2004 Lawrence New Project Award Winner

Perinatal Patient Safety Project

By Julie Nunes, RN, MS, CPHRM
Sharon McFerran, RN, PhD, CPHQ

Please see "The Perinatal Patient Safety Project: New Can Be Great!" in The Permanente Journal *2005 Winter;9(1):25-7.*

Abstract

The Perinatal Patient Safety Project (PPSP) was created as a systemic strategy for creating high-reliability perinatal units by preventing identified causes of perinatal events in the clinical setting. With developmental funding from a Garfield grant, implementation of the PPSP has been completed at four pilot sites in the Kaiser Permanente Northern California (KPNC) Region. Its success has resulted in implementation at all perinatal units in the KPNC Region as well as being promoted by National Risk Management for nationwide implementation. PPSP emphasizes structured communication, multidisciplinary rounds, a definition of fetal well-being, and practicing for emergencies. Steps taken to create high reliability perinatal care include improved communication, patient safety focus, and satisfaction among perinatal patients, providers, and staff.

The Perinatal Patient Safety Project (PPSP) consisted of a multitude of approaches borrowed from many theories, disciplines, and industries. Its purpose was to create high-reliability perinatal units through the use of human factors techniques and systems improvements. The concept of high reliability was borrowed from the United States Navy, NASA, and similar organizations that operate highly complex systems with few errors over a long period of time. The error rate for these organizations is five to six sigma quality performance (Table 1). They recognize the criticality of the quality of their performance and that humans are inherently fallible and procedures and practices need to be in place to trap the inevitable errors. An example of this high level of quality performance is the United States airline industry, which operates consistently at six sigma.

Table 1. Simplified sigma conversion table

Your sigma is	Defects per million opportunities	Percentage of items without defects
1.0	690,000	30.9
2.0	308,000	69.2
3.0	66,800	93.3
4.0	6,210	99.4
5.0	320	99.98
6.0	3.4	99.9997

Key to their performance is the concept of human factors techniques: briefings, assertion, situational awareness, and recognition of red flags. Within these techniques is a sound framework of communication and teamwork.

What is the significance of communication and teamwork in an industry such as the airlines, and how does that apply to health care? Years ago, when the airlines were converting from propeller-driven aircraft to jet engines, there was the assumption that the high reliability of the jet engine would eliminate aircraft crashes. However, accidents continued to occur. Accident investigations revealed that the vast majority of accidents were not caused by the aircraft. Rather, they were the result of the communication and teamwork of those in the cockpit. Identified barriers to effective accident-avoiding actions included fear of speaking up, hierarchical power, etc. In health care, these same issues have been identified by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Their database of 2966 significant events from across the nation (from 1995 to 2004) has revealed that 65% of these had communication as a primary contributing factor.[1]

Articles by Eric Knox, MD, and Kathleen Rice Simpson, RN,[2-5] that contained conclusions based on an analysis of medical-legal cases from


Julie Nunes, RN, MS, CPHRM, (left) is the Northern California Regional Director of Risk Management for KP and the Chief Investigator for the Perinatal Patient Safety Project. E-mail: julie.nunes@kp.org.
Sharon McFerran, RN, PhD, CPHQ, (right) is KPNC Risk Management Senior Project Manager. E-mail: sharon.v.mcferran@kp.org.

250 hospitals collected over ten years by MMI, an insurance company, supported the need for improved communication in labor and delivery (L&D) and outlined specific criteria for high-reliability perinatal units. These criteria, built into PPSP, are:

- "Safety first" is the hallmark of the unit's culture.
- Team contribution is valued.
- Communication is structured and rewarded.
- MD responds when called by an RN.
- Emergencies are rehearsed.
- L&D is viewed as "potentially dangerous" (ie, to guard against complacency).
- Fetal and maternal wellness are defined.
- Evidence-based protocols are used.

