration, understanding how things work differently, and how we could become more similar,” says Kaitlyn Meier, Manager, Business Operations for Heart, Vascular, and Neuroscience. Kocher had attended training at the Academy for Excellence in Healthcare (AEH) at The Ohio State University, and thought it would be a productive exercise for the team to go through the AEH training curriculum, learn lean concepts, and work together to find solutions.

Lean Learning at AEH

The I3 team attended AEH training in October 2016 to improve their understanding of lean tools and techniques, such as value-stream mapping, standardized work, A3 thinking, and benefit/effort analysis. The team reported their initial improvement-project findings to AEH in late January 2017.

The I3 team developed and communicated their integration project via an A3 format, and worked through a number of iterations to identify and articulate the problem. “One thing that was recognized early on in the project was that we weren’t really sure what additional space we would acquire,” says Kim Kinney, Senior Manager, Operations for Heart, Vascular, and Radiology. “We weren’t aware of the exact geography or quantity of bays we were going to end up with.”

The current-state pre-procedural area (PCU 2) consisted of 21 bays, with a daily demand of 19.5 bays. The team eventually identified the future-state demand to increase to 25.5 bays — but with no increase in bay capacity. The team used a benchmark factor of 1.5 bays per procedure suite to calculate bay capacity.

Riverside I3 Project Team

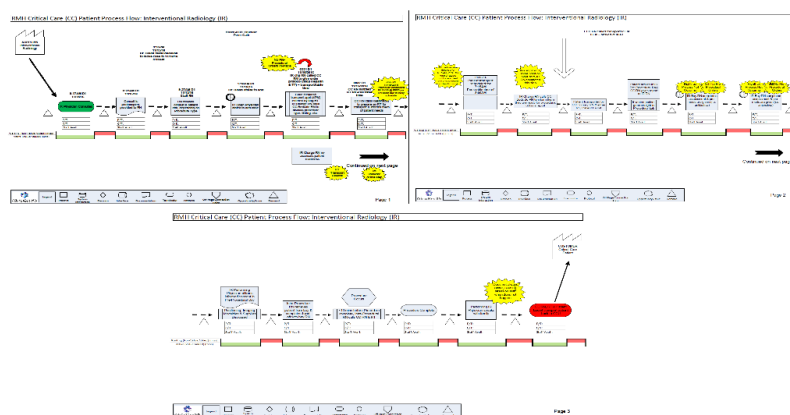
- Kim Kinney, Senior Manager, Operations for Heart, Vascular, and Radiology
- Chris Mitchell, Radiation Safety Officer (former Manager, Vascular Interventional Radiology)
- Cari Ice, Manager, Interventional Heart & Vascular Services (CVL/EP)
- Kaitlyn Meier, Manager, Business Operations for Heart, Vascular, and Neuroscience
- Mark Ohl, Nurse Manager, Advanced Heart and Vascular Center
- Ethan Gundrum, Accreditation Specialist

The team set a goal to decrease utilization of pre-procedure bays in the PCU for all inpatients by 50 percent (approximately six patients per day) by May 1, 2017. This would require decreasing the time spent by a patient in the pre-procedure area. They also set a longer-term goal to decrease pre-procedure utilization by 90 percent (approximately 10.8 patients) by October 1, 2017; this would require complete

elimination of most patient time in the pre-procedure bay (i.e., patients transporting directly to procedural labs).

The I3 team mapped the current state of VIR, starting with the VIR physician being consulted, and progressing through the procedure being completed, and ending with the patient being transported to the critical care unit (see *VIR Current-State Value-Stream Map*). On the map the team indicated various process problems, such as pre-procedural orders missing at many process steps, patient transport delayed because the charge nurse was unaware of patient readiness, and physicians not always communicating with the patient/family after the procedure. Along the process there was miscommunication (e.g., between charge nurse and physicians), and the handoffs from step-to-step were inconsistent.

VIR Current-State Value-Stream Map



Source: OhioHealth Riverside Methodist Hospital

Developing Integration Countermeasures

The I3 team developed countermeasures of creating and implementing standardized pre-procedural order sets (e.g., set provider expectations for utilizing standardized order sets); creating standard work for all handoffs (e.g., from bedside RN to procedural RN); and creating a pre-procedural provider process to ensure patient readiness (e.g., obtaining informed consent). They also planned to track outcomes from the implementation of countermeasures against three new metrics — percent of standardized order sets utilized for inpatients, percent of pre-procedural work-up completed upon arrival to lab, and number of inpatients utilizing pre-procedural bay per day.

Completion of the I3 project was set for June 30, 2017, and the team began to implement countermeasures in January. Their work consisted of:

- *Changes to informed consent process:* The CVL and EP departments had previously moved from the Green Tower at Riverside to the second floor in the Red Tower, and, thus, had experienced what VIR was going through with the I3 project. These departments conducted incremental process improvement based on patient satisfaction surveys and, through their move, changed their inpatient informed consent process. Rather than acquiring informed consent in a pre-procedural bay, they acquired it on the floor for inpatients, which allows them to bring the patient directly to the procedural lab. This practice differs from that of VIR, says Meier, because the inpatient does

not come directly to the procedural lab for VIR; patients are consented in the pre-procedural bay by the performing provider. (The VIR physician practice is an external physician group, and, as such, they do not have a rounding service at Riverside.)

