2014 Gage Awards

Reference #	7446779
Status	Complete
Name of hospital or health system	University of Kansas Hospital
Name of project	5-Year Experience with PROMPT™ (PRactical Obstetric Multi-Professional Training) at a US Hospital Reveals Sustained and Progressive Improvements in Perinatal Outcomes
CEO name	Bob Page
CEO approval	Check here to confirm that your CEO approves of this project being submitted for a 2014 Gage Award
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Within which of the two categories does your application best align?	Quality

1. Provide a brief description of the project. (This section should resemble an abstract for a poster presentation or an abstract for a peer reviewed journal. Include an objective, data sources, study design, findings, and conclusions.)	Objective: Birth is less safe than it could and should be. Simulation and improved training have been near ubiquitously recommended to improve intrapartum safety, however the key ingredients of a successful program (e.g.- who to train, content, frequency, high vs. low fidelity, and the inclusion of communication and teamwork drills) are unclear. Obstetrical simulation efforts in the past have improved provider knowledge and confidence, but patient outcomes fared less well, either left unstated or associated with an increased rate of intervention; one team reported a worse outcome after simulation training. The only obstetrical program iteratively developed with information from a randomized controlled trial and demonstrated to improve obstetrical patient outcomes is PROMPT™. Developed in the United Kingdom, we adapted PROMPT ™ for North America and initiated mandatory, annual training. Study Design: The first PROMPT™ course at the University of Kansas Hospital was held in August 2008. We sought to train all healthcare workers who could be involved in an obstetrical emergency. We compared annual rates of multiple perinatal outcomes from 2006-2012 using an events/trials approach to investigate changes in annual proportions over time. Results: PROMPT™ participation was associated with significant improvements in multiple outcomes: a decrease in rates of umbilical artery acidemia at term, a reduction in the rate of brachial plexus injury as well as a background reduction in cesarean section and episiotomy rates. There was also a favorable decline in HIE. It is estimated that the healthcare costs avoided by these improved outcomes saved almost $20 million during the five year experience. All of these improvements occurred despite a growing delivery volume, increasing numbers of young, recently trained providers, and poor participation of non-obstetrical physicians who worked on the Labor unit. Conclusion: PROMPT™ can be successfully adapted to the practice patterns of obstetrics in North America to achieve important cost effective improvements in patient outcome. Combined with international results, these first North American outcomes support recommendations that annual training in a PROMPT™ like program be mandatory for all healthcare workers whose duties include Labor and Delivery.

2. Describe the methods use in this project. Include where, why, and how the project was accomplished.	METHODS The first PROMPT™ program at the University of Kansas Hospital (KUH) directed by the local team occurred in August 2008. All Hospital personnel assigned to Obstetric and Nursery units, plus all OB-GYN residents and all OB-GYN faculty who either took in-house call or performed deliveries were required to complete annual training. Instructors were not compensated, and the course remains free to all medical center participants. The PROMPT™ program conducted from third quarter 2008 through 2012 included modules on fetal heart rate interpretation and response, maternal collapse, eclampsia and hypertensive emergency, maternal hemorrhage, shoulder dystocia (SD), umbilical cord prolapse, forceps use, and vaginal breech/twin deliveries. Both procedural simulations and paired didactic sessions were conducted in multiprofessional teams. Woven throughout all activities were lessons on structured communication, teamwork and situational awareness, and leadership. The importance and content of medical record documentation was stressed regularly. The two-day course was typically held five times per year. To evaluate the impact of PROMPT on patient outcomes, we collected data from 2006–2012 on the number of cesareans, episiotomies, Apgar scores of <7 at 5 minutes,umbilical artery (UA) pH of <7.00, perinatal hypoxic ischemic encephalopathy (HIE), SD, and brachial plexus injuries (BPI) even if resolved by discharge. Apgar scores were assigned by Nursery/NICU nurses or pediatricians. Umbilical blood gases were routinely sent to the KUH Laboratory. KUH employees who were for the most part uninvolved with conducting PROMPT™ performed the data collection as part of their ongoing quality assurance efforts. Likewise, the data analyses were also part of ongoing quality assurance efforts. Data collection by QA personnel was supplemented by the efforts of a research nurse (L.S.) employed by the Department of Obstetrics and Gynecology. Annual rates for cesarean delivery were calculated. The number of term deliveries (≥ 37 0/7 weeks) was used to produce annual Apgar, UA pH, and HIE rates for term deliveries. Quarterly episiotomy rates were available from the UHS Clinical Data Base/Resource Manager. Statistical analyses utilized an events/trials approach to evaluate linear changes in annual proportions over time. Healthcare costs avoided were calculated on the basis of annual rate changes and estimates of per outcome costs. For cesarean deliveries and HIE, we used published cost estimates. However, we were unable to identify an estimate of average medical costs for injuries associated with SD, nor for the average liability cost associated with a permanent BPI. We pragmatically assumed that the average lifetime cost of a BPI nationally (combined transient and permanent, medical and

	liability costs) was $500,000. This a reasonable estimate in comparison to another neurologic damage disorder with a wide range of impact, spina bifida, where the estimated average incremental health care cost approximates $850,000 and does not include liability.