What does this have to do with KPNC Region and the Perinatal Patient Safety Project (PPSP)? When the project was initiated, the medical-legal costs of birth injuries were dramatically increasing even though the birth injury rate had remained stable over the past ten years. In addition to the medical-legal costs of birth injuries, other costs associated with birth injuries included the physical, emotional, and financial costs to the patient and family, emotional, and reputational costs to the health care providers and staff, and reputational and financial costs to KP.

Reviewing the KPNC's data, it was determined that the volume of births in KPNC was large (32,000 births per year at 11 KP hospitals in 2002). There was collaborative practice between obstetricians and midwives and easy access to a perinatologist for consultation if needed. Ninety-two percent of prenatal patients are seen in the first trimester, and 90.6% of women were screened for preterm labor. Data analysis of birth injuries by the KPNC Region Division of Research clarified that birth injuries were (and still are) rare, as determined on the basis of a large number of births. Further analysis indicated significant variation between medical centers that was not explained by their high-risk patient mix.

Although the health care industry recognizes the criticality of perfect performance, the industry's quality capability is considered to be between two to four—well below the five- to six-sigma performance of high-reliability organizations. Review of the perinatal literature[2-5] indicated that the issues identified nationally were identical to those being experienced in KPNC. Some of the recurring systems-related problems included inadequate or inaccurate communication at shift reports, signouts, and hand-offs and problems with assertion and escalation of communication, task fixation and overload, team culture, and hierarchy.

In the opinion of Julie Nunes, RN, MSQ, CPHRM, Director of Regional Risk Management, the traditional corrective action approach to significant events resulting from birth injuries would not result in high-reliability performance. Armed with these data and new concepts, Julie Nunes (PPSP principal investigator), Bruce Merl, MD (PPSP co-investigator), Gabriel Escobar, MD (PPSP co-investigator), Sharon McFerran, RN (PPSP project manager), and Paul Preston, MD, (Human Factors and Critical Events Team Training educator for PPSP), developed a performance improvement approach based on human factors and systems improvements with the goal of developing high-reliability perinatal units. The project initially piloted its approach at four KP

… the issues identified nationally were identical to those being experienced in KPNC.

Table 2. Kaiser Permanente Northern California Perinatal Patient Safety project (PPSP) members

PPSP Principal Investigator	Julie Nunes, RN, MS, CPHRM, KPNC Director of Risk Management
PPSP Co-Investigator	Bruce Merl, MD, TPMG Director of Medical/Legal Affairs and Ophthalmology, KP Martinez
PPSP Co-Investigator	Gabriel J Escobar, MD, Research Scientist, Division of Research
PPSP Senior Project Manager	Sharon McFerran, RN, PhD, CPHQ, KPNC Risk Management
PPSP Educator	Paul Preston, MD, Assistant Chief of Quality/Anesthesiology, KP San Francisco Medical Center
PPSP Patient Care Services Liaison	Lynda Garrett, RN, MPH, Senior Consultant, KPNC Region
PPSP Patient Safety Liaison	Suzanne Graham, RN, PhD, Director of Patient Safety, KP California Regions
KP leaders at PPSP pilot sites	
Hayward Medical Center	Nancy Corbett, RN, BNS, Perinatal Services Manager, Maternal-Child Health
Hayward Medical Center	Dennis McBride, MD, Obstetrician
Hayward Medical Center	Stephen Young, MD, FACOG, Chief of Obstetrics & Gynecology, KP Greater Southern Alameda Area; Chair, Obsetrics and Gynecology Chiefs
San Francisco Medical Center	Linda Kay Deaton, RN, BSN, Assistant Nurse Manager, Perinatal Services
San Francisco Medical Center	Nancy Taquino, RN, MSN, Director, Maternal-Child Health
Santa Teresa Medical Center	Elaine Barrett, RN, BSN, Manager, Maternal-Child Health
Santa Teresa Medical Center	Joseph Derough, MD, Obstetrician, Medical Co-Director, Patient Safety
Walnut Creek Medical Center	Jeffrey Maier, MD, Perinatologist
Walnut Creek Medical Center	Lynne Morrison, RN, BSN, Manager, Labor & Delivery
Walnut Creek Medical Center	Duayna Pucci, RN, MSN, MHA, Director, Maternal-Child Health

Table 3. Components of SBAR communication	
Use:	SBAR is a structured communication format used to enhance the predictability of information transfer.
Acronym:	• **S**ituation (Why am I calling?) • **B**ackground (What will the provider need to know?) • **A**ssessment (What is my evaluation of the patient's status?) • **R**ecommendation (What is it that I want or need from the physician?)

