Old Wine in New Casks: Avoiding Broken Systems in Shiny Spaces

Engaging front-line staff in integrated process and architectural design for ideal surgical patient care.

EAST TENNESSEE **Children's Hospital**

1) Background:
In 2013, East Tennessee Children's Hospital began to plan, design, and build a state-of-the-art patient and family-centered care tower for clinics, surgery, and NICU.

2) Challenge:
The Surgery Department operates on multiple floors, has many constraints, excessive handoffs, duplicative information in multiple EMRs, and ineffective processes. This results in excessive wait times, long stays, unnecessary searching for needed information, and dissatisfied patients, families, staff, and providers.

From Parking Lot to Completion

3) Goals:
1. Design a patient and family centered care tower that delivers ideal care on one floor.
2. Improve processes to reduce patient wait time and length-of-stay.
3. Improve Operating Room on-time starts.

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4) Schematic Design:
Focus: From concept to inception user groups including front-line team members, providers, management, and families were involved with the design and planning of a new tower.

Top: Cross-functional user groups design individual room layouts and equipment locations in full-scale cardboard mockups. **Left:** Confirming column locations for bed/equipment clearances. **Bottom:** Chip game, spaghetti diagrams, and full-scale floor layouts in rented warehouse space were used to design and validate room adjacencies.

Improvements:
- Designed perioperative space with end-to-end patient flow on one floor.
- Redesigned room doors to allow for emergency equipment access.
- Reduced number of Pre/Post rooms with a column at the headwall from 11 to 3.
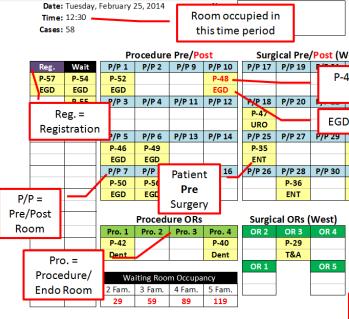- Reduced new facility equipment needs by $560,000

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5) Room Modeling:
Focus: In the past, a patient's pre-op room was reserved for them for the entire day. In the new design, pre-op rooms will be flipped and used for multiple patients multiple times throughout the day. This Room Model was used to validate and confirm the number of pre/post rooms, PACU beds, and ORs required.

Top: Basic spreadsheet modeling was used to visualize room utilization in 15 minute periods throughout a high volume surgery day. Rooms light up yellow when occupied. Actual patient time data was used through EMR time stamps on a high volume day to test the space.
Bottom: Outcome graphs display room usage throughout the day and help validate room capacity and where adjustments in room numbers and scheduling could improve flow and utilization.

Pre/Post Room Utilization

Operating Room Utilization

Improvements:
- Validated that the 40 bed Pre/Post room capacity has the ability to meet current and future patient demand.
- Ability to meet patient demand with two less planned ORs resulting in $812,000 cost avoidance.
- Created buy-in from nurses, anesthesiologists, and surgeons that the number of Pre/Post rooms flow and meet their needs.

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6) Periop Assessment:
Focus: Understand and develop processes focused on optimizing OR access, improving operations, improving utilization, increasing quality, improving budget performance and maximizing patient/staff/physician satisfaction to deliver ideal surgical patient care.

Approach:

Operational Assessment: Interviewed 17 physicians and hospital leaders along with direct observation of periop operations to better understand the current operating environment, challenges, and goals.
Value Stream Analysis: With input from 22 ETCH employees, the value stream mapping session focused on reviewing our current process starting from the doctor's office through surgical services to hospital discharge. From this session, focus areas for moving forward with improvement were identified.

Key Findings and Improvement Focus:
- **Pre-surgery Information Flow:** The majority of frustrations and delays experienced on the day of surgery are actually due to incomplete and missing information at the time of booking.
- **New Facility Process Flow:** Design and detail how patients will move through the new facility with a focus on the new **Pre/Post/PACU design and OR flow.**
- **OR Coordination (i.e. "Air Traffic Controller"):** Design a central communication board (CCB) to signal status, sequencing, and prioritization of a dynamic OR schedule to all departments.

