

# Processes to improve obstetric patient safety and outcomes in a rural hospital: are there unintended consequences?

## Abstract

There is growing international interest in improving obstetric service processes, outcomes, and reducing costs. Change in delivery of the healthcare system is universal due to innovation but predominantly incited by the sociopolitical call to reduce costs. Most of the literature has been provided by increasing numbers of accomplished researchers concentrating on obstetric patient safety and outcomes. Several papers demonstrate similar maternal/neonatal outcomes on rural versus urban populations. Measuring and improving outcomes has proven to be a difficult task. Processes to improve patient safety will be discussed from a rural hospital perspective, some of which have been and can be easily implemented in all hospitals to effect efficiency, effectiveness, and data to alter the communication (oral and electronic). If you cannot dynamically measure quality, you cannot improve quality. There are local solutions to local problems. Perinatal regionalization, telemedicine, and tele-sonography continue to provide improvements in access to at-risk care. The development of the TEAM approach cannot be underestimated. It is essential to remove the silos from the service. Monitoring and infusion of resources to improve population accessibility is in need of enhancement. Value driven healthcare will be affected by balancing business and financial needs with improved quality of care.

**Keywords:** rural health, patient safety, obstetrics, quality, shared decision making

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**Abbreviations:** NICU, neonatal intensive care unit; SWOT, strength, weakness, opportunities, and threats; SBAR, situation, background, assessment and recommendation; MIS, medical information systems; EMR, electronic medical record; EMTALA, emergency treatment and labor act

## Commentary

Over the past 14 years there has been a growing interest in improving hospital processes for effectiveness, efficiency, and patient safety.<sup>1-4</sup> The obstetric research is difficult and complex partly because of the high percentage of physiologically well patients, mother and neonate.<sup>5</sup> The main intent of the researcher objective was to improve accuracy, competencies, and to initiate a collaborative commitment through processes, which will result in improved outcomes.<sup>4,5</sup> They also strove to decrease variances, reduce harm, and lessen costs. Continuous and constant data is needed to benchmark care, which is episodically provided in silos. As important is that unknown, amounts of the quality data may be inadequate and programs are inconsistent. For example, hospitals with low obstetric volumes appear to have higher postpartum odds of maternal hemorrhage. Additional data concludes obstetric quality and safety outcomes vary significantly across rural hospitals by birth volume. It appears further research is needed to determine if volumes and geography affect outcomes.<sup>6-8</sup> There is great variation among hospital's and the quality indicators.<sup>7,9</sup>

You may ask, what are the outcomes you want to advance?<sup>10</sup> Improved outcomes take many forms and may result in unrecognized, unintended consequences. Objectives will depend on international geography and established public health targets to reduce maternal and child mortality and morbidity. It is oftentimes important to notice

the differences in definition, such as rural, urban, quality, and process. Currently in the United States, most outcomes are targeted by the short-term adverse effects on the mother, fetus, and neonate.

Regulators in the United States, including the Joint Commission and insurance companies, have cited such short-term outcomes by which they gauge and may publicly report physician and hospital performance. These include, but are not limited to, read missions, birth trauma, admissions to the Neonatal Intensive Care Unit (NICU), vaginal lacerations, episiotomies, elective near term deliveries, liability claims, financial ramifications, and cesarean section rates, thus demonstrating a need for expanded quality measures.<sup>10</sup>

In truth, the most valuable maternal and child outcomes we desire to reduce are delivery of premature babies, child neurologic dysfunction, maternal mortality and morbidity (50 times more common than mortality). Will altering processes and standardization improve these outcomes? The long-term adverse outcomes have a low prevalence and will continue to require multicenter well-funded studies, large hospital systems or meta-analysis to provide the appropriate research papers to support that evidence-based care can be the cause of improved outcomes. It appears it takes 3-5 years to provide any statistically significant long-term outcome change based on process alteration in part due to the low prevalence of the adverse benchmark. It will also require robust, integrated, and granulated data management across diverse systems and populations. Recent large studies of some long and short-term outcomes are disappointing.<sup>11,12</sup>

As such, the regulating bodies and benchmark developers for public dissemination have limited scopes of quality to short-term outcomes. To be meaningful, these short-term "quality" measures require greater refinement of data, such as individual cesarean section

rates. Gross rates are not an indicator of quality of performance unless we know why it was done, the acuity of the patients, comorbidities, etc. In addition, grading outcomes across diverse hospitals may not be valid. Furthermore, obstetric care should be based on shared decision making with evidence based medicine and the patient.