… the need for a single clear operating style was identified.

medical centers (Hayward, San Francisco, Santa Teresa, and Walnut Creek). The 2004 Lawrence Patient Safety Award for 2004 was presented to the participants in the piloting of this project (Table 2). Based on the success of the pilot sites, the project was replicated in 2004 at the KP Redwood City, Sacramento, South Sacramento, and Vallejo Medical Centers and in 2005 at the KP Fresno, Oakland, Santa Clara, and Santa Rosa Medical Centers. Also, in 2004, the program began to be replicated programwide under the direction of Karen Mazzocco, RN, JD, Senior Project Manager for National Risk Management.

The project was based on "safety first" for the patients, physicians, and other staff. To create the culture of safety, a multidisciplinary team—including representatives from across the continuum of perinatal care—was assembled at each site. Before their first meeting, the team (and as many others from the perinatal continuum of care as possible) attended a four-hour human factors training session. In addition to addressing the basic human factors concepts, topics such as accident causation, dynamics of human error, and the effects of fatigue were presented.

The team's first actions were to implement the use of SBAR (Table 3), a structured communication format borrowed from the United States Navy, and assertion (Figure 1). SBAR is an acronym that stands for **S**ituation, **B**ackground, **A**ssessment, and **R**ecommendation. Everyone within the continuum of care needed to be included in the training and implementation plan. These techniques were important to clearly and concisely communicate patient information, especially during an emergency. The chain-of-command policy was also reviewed and, if needed, modified to reflect the complex nature of the perinatal environment. This policy needed to be current and organizationally appropriate for use when needed to advocate for the patient's safety, especially those who cannot speak for themselves.

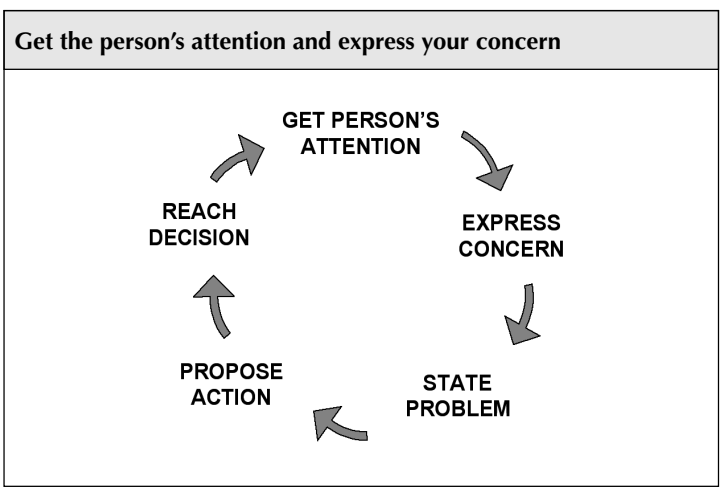


Figure 1. Assertion model to guide and improve assertion in the interest of patient safety.

Critical to the functioning of a multidisciplinary team was the acceptance of the "Just Culture Statement." The intent of this statement was to begin to open the lines of communication so that problems could be identified and corrected. This document held employees free from discipline if they discussed problems and errors. The only exceptions were if the employee was under the influence of drugs or alcohol, if the action taken was intended to cause harm, or if the action was deemed egregiously negligent.

Using the template of a high-reliability perinatal unit as outlined by Knox and Simpson,[2] the need for a single clear operating style was identified. Based on a definition approved by the KPNC Perinatology Peer Group, a definition of fetal well-being was adopted to provide the physical criteria for when the nurse must call a physician and specified that the physician must come when called by a nurse. Other actions taken included clarifying the fetal heart rate tracing terminology differences between physicians and nursing (Figure 2).