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7) Pre-day of Surgery Information Flow:
Focus: Lack of coordination between the hospital and providers too often results in missing patient information. This causes downstream hunting and gathering of information, preventable work, difficulty in coordinating OR support, late starts, and long wait times for surgeons and patients.

Findings:
- We had three phone calls and multiple checkpoints and yet still only received complete information on the day of surgery 10% of the time.
- Redefined who, what, and when of needed information.

Improvements:
- Designed and updated Admission Order Booking Sheeting, Surgical Booking Sheets, Ancillary Support Orders, and H&P's
- Established clear guidelines and timelines for practices to follow (92% compliance).

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8) Day of Surgery Information
Focus: In the new space our Pre/Post assignments are combining with PACU. We had an opportunity to not just move our pre/post team to the new ORM module but to redefine the data elements essential to Outpatient Surgery to ensure we have the right information available to the right person at the right time.

Approach:
- The team defined patient information needed by all stakeholders for the flow and coordination of services. The group then determined which types of information are needed in each area (Registration, Pre/Post, PACU, OR "Air Traffic Control", ORs, Anesthesia).

520 Previously there were approximately 520 possible questions being asked of patients/families prior to surgery.

Improvements:
- Consolidated EMR modules to allow for shared information between groups.

ORM PCS AIMS

Pre Data
Currently we gather 520 information fields
148 of those are duplicates

Post Data
Future state: 199 items
21 duplicate items

- Reduced total number of questions by **62%** and duplicated questions by **86%!**

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9) Periop Coordination
Focus: To achieve an on-time start our teams require significant information, preparation, and coordination. To accomplish this a process will need to be developed and deployed to manage perioperative coordination ensuring visibility, tracking, and priority of both patient flow and provider status.

Approach:
- Deploy a new management system for OPS focused on improving patient flow.

Patient Priority Board

Top: New patient priority board provides patient flow management and priority. Allows all parties to see the status and priority of the patient. **Left:** Charge nurse has primary focus on patient flow management (i.e. "Air Traffic Control")

Improvements:
- Improved OR 1st case of the day on-time starts from **29%** to **58%.**
- Average time to get a patient ready for surgery is **46 minutes;** under our goal of 60 minutes 87% of the time.