Shared decision making is becoming more prominent as a method to improve population health<sup>13</sup> How strong is the evidence-based medicine and how well does the patient understand the explanation of the evidence upon which they will make a shared decision? Can one exist without the other if we are to improve patient safety? The balance of autonomy and beneficence is ubiquitous. There are skills needed in informing and measuring heterogeneity of patient populations. Will the evaluators of hospital and physician quality insert the variable of patient diversity with the intent to maintain wellness and patient compliance into the grading system? How much effect does the doctor have on patient behavior?<sup>14,15</sup> Until patient population diversity is incorporated into grading reports of performance, one questions the true value of the grading system resulting in improving patient care in the current system.

We all recognize any grading of physicians and hospitals will alter their behavior, but will it improve the care and outcomes? The long-term outcomes with strong evidence could be funded by the same insurers and regulators, but they have generally failed to do so. Cost factors at all levels can influence the commitment of resources for safety efforts. The diversity of populations must be taken into account. Individual human behavior is difficult to measure when the system performance is evaluated. Systems to provide home support after delivery need to be improved to assist in newborn care and maternal compliance for care of their comorbidities. Targeted “pay for performance” may take into account the more complex and higher acuity patients that cost more for proper care.

As “pay for performance” becomes more prevalent and has a greater effect on reimbursement these rating scores of “quality” and outcomes will require more scrutiny, validation and unintended consequences as seen with the electronic fetal monitoring and the cesarean section rates. Also, the use of hormone replacement in post-menopausal women and increased heart attacks should cause us to pause. Approximately 14% of all US deliveries are in rural hospitals (depending on the definition of rural) Literature shows that hospitals with less than or equal to 1200 deliveries provide in-patient care for almost 50% of the deliveries in the US. According to ACOG, in 2008, only 6.4% of obstetricians/gynecologists practice in rural settings.<sup>16</sup>

I wish to describe processes that we have implemented in a rural facility housing an NICU with approximately 1200 deliveries per year. There are no residents or fellows in the healthcare system. All patients from every socioeconomic background are seen in the healthcare system or private physician offices and there are no clinics. The following is a summary of initiatives we implemented that may assist in improving the obstetrical services and reduce miscommunication and harm.<sup>17,18</sup>

## Establish the team approach

This includes all personnel (most importantly nurses) in all processes such as case presentations, protocol development and approval, educational didactic sessions, input from the NICU, pediatricians, and anesthesia department. We tried to align incentives.

## Develop a plan from all personnel

We began by using the Strength, Weakness, Opportunities, and Threats (SWOT) business model approach. Hours were spent meeting with all providers to determine opportunities to improve care. They proved to be primarily communication and professionalism. We subsequently distributed to the team by email timely journal articles and webinars which addressed improving care for discussion, evaluation, and possible implementation at our monthly Risk Management and Patient Safety Meeting attended by all interested providers.

## Mission and vision statements

I learned as Chair of the Robert Wood Johnson Medical School Department of OB/GYN near the International Headquarters of Johnson and Johnson that the mission statement had a genuine effect with almost all the employees and management for nearly 100 years. The founder of this most successful corporation established it. Our obstetric mission and vision statements were established by the TEAM following the SWOT exercise.

## Simulations

Improving mishaps in the aviation industry have had a worldwide impact. They used simulations to effectively reduce errors, improve communication, and establish strict adherence to protocols.<sup>17</sup> Videotaping the sessions is an essential component of the debriefing. We hold these sessions at least once per month. They address both the common and uncommon events. A multidisciplinary presence is required in most simulations. Protocols are followed and corrections in actions are a learning experience.

## Mentoring

It was recognized that the charge nurses were not adequately trained to provide leadership and manage a group to adhere to accepted behavior and protocols. This included interactions with doctors, nurses, and disruptive behaviors. We all realize the nurses are the first line of care requiring structure and critical thinking in a system where they know someone has their back. This is particularly important on night shifts and weekends. Thus, mandatory mentoring sessions were established for all managers and charge nurses no matter their seniority. Often individuals are put in charge because they are entitled. This applies to physician management and leaders as well.