A major innovation within PPSP was the development and implementation of Critical Events Team Training (CETT). The basis of this training approach was that teamwork and communication may reduce the frequency of emergencies in L&D but can never completely eliminate them. To address emer-

gencies when they arise, the team must work together and perform at a high level. From the Anesthesiology Department, which has been conducting drills for emergencies for the past few decades, the team has learned that critical skills erode when events are rare and when drills are not performed and that teamwork in emergencies is critical. It was also clear that during L&D emergencies, various disciplines that must come together and function at a high level as a team had never been trained as a complete team. Their training had always been in their own discipline's silo.

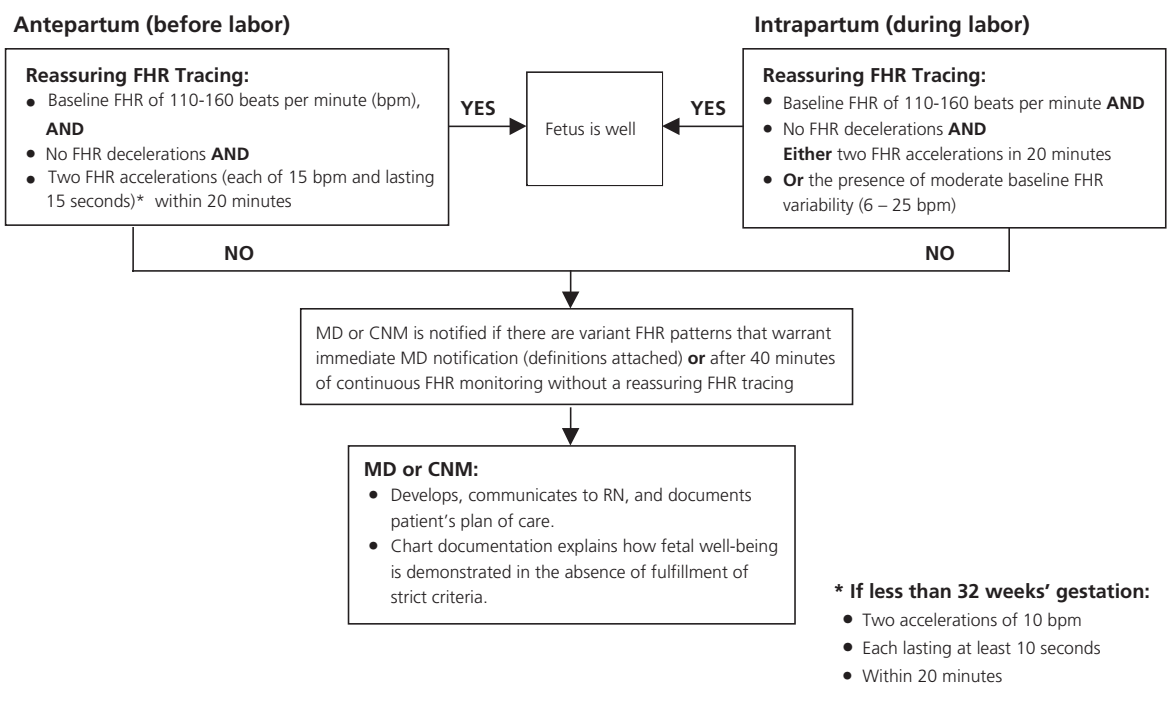
Using mannequins to simulate actual L&D events, CETT is a method of practicing for emergencies within the Medical Center's L&D rooms and obstetric operating suite. The simulations include participants functioning in their appropriate roles and diagnosing and managing the situation as they would if it were real. The training environment focuses primarily on communication and systems and, to a lesser degree, on the technical aspects of performance. The simulations are videotaped, and the tape is used to augment the debriefing. Immediately upon completion of the simulation, the videotape is erased to assure confidentiality and to maintain the blame-free learning environment. All opportunities for improvement identified during the debriefing are documented and are given to the multidisciplinary team to address.