OR 1st Case On-time Starts

OPS Weekly Data % On-time and Minutes Prep Time

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10) Next Steps

Move Planning:
Focus: Define all areas where processes will need to or should make adaptations for March 2017 opening.
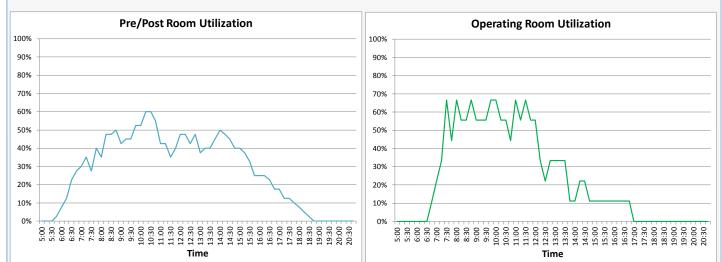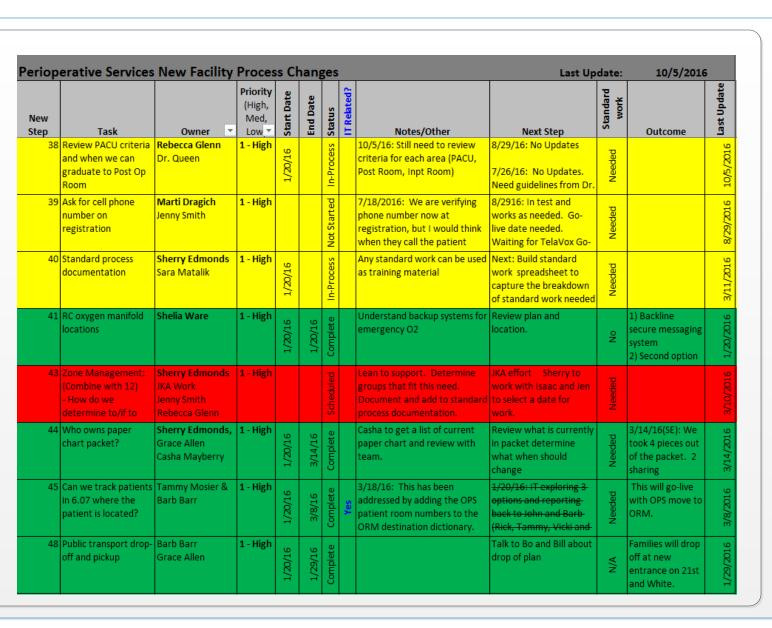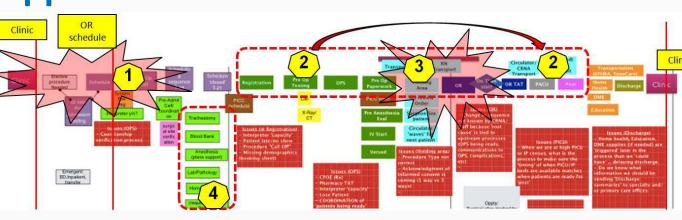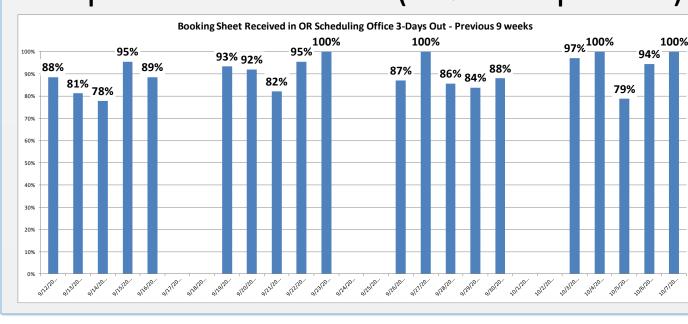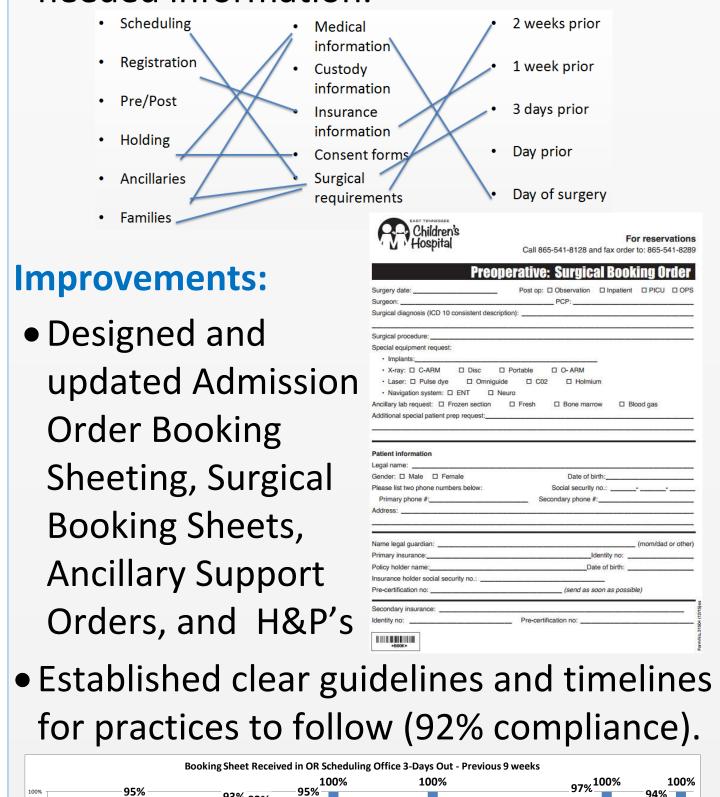
Approach:
- Identify specific needs to be addressed.
- Assign priority, project owners, timeframes, and support required.