This is where the team sought to be “innovative and compliant with regulatory guidelines,” says Meier. Because it was not operationally possible for VIR physicians to round on inpatient units, the team proposed — being mindful of patient throughput and resources available — to use advanced practice providers (APPs), such as nurse practitioners and physician assistants, to provide education to the inpatients within their room on the floor prior to being transported to the pre-procedural bay. This allowed for the patient to be knowledgeable of the procedure being performed prior to leaving their room.

- *APP process changes:* Connected with the changes to the informed consent process, the team proposed that APPs review both inpatient and outpatient VIR consults (except off-hours), and that the VIR charge nurse would no longer review consults, as this was determined to be out-of-scope. Opportunities for effectively managing incoming consults throughout the day continue to be explored as a process improvement opportunity.
- *Order sets:* An order-set team was formed to create and implement standardized/comprehensive order sets and set provider expectations with utilization (physician and APPs). There were approximately 80 different procedures (inclusive of laterality) that take place in VIR, and various order sets to accommodate. Many subcategories had been identified, such as IVC filter insertion/removal, general biopsies, central line insertion, blood patches, etc. This standardization countermeasure would require some staff to change their order sets, which initially resulted in mixed reactions from physicians as well as APP concerns over effects to their workday.

All countermeasures were expected to deliver high benefit, yet the I3 team also knew they would require high effort. As the team worked on the countermeasures, they came to recognize that the informed consent initiative would require substantially more stakeholder involvement with OhioHealth Medical Staff Affairs, the organizational regulatory and compliance department, general counsel, and the private physician groups, notes Meier. For this reason, these process improvement opportunities continue to be developed not only at Riverside, but for OhioHealth as a system. Meier says that by rigorously evaluating this process as part of its project, the team was able to benchmark goals internally and externally on best practices, and the team became more aware of the regulations by engaging the president of medical affairs throughout the process. “What our project has done is create an open conversation for the organization to take a deeper dive into opportunities between current state and best practice, and what we need to do to, basically, shorten that gap. Those conversations continue.” She expects the decision-making to continue through the year and engage multiple stakeholders within OhioHealth.

Other operational issues also arose, such as an APP leaving the VIR department in April. Work that would have shifted to the APP required the team to develop a different, creative approach in order to be ready for May 20, when the first VIR suite moves over to the new location and inpatients will be moved to the Red Tower. “We’ll begin to use the PCU (the centralized pre- and post-) for some of those patients. We had

hoped that by May 20 we would be able to decrease the amount of inpatients by about 50 percent; however, we realize that probably is not going to happen just because of things that have happened beyond our control.”

To handle the inpatient volume that the VIR will see daily, in April the team was making plans to temporarily operate out of two VIR locations, utilizing the different areas of PCU to accommodate all of the patients. “Originally, we had thought we were only going to prep patients on the second floor and recover patients on the third floor,” says Kinney. “But there are going to be some days where we are going to be required to have patients be prepped on the third floor where we have more capacity.”

The team has made substantial progress with its third countermeasure focused on standardizing order sets. “When we started this project, we had approximately 40 order sets for pre-, intra-, and post-procedural care for the multiple procedures that are done within vascular interventional radiology,” notes Kinney. “However, of those multiple order sets, they were either incomplete, inaccurate, or, in some cases, some of the procedures did not have order sets at all. Since January, the team has been meeting on a weekly basis, and we think we’re going to be able to reduce the total order set count to approximately 15 for all of VIR.”

The order-set change also will impact VIR beyond Riverside because changes in Epic (OhioHealth’s electronic medical record system) requires systemwide approval for implementation. “We’re working with teams at other campuses that consist of leadership, medical directors, and front-line associates to make sure that these order sets can be utilized effectively at their campuses and not hinder their workflow,” says Kinney. The uniformity makes it easier for staff and should remove any confusion and ambiguity.

As the integration project moved forward, less tangible benefits also emerged:

- *Cultural change*: Discrete review of data enabled the I3 team to analyze processes and provided evidence necessary for a cultural change.
- *Provider engagement*: Physician champions have advocated for the process changes.
- *Team development/relationship building*: The effort to understand the integration problem at a detail level and find potential solutions occurred because of the time dedicated to training at AEH and the team’s openness to new lean concepts and tools.
- *Individual leader knowledge*: The I3 team has begun using the new tools in their respective areas.