## Communication

Cascading errors in communication leads to most adverse events. There needs to be a supportive culture to provide confidence for each member to express concerns, disagreements in care, avoid silence, and report disruptive behavior.<sup>18,19</sup> Anger and stress negatively affect judgment. Emphasis was placed disseminating complete information to the health care team. Accurate hand-offs are essential to providing proper care now being taught in medical schools.<sup>20</sup>

## Laborist

A laborist would assist in maintaining continuity while the providers remained in their offices until needed.<sup>21</sup> The laborist also provides adherence to protocols, assistance at surgery, manages emergencies, and delivers “unattended” deliveries by the private obstetrician or nurse midwife.

## SBAR

The situation, background, assessment, and recommendation (SBAR) was implemented to assist in standardizing communication, however most doctors want to quickly get to the gist of the issues. SBAR was used by most but not all as a method of standardized communication for over 2 years after it was implemented.

## Process improvement and Medical Information Systems (MIS) data management

Hospitals cannot improve quality if they cannot measure quality and collaborate with the both the Process Improvement department and MIS. Granulation of accurate data with a timely feedback loop is essential as we move to improve overall care. Electronic medical record (EMR) data is in the nascent stages. It is sometimes incomplete or inaccurate, but it has allowed us to share timely healthcare information as never before. This detail allows us to move forward in more accurate and precise evaluation of performance. Furthermore, we can determine adverse or enhanced outcomes based on processes providing proper outcomes to assess provider performance. The EMR needs to be constantly customized to provider needs including placing pediatric, newborn, anesthesia, and NICU information for timely sharing to avoid errors in missed diagnosis or preparing for care of all patients. Moreover, new reports discuss errors in EMR documentation attributing 20% of one system's liability claims. Clearly, if the information is invalid then it should be corrected. If we find the quality measures unsatisfactory we should demand for better more justifiable and real data that improves our practice of medicine. The system requires a feedback loop to address areas for timely improvement. Community wide compatible infrastructure will assist in reducing lack of information arriving to the point of care in a timely fashion. It is becoming more evident that poor care or documentation in the outpatient setting is compounding errors in the hospital.

## Cultural change

This is the most challenging and most rewarding impact that leadership can attain in efforts to improve safer care. It takes time and is built on the first-adopters to accept the change. They must buy in to the TEAM approach, professionalism, critical thinking, and the mission and vision statements. The first-adopters are your core. They understand reciprocity and are motivated by a desire to provide collaborative improvement for excellence. Change in healthcare is difficult to achieve and the desire for quick action is always sought. Expectations need to be modified, but their desires must not be assuaged. It takes constant and consistent steps by leadership to monitor communication and action if realistic and positive impact can be achieved. Accountability must be aggressively pursued. If accountability is not pursued then disappointed personnel pervade the culture and negatively affect implementation of positive change. The leaders should bring the personnel's limbic system to the forefront. Provide them with a platform to express what makes them enjoy their job and what the most rewarding experience is. We need to appeal to the limbic system to incite positive emotions, which are just as important as the fact-loaded precortex. Inspiring value in each person's personal role is both enriching and enhances performance. Professional behavior must be constantly encouraged. It requires training to properly manage unprofessional behavior (disruptive), which is a Joint Commission sentinel event.<sup>18,19</sup>

## Product line

This is another example of utilizing business models that have proven effective for decades, such as Japanese engineers introduced into automobile manufacturing. Integrating the multidisciplinary, diverse patient flow provides many advantages. It improves communication, openly discusses system accountability, examines waste, and should bring efficiency geared to the patient's desires and good outcomes. The product line provides information and measured feedback to distributed management. The "perinatal" and "product" flow is currently counter intuitive as the prenatal care moves to in hospital care and the newborn and mothers are generally placed in silos of care. Finally, infant and child evaluations are lost to almost all previous providers. All these silos provide individual information that in a feedback loop will enable us to target the areas for improved value and reduced harm. Hospital administrators and directors of services must participate to provide plans and resources to add value to the service line.