CETT was conducted at all four pilot sites and is continuing to be conducted as new sites become involved in PPSP. The success of CETT has been recognized, and a CETT Train-the-Trainer session was developed and is now being offered to all KP Regions.

Critical Events Team Training provides realistic simulations of emergency events in Labor and Delivery. Pictured is an example of a simulation at KP Santa Teresa Medical Center.

As birth injuries are rare events, the effect of this project on birth injuries will take a long time to determine. It will take years to accumulate a sufficient number of birth injuries to determine a declining trend. The Safety Attitudes Questionnaire

Figure 2. Establishing fetal well-being by the fetal heart rate (FHR).



NOTE: This process may result in "overcatching" problems but is considered important for patient safety.

As birth injuries are rare events, the effect of this project on birth injuries will take a long time to determine.

(SAQ)[7] has been used as a short-term measure for this project's success. The SAQ was administered before and after the project at all KPNC perinatal units. Because KP's goal is to constantly improve in all areas of patient care, all 11 medical centers' SAQ scores improved during the period of assessment of the pilot sites. The pilot sites, however, significantly outperformed the nonpilot sites in every category measured, ie, job satisfaction, perceptions of management, safety climate, stress recognition, teamwork climate, and working conditions.

The importance of the activities first implemented by PPSP in 2002 was validated by JCAHO Sentinel Event Alert #30 in 2004.[6] After evaluating their national database of birth injuries, JCAHO stated that hospitals must:

- Teach the staff to work together and communicate more effectively.
- Conduct clinical drills with debriefings to identify opportunities for improvement.
- Develop clear guidelines for fetal monitoring.
- Use standardized terminology to communicate fetal heart rate tracings.
- Review policies regarding the availability of key personnel for emergency situations.

The PPSP did a lot of things right. The PPSP Regional Steering Committee focused on rapidly sharing information between medical centers. The pilot sites were allowed to implement the desired changes their way as well as to identify and improve problems of their own choosing. PPSP conferences were held to share the concepts broadly. Quality protection was provided by structuring the PPSP to report to the Quality Committee. The PPSP structure modeled its values of trust and respect of all disciplines, leadership commitment, clear communication, teamwork, empowerment, conflict resolution, innovation, and holding the gains (Figure 3). ❖

Figure 3. PPSP Structure Models Values.

Acknowledgments

The Perinatal Patient Safety Project (PPSP) was funded by a Garfield Memorial Fund grant and support was provided by The Permanente Medical Group Associate Executive Director and Kaiser Foundation Hospitals Quality Department.

Sponsors of this project included:

- *Cochairs of the KPNC Quality Oversight Committee (QOC)*
- *Perinatal Council (Patient Care Services)*
- *Risk Management and Patient Safety Committee (a subcommittee of the Quality Oversight Committee)*
- *Chiefs of Obstetrics Committee*
- *Chiefs of Anesthesia Committee*
- *Maternal-Child Health Leaders Committee.*