Preparing for Integrated Interventional Services Go-Live Date

Constraints beyond the team’s control — which in April also included covering for Mitchell, who was the Manager for Interventional Radiology (Vascular and Neuro), but moved to an internal position as the Radiation Safety Officer — slowed the application of I3 countermeasures. The I3 team is still making progress, and their goals are still to eventually minimize and eliminate time in the pre-procedural bays;

however, the near-term objective is to adapt to obstacles that have emerged. To prepare for the integration of the labs, the team began to incorporate some additional lean tools, such as visual management.

“We are creating one centralized dashboard in the electronic medical record system for the procedural care unit so that they can see all patients coming and going from all of the interventional areas in their live state,” says Meier. “We’ll be able to see exactly where the patient is located, which floor they are on, and what bay or room they are in. You will be able to differentiate between, ‘Are they scheduled and not here yet? Are they in the facility and registered? Are they in the pre-procedural area, or are they in recovery?’ The PCU team will be able to see those patients throughout their journey.”

The collaborative, electronic status board will keep staff from moving through multiple EMR screens, based on the type of labs being performed, and it also serves as a “heat map” to keep staff aware of the times of day when volumes are likely to increase. The electronic status board was being implemented in early May.

The team also is building an internal communications tool so that staff can quickly alert each other to changing requirements, such as the need to divert a pre-patient to the third floor when bays on the second floor reach capacity. Given the backup diversion plan and communication improvements, the I3 team does not anticipate a shortage of patient pre-procedure space.

The team will still use the three new metrics to gauge progress, believing they continue to represent the goals of the project. They may add other metrics, such as the length of time a patient is in a bay, until they can move forward with the informed consent and APP countermeasures. They also will continue to judge the project by the original goals. “Our long-term goal of reducing the bay time was 90 percent, and we kind of all knew it was a little bit lofty,” says Gundrum. “But we wanted to reach for an ideal state rather than setting a more easily obtainable goal and not going for gold.”

As the I3 team has developed countermeasures and pursued its goals, it also has been extremely aware of staff anxiety for all of the interventional services departments due to the move. The employee concerns have existed for years and will be realized come May and June when the VIR lab moves with CVL and EP. Kinney notes that EP and CVL staff have been working in an environment where construction has occurred continuously, temporary walls go up one day and are taken down the next, construction traffic is ongoing, and staff often do not have access to break rooms or locker rooms.

“The closer you get to go live, the more anxious people are going to be,” says Mitchell. “As they start to see things happen and maybe not happen, [such as APP changes], that anxiety kicks in more. That’s going to be seen from the teams probably until integration or longer.”

“On May 20, they will start seeing inpatients consistently, and on June 12 all outpatients,” says Kinney. “It will be kind of a flipping of the switch for them.”

The team expects the changes to create more streamlined, standardized processes that will make it easier for patients and, with more interaction among all physicians in interventional services, provide better patient care and reduce complications, says Ice.

“From a patient safety perspective, now that these pre-procedural orders will be acted on the floor, you’re going to have the nurse that’s already taking care of this patient acting on the orders, and they’ve already known this patient,” notes Gundrum. “It takes away a handoff also from the bay nurse as well... The nurse taking care of the patient already knows what’s going on, and is able to act on those orders. If any changes happen, they would be a lot more adept to that as well.”

In addition, when the services were dispersed, not everyone within Riverside was aware of interventional services and/or how to direct patients or staff to those departments. “If all interventional services are on one floor, it really assists with patients and their families finding where they need to be,” says Ice. “When codes are called on the overhead, it really helps with all of our support services to navigate to where they need to be. The proximity to the emergency room for vascular interventional radiology has improved, and they are now closer to that area.” Patients also will benefit from VIR registration moving to the point of entry, rather than a separate location, and they will have an adjacent parking area, adds Meier.

“We’re very mindful of the fact that the changes we’re making and the continuous improvement isn’t going to stop on June 30,” notes Meier. “So even though that component will be complete, there’s still a lot of work left to do.”

AEH Commentary

The Riverside project illustrates how solutions to complex healthcare problems can run into regulatory and/or organizational policies and require a broader group of problem solvers (e.g., leadership, legal, physicians). The I3 team realized that such challenges should not be avoided: work on systemic problems can lead to far-reaching improvements that can be applied well beyond the area of the project initiative.

The project also shows how forming a team that includes various roles and support staff will help to improve communication about a problem and break down departmental barriers and common misconceptions. With the help of lean concepts and tools, the I3 team was able to collectively examine the integration problem and the processes involved without a personal context, which enabled members to ask the extra and occasionally difficult “why” questions necessary to uncover real root causes and develop meaningful countermeasures. The lean tools learned also helped the team evaluate their problem more quickly, and will be beneficial with project management, in general, and other improvement projects that team members pursue.

About AEH

The Academy for Excellence in Healthcare blends in-person class time with hands-on project work, interactive simulations, and recurrent coaching, all aimed at helping healthcare teams spark actionable change at their organization. At the heart of this program is a real-world workplace problem each participant team selects and commits to solving through five intensive days on campus, followed several weeks later by two days of project report-outs and lean leadership training. This project-based approach pays immediate dividends and lays the groundwork for transformational change.

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