## Perinatal regionalization

Regionalization is placing the patients in appropriate care facilities.<sup>22-27</sup> It should emphasize identifying high risk pregnancies. Risk-appropriate care and levels of services are usually defined and sometimes funded adequately by the state or country. Having directed the maternal segment in the developing Florida RPICC in the 1980s the goal was to direct the most at risk neonates (very low birth weight=<1500gms) deliver at subspecialty perinatal centers. The program was, in my opinion, based on the fact the maternal transport takes precedent to the neonatal transport to improve outcomes (inborn versus outborn). Last year our rural hospital accepted 40 maternal transports and 72 neonatal transports. It appears the message of better morbidity and mortality when neonates are born at the regional center has not been universally implemented or transfer can be negatively affected by weather, geography or emergent intervention required before transport is safely accomplished. Our catchment region is a radius of 100miles and transport by helicopter or ambulance. We have provided outreach consults and education to our surrounding communities. Transfer and referral services are available 24/7 supported by the obstetric nursing station and the maternal fetal medicine or neonatologist's cellphones. It is important to standardize the mechanism for transfer of accurate information. We have developed an internal system that works well. The referring physician/institution takes responsibility for the transfer and making the correct determination if the transfer should occur and assuring the receiving center agrees. The Emergency Treatment and Labor Act (EMTALA) laws are in effect to avoid "dumping" patients and regulating the use of appropriate care at the transferring and receiving hospital. Geography and logistics play important roles in facilitating transfers. Weather and availability of people to drive an ambulance are issues we face in a rural hospital: it can take up to two hours to get an ambulance crew assembled. In addition, if fetal or neonatal surgery is indicated we preferably direct the patient to a full-care University hospital or transport from our hospital. A decrease in Medicaid funding of NICU care in this state places these programs at risk.

Telemedicine and tele-sonography have been used in states with large rural populations such as Arkansas.<sup>28,29</sup> This is a growing trend, both internationally and in the United States.

It provides an opportunity to have immediate access to remote patients and healthcare providers. Cost, as in all improvements in quality, is a barrier. Most large scale systems have required outside grant funding; we have found it currently too costly to incorporate. But as we continue to view improvements of new technologies using pc-pc transfer of information the cost will decrease. Unfortunately, we still need objective side-by-side comparisons with onsite sonography versus remote. Federal or state funding may assist in improving patient accessibility to remote experts and improve care for the poor and geographically remote patients enhancing population health.

This is only a descriptive commentary providing selected processes others in healthcare system research have described. We began our cultural change by including the entire healthcare team in building confidence in their opportunities, critical thinking, and timely information transfer. These processes require time to improve positive attitudes with constant vigilance and when possible utilize protocols and targeted data mining to determine their effects on selected outcomes. Data is management and must be dynamic and replace the entrenched static monitoring. Too often managers only use a fire truck to put out fires in a post de facto response. The circular truck often runs out of water: thus, proactive management and leadership is more effective. Accurate data and ranking and priorities work well to alter behavior. The short-term outcomes can be analyzed in smaller healthcare systems like ours. Long-term outcomes will require large and prolonged studies and/or meta-analysis. Successful following of protocols have been rewarded in cooperative ventures with the liability carriers reducing premiums.

The cultural change and the collaborative commitment to excellence calls for more providers to accept progressive and creative alternatives founded on high grade evidence. Review of future articles by experts that perform research on patient safety processes and outcomes is part of leadership and to adopt proven effective ideas and evidence based processes and outcomes. Much of this evidence and selected processes can be used in smaller services. Always be conscious that the changes take time. Constant vigilance and leadership are important: dispose of the “hit and run” consultant. First impactful steps from the existing literature would be to institute steroids given to all mothers with babies at risk of delivery before 32 weeks, protocols and simulations for hypertension, massive maternal hemorrhage, and preparation for at-risk mothers to deliver at regional centers. The lack of patient accessibility to proper healthcare in rural areas remains a major obstacle and deterrent to improving health in rural healthcare systems and beyond the scope of this paper. Overall the external factors are calling for rapid change due to cost, growing provider shortage and inexperience. We continue to review strong evidence based protocols and implement them while maintaining a careful analysis in search of unintended consequences. We must not forget that the performance and cost of the healthcare system is a multi-stakeholder problem with causality related to insurance companies, government regulations, defensive medicine and patients. It is not only the causality of patient safety related to hospitals and physicians.<sup>30</sup>

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## Conflicts of interest

The authors declare there is no conflict of interests.

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