References

1. Joint Commission on Accreditation of Healthcare Organizations. Root causes of sentinel events: all categories; 1995-2004 [graph on the Internet]. Washington (DC): Joint Commission on Accreditation of Healthcare Organizations; 2002 [cited 2005 Mar 10]. Available from: www.jcaho.org/accredited+organizations/ambulatory+care/sentinel+events/root+causes+of+sentinel+event.htm.
2. Knox GE, Simpson KR, Garite TJ. High reliability perinatal units: an approach to the prevention of patient injury and medical malpractice claims. J Healthc Risk Manag 1999 Spring;19(2):24–32.
3. Simpson KR, Knox GE. Adverse perinatal outcomes. Recognizing, understanding and preventing common accidents. AWHONN Lifelines 2003 Jun-Jul;7(3):224-35.
4. Simpson KR, Knox GE. Common areas of litigation related to care during labor and birth: recommendations to promote patient safety and decrease risk exposure. J Perinat Neonatal Nurs 2003 Apr-Jun;17(2):110-25.
5. Simpson KR, Knox GE. Perinatal teamwork: Turning rhetoric into reality. AWHONN Lifelines 2001 Oct-Nov;5(5):56-9.
6. Joint Commission on Accreditation of Healthcare Organizations. Sentinel Event Alert: Issue 30 [monograph on the Internet]. Washington (DC): Joint Commission on Accreditation of Healthcare Organizations; 2004 [cited 2005 Mar 10]. Available from: www.jcaho.org/about+us/news+letters/sentinel+event+alert/sea_30.htm.
7. Sexton JB, Thomas EJ, Helmreich RL, et al. Safety Attitudes Questionnaire [monograph on the Internet]. Houston (TX): The University of Texas Center of Excellence for Patient Safety Research and Practice. [cited 2004 Dec 30]. Available from: www.uth.tmc.edu/schools/med/imed/patient_safety/survey&tools.htm.

Suggested Reading

- Roberts KH. Some characteristics of high reliability organizations. Organizational Science 1990;1(2):160-77.
- Vaughn D. The Challenger launch decision: risky technology, culture and deviance at NASA. Chicago (IL): University of Chicago Press; 1996.
- Weick KE, Sutcliffe KM. Managing the unexpected: assuring high performance in an age of complexity. San Francisco: Jossey-Bass; 2001.
- Helmreich RL. On error management: lessons from aviation. BMJ

2000 Mar 18;320(7237):781-5.
- Physician Insurers Association of America. Cumulative data sharing report, January 1, 1995-December 31, 2000.
- Vincent C, Taylor-Adams S, Stanhope N. Framework for analysing risk and safety in clinical medicine. BMJ 1998 Apr 11;316(7128):1154-7.
- Institute of Medicine, Committee on Quality of Health Care in America. Kohn LT, Corrigan JM, Donaldson MS, editors. To err is human: building a safer health system [monograph on the Internet]. Washington (DC): National Academy Press; 2000 [cited 2005 Mar 24]. Available from: www.nap.edu/openbook/0309068371/html/.
- Helmriech RL. Managing human error in aviation. Sci Am 1997 May;276(5):62-7.
- Uhlig PN, Haan CK, Nason AK, Neimann PL, Camelio A, Brown J. Improving patient care by the application of theory and practice from the aviation safety community. Presented at the 11th Annual Ohio State Symposium on Aviation Psychology, Columbus, OH, March 6, 2001.
- Blickensderfer L. Nurses and physicians: creating a collaborative environment. J Intraven Nurs 1996 May-Jun;19(3):127-31.
- Keenan GM, Cooke R, Hillis SL. Norms and nurse management of conflicts: keys to understanding nurse-physician collaboration. Res Nurs Health 1998 Feb;21(1):59-72.
- Leape LL. Error in medicine. JAMA 1994 Dec 21;272(23):1851-7.
- Wu AW, Folkman S, McPhee SJ, Lo B. How house officers cope with their mistakes. West J Med 1993 Nov;159(5):565-9.
- Wu AW. Medical error: the second victim. The doctor who makes the mistake needs help too. BMJ 2000 Mar 18;320(7237):726-7.
- Kassebaum DG, Cutler ER. On the culture of student abuse in medical school. Acad Med 1998 Nov;73(11):1149-58.
- Reason J. Managing the risks of organizational accidents. Aldershot (Hants, England): Ashgate;1997.
- McFerran S, Nunes J, Pucci D, Zuniga A. Perinatal Patient Safety Project: a multicenter approach to improve performance reliability at Kaiser Permanente. J Perinat Neonatal Nurs 2005 Jan-Mar;19(1):37-45.
- Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. Qual Saf Health Care 2004 Oct;13 Suppl 1:i85-90.

The Learners

In a time of drastic change it is the learners who inherit the future.
The learned usually find themselves
equipped to live in a world that no longer exists.

— Eric Hoofer, 1902-1983, American social philosopher