3. Describe the results of the project. What data was used to support improvement results?	From 2006–2012, the number of participants trained rose annually, though there was a decline in 2012 in part due to the addition of several new trainers who were former participants (Table 1). The number of involved OB-GYN faculty trained increased from 9 to 15, while their average age declined from 57 to 45 years ($p<0.01$). OB-GYN faculty made about half of all PROMPT physician trainees. We had little success encouraging the voluntary participation of Family Medicine and Anesthesiology physicians involved with the care of obstetric patients. The number of total deliveries increased from 1,436 deliveries in 2006 to 1,720 deliveries in 2012 ($p<0.01$, Table 2). The cesarean delivery rate remained stable from 2006– 2009, falling well within the national average for that time period. Thereafter, the annual rate declined progressively to 23% in 2012. The episiotomy rate also declined beginning with the time it was first collated and verified as part of our 2010 QA process (Figure 1). Examination of the annual proportions of a UA pH<7.00 among term deliveries uncomplicated by major fetal malformation suggested a decline (Table 2), although this decline was not significantly overall. However, three quarters of the low UA pH measurements in the last two years were associated with catastrophic events. A significant decrease was detected ($p<0.01$) when the UA pH<7.00 cases associated with catastrophic events were removed from the overall counts. There was also a favorable decline in HIE from 2008–2012, though the relatively small number of annual deliveries precludes any chance of reaching significance. The rate of an Apgar score of <7 at 5 minutes was unchanged. From 2008–2012, annual BPI rates (per vaginal delivery) decreased significantly ($p<0.01$, Table 2). While the proportion of vaginal births with an SD outcome increased slightly over time ($p=0.04$), the proportion of those SDs where a BPI occurred decreased ($p<0.01$). Prior to the initiation PROMPT™, the rate of at a least transient BPI associated withSD was 10.7%. After the initiation of PROMPT™, the injury rates for both BPI per SD and BPI per vaginal delivery declined progressively to 0% in 2011 and 2012 despite declining cesarean section and episiotomy rates, coupled with a younger physician workforce. Using the significant reductions in cesarean deliveries and BPIs, along with a suggestive decline in HIEs, the potential healthcare costs avoided from 2008–2012 that were ecologically associated with the implementation of PROMPT totaled $19,934,048 (Table 3). The decrease in cesarean deliveries and BPIs represented 33% of these avoided cost ($6,534,048). All Tables will be shown at presentation.

4. Describe what happened as a result of the project. Was the improvement related to the intervention? Can the project be duplicated by other organizations?	While other obstetric courses exist, PROMPT is the only training package that has been demonstrated in both RCT and cross sectional study to improve outcomes for mothers and babies. In addition, only PROMPT has been shown to be adaptable to multiple cultures while achieving similar improvements in outcomes. The KU team has acculturated the program for North America and after demonstrating efficacy, trained multi professional teams from 7 US hospitals in the past six months. PROMPT has also been adopted by over 85% of the maternity units in the United Kingdom, and by units in Ireland, Iceland, Belgium, Denmark, France, Singapore, Hong Kong, Mongolia, Australia, NewZealand, Abu Dhabi, and Italy. PROMPT combines didactics and simulation with team training, communication training and leadership training and it is run by the units own staff, for all their staff, in their own environment. By encouraging local training, the course minimizes training costs and can be further adapted to local needs. There are individual studies supporting the core components of PROMPT. In addition, the PROMPT program is distributed in a fashion that eliminates the need for an expensive simulation center. PROMPT is truly unique. PROMPT has demonstrated that just by training in teams, team working improves. The KUH experience confirms the supporting research-training is only effective if we train as we practice in real-life; in multi professional teams that annually include all the maternity staff that may be present at a real emergency. By training together, team members know their role and the roles of their team mates so if one should falter, another is ready to step forward and correct the problem.
5. Describe how patients, families, and if appropriate, community was included in the work.	The lives of patients, families and their communities are enhanced by the all round improvement in perinatal outcomes.
Last Update	2013-11-14 13:30:51
Start Time	2013-11-14 12:22:20
Finish Time	2013-11-14 13:30:51