Progress to Date:
- 51 project identified with 29 high priority
- 17 Complete, 11 in-process, 1 planned

Perioperative Services New Facility Process Changes

On-time Starts Kaizen:
Focus: Continued improvement to OR on-time starts performance.
Approaches:
- Review and track OR turnover time to improve OR utilization and surgeon satisfaction.
- Implement standard Versed dosages based on patient weight ranges to eliminate drug waste and nurse witness process.
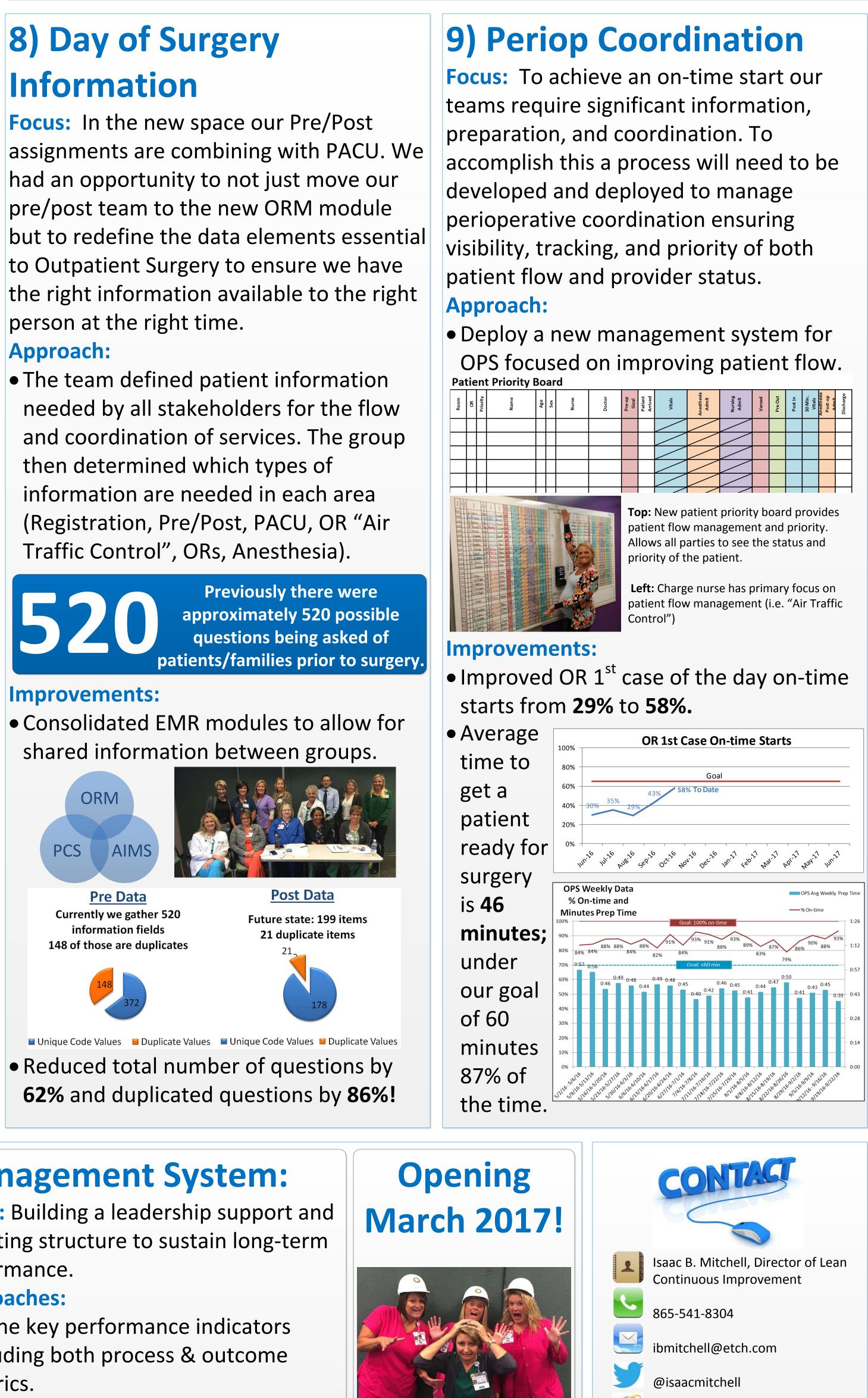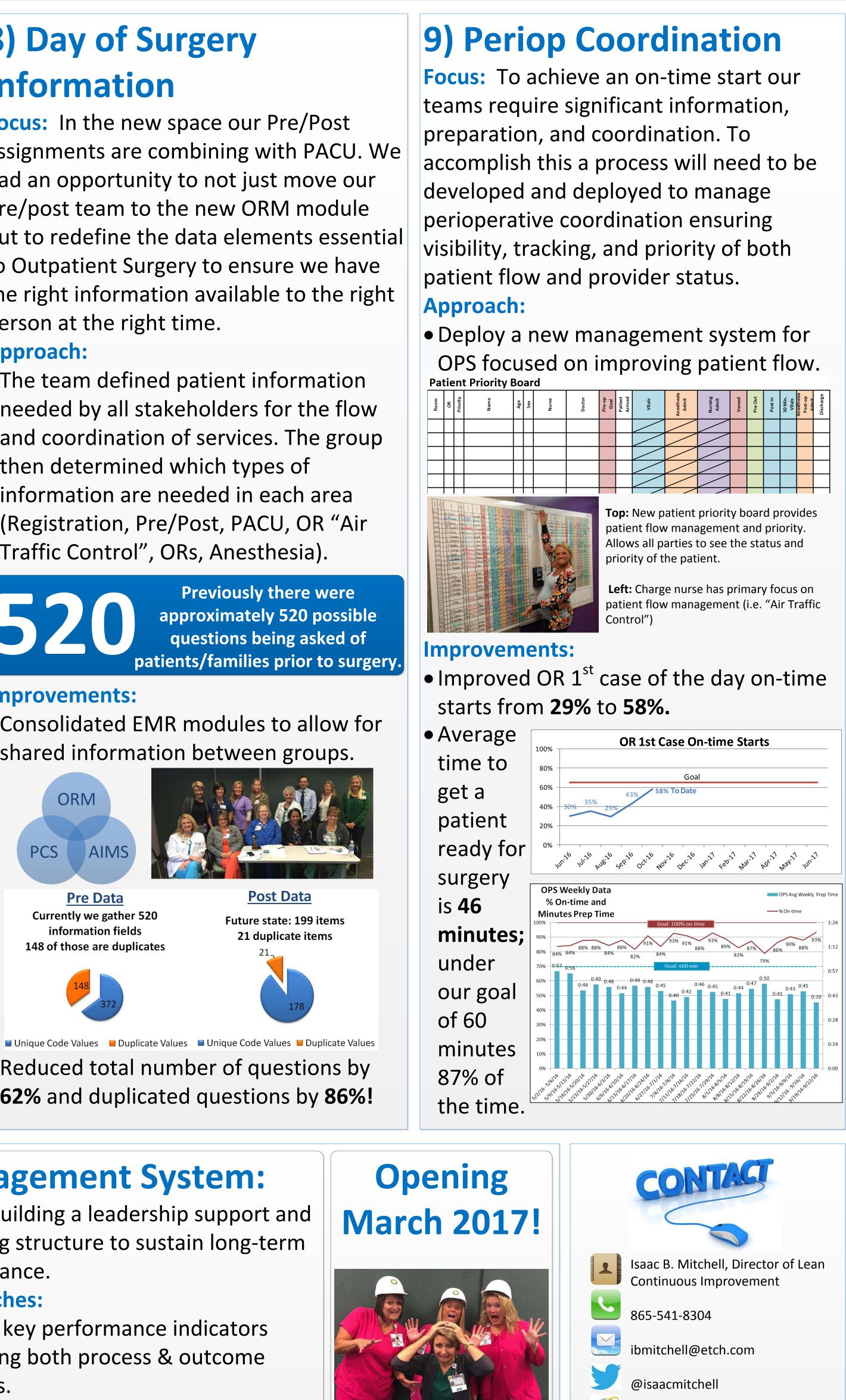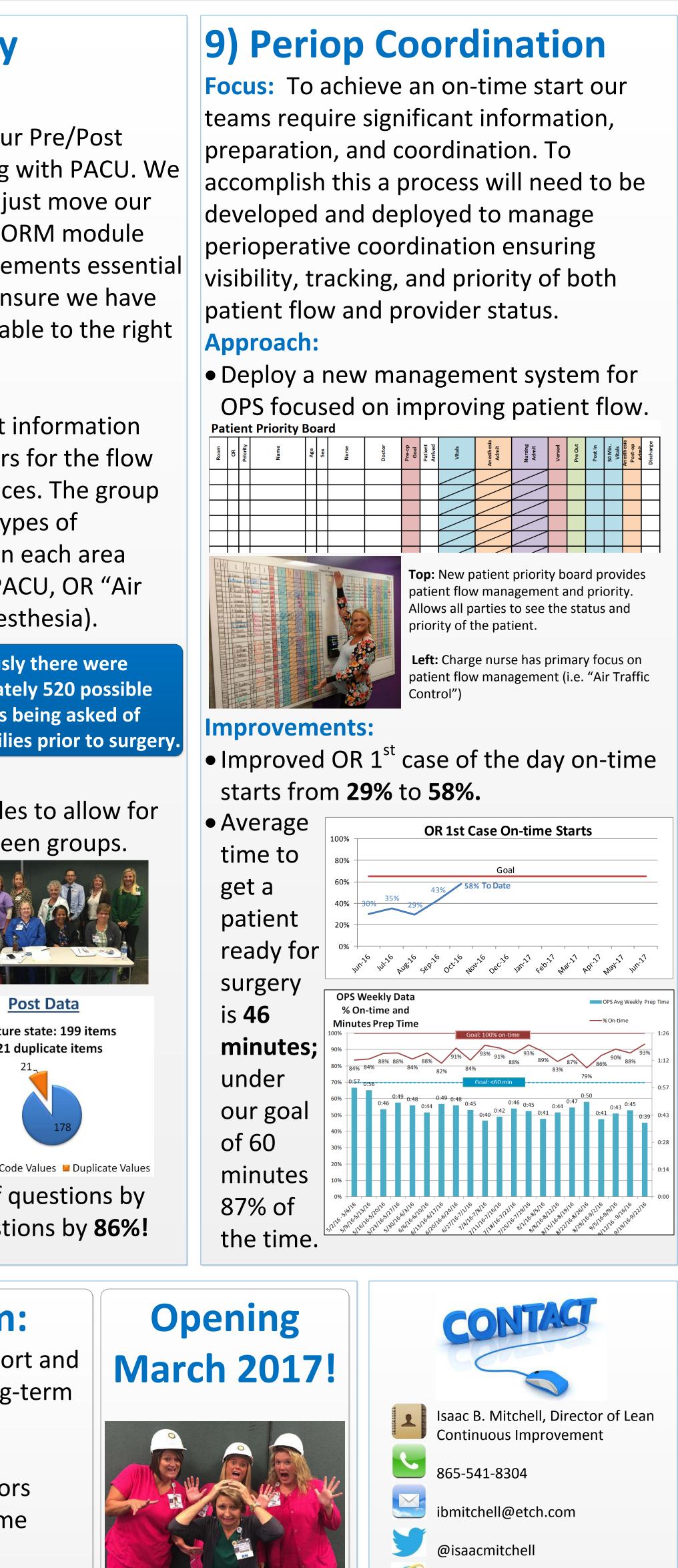- Stagger OR start times to ensure Anesthesiologist doesn't have three assignments that start at the same time.

Time spent w/ patient
Time doing the turnover activity
Waiting
Transportation

Minutes | 1 2 3 4 5 6 7 8 9 10 11 12 13
CN turnover
ST turnover
CRNA turnover

Management System:
Focus: Building a leadership support and reporting structure to sustain long-term performance.

Approaches:
- Define key performance indicators including both process & outcome metrics.
- Implement daily huddles to review today's performance and coordinate and prepare for tomorrow's schedule.

Opening March 2017!

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