Profile
Lakeland Health is located in St. Joseph, Michigan and is a teaching hospital comprised of three acute care hospitals with 370 licensed beds. In 2015 there were 59,378 inpatient admission, 80,669 emergency room visits and 305,766 outpatient visits. Lakeland Health includes 34 practice location with 4,049 associates including a medical staff of a medical staff of 450.

The Challenge
Research shows that obstetric (OB) hemorrhage was one of the leading causes for maternal death and a major contributor to maternal morbidity (California Maternal Quality Care Collaborative [CMQCC], 2011). Tragically, deaths from hemorrhage consistently rank as one of most preventable causes of mortality with 70-92% of deaths judged avoidable (CMQCC, 2011). Several regulatory agencies identified the prevention of obstetrical hemorrhage as a priority to improve patient outcomes.

Preeclampsia and hypertension are also serious OB concerns. Severe maternal morbidity is 50 times more common than maternal mortality. During the last two decades, the incidence of preeclampsia has increased by 25% in the United States. Hypertensive disorders of pregnancy, including preeclampsia, are also major contributors to premature births. This emphasizes the importance of early detection and providing quality patient education to mitigate the dangers associated with hypertensive disorders during pregnancy.

Therefore, Lakeland Health participated with the Michigan Hospital Association (MHA) Keystone initiative and innovatively utilized the EHR to support best practices and reduce the risks for morbidity and mortality.

Implementation Overview
Our journey started with a hemorrhage risk assessment in the offices that crossed over into the hospital record. We made the change from estimated blood loss (EBL) to qualitative blood loss (QBL) with the implementation of a calculator specific to both sites. This was followed by creating an OB Emergency Narrator allowing us to document in real-time, with the same features as the more commonly used Trauma narrator. Our physicians are even able to pull the data from the OB Emergency Narrator into a note for their documentation. This optimization has allowed our team to recognize risk from the prenatal period and be prepared during the delivery and recovery. Lakeland Health automated and implemented the following four innovative technology initiatives to manage obstetrical hemorrhage:

- Hemorrhage Risk Assessment
- Standardizing Pitocin administration during 3rd Stage of Labor
- Quantitative Blood Loss Calculator
- OB Emergency Narrator

Hemorrhage Risk Assessment
This is a flowsheet template built in Lakeland’s EHR. Documentation starts in the offices and continues through delivery. It is a standardized tool that promotes the assessment of the risk of hemorrhage throughout the continuum of care during the pregnancy. It calculates the
risk for hemorrhage and prompts the nurse to select the appropriate blood bank order for the individual patient. This ensures that blood is available for those at greatest risk for hemorrhage and is cost-effective for those at lower risk.

**Standardizing Pitocin administration during 3rd Stage of Labor**
A group of clinicians and IT/EHR Analysts collaborated and revised the Labor and Delivery order sets to include standard Pitocin orders to ensure the medication is readily available for administration. Giving Pitocin after delivery of the shoulder of the baby or after delivery of the placenta decreases the risk of hemorrhage.

**Quantitative Blood Loss Calculator (QBL)**
One of the most creative and innovative tools we implemented is the QBL calculator. This incorporates a flow sheet into a report which is then available in the delivery summary. The calculator determines a quantifiable blood loss rather than an estimated blood loss. This is accomplished automatically by subtracting dry weights from wet weights of blood saturated items. The dry weight for every sponge, pad, and type of linen that may be used during a delivery are predefined within the flow sheet. That way, during the delivery as the nurse weighs each item and documents the wet weight, the calculator automatically subtracts the dry weight to provide an accurate blood loss volume. Quantitative blood loss allows for accurate measurements and proper treatments for hemorrhage and its complications.

**OB Emergency Narrator built in EHR**
A Narrator is a documentation tool in our EHR that allows the end user to perform a number of tasks while viewing the specific timeline used during codes or traumas. Lakeland’s EHR/IT Analysts creatively customized the EHR “model narrator” to improve care during post-partum hemorrhages. The Narrator allows for more rapid administration and documentation of medications, with “one step functionality” and blood products during OB emergencies.

Lakeland Health automated and implemented the following innovative technology initiatives to manage preeclampsia.
- Blood Pressure Alert
- Preeclampsia Discharge Instruction

**Blood Pressure Alert for Obstetric Patients**
Blood pressure parameters for obstetrics patient are significantly different than the general population. The maximum value was modified for the patients admitted to the OB unit. If the BP falls out of defined parameters, the value is displayed in red (visual alert), and the nurse will notify the provider for further treatment orders.

**Specific Discharge Instructions for Preeclampsia**
A Smart Phrase containing specific discharge instructions was created for preeclamptic patients to be used at discharge. The Smart Phrase includes diagnosis-specific care instructions that print out on the after visit summary to educate the patient on her follow-up care.

**Resulting Value / ROI**

**Hemorrhage Risk Assessment**
Based on the six month rolling average, the table below shows a decline in the blood utilizations since the Hemorrhage Risk Assessment was implemented in January 2015.

**Process Improvement**
Reports and dashboards are key elements for process improvement for following the Plan, Do, Check,
Act (PDCA) process. Care providers stay informed of current patient statuses and up-to-date quality metrics with the goal of providing safe and effective obstetrical care. Report cards and dashboards have been created to show progress towards goals and are reviewed at monthly meetings and shared with all providers, nursing leadership, and staff.

**Preeclampsia reports**
- Flag the time of admission to the time of the first blood pressure
- Automatically highlight the blood pressure if it falls in the severe range
- Identify if the care provider was notified

**Postpartum hemorrhage reports**
- Provide feedback to specific providers and nurses as to their rate of compliance with providing Pitocin after delivery of the placenta

Reporting dashboards are reviewed with all non-compliant events investigated and evaluated for improvement opportunities. The Birth Place unit managers developed departmental and individual nursing staff report cards to monitor compliance with all key metrics. The automation of the reports has proven time effective and efficient, allowing for other ongoing quality patient care activities.

**Lessons Learned**
Lakeland Health is implementing more initiatives, on faster time lines than our benchmark organizations. Our organization effectively responds to emerging issues by leveraging the power of technology. In this case, innovation is about the multi-incremental enhancements that have made impacts in patient safety and outcomes. The individual tools that were implemented may have been less significant as single improvement elements, but the cumulative effect was significant, a creative and innovative application of technology used to solve a complex problem.

The clinical team had a vision to improve the care for the obstetric patient. The EHR/IT Analyst took that vision and developed creative ways of building, modifying, and enhancing the EHR to provide tools needed to improve the patient experience. The Hemorrhage Risk Assessment, Blood Loss Calculator, and OB Narrator required the EHR/IT Analyst to collaborate with the clinical teams, complete research as to what other hospitals had achieved, and then elevated their ideas to create even better tools. Each item was built with the understanding that key metrics would be discreetly documented to ensure the process improvement cycle of plan, do, check, act could be followed. Standardizing order sets, developing patient education using discharge instructions, and blood pressure alerts were simpler to develop but were essential in achieving the overall benefits. Improving care for the obstetric patient was the guiding principle that lead to the incremental enhancements leading us to our goal of perfect care.
“Leveraging our EHR and supporting IT capabilities at HIMSS Stage 7 has helped Lakeland and our caregivers to deliver exemplary care, reduce cost and save lives,”

Lowell Hamel, MD, VP – Medical Affairs and Chief Medical Officer, Lakeland Health