Spring 5-7-2013

Interprofessional Roles Shoulder Dystocia: Maximizing Safety in Community Hospitals

Elizabeth Yznaga
yznaga@yahoo.com

Interprofessional Roles Shoulder Dystocia:

Maximizing Safety and Personnel in Community Hospitals

Elizabeth Yznaga

University of San Francisco

Section I

Title

Interprofessional Roles Shoulder Dystocia: Maximizing Safety in Community Hospitals

Abstract

Prompted by evidence that clinical simulations improve patient safety, team simulations are emerging in hospital settings. Accrediting organizations such as the U.S. Joint Commission on Accreditation of Healthcare Organizations and the American College of Obstetricians and Gynecologists (Joint Commission, 2004, American College of Obstetricians and Gynecologists, 2002) have recommend simulation of obstetrical emergencies, including shoulder dystocia for hospital teams. National patient safety mandates for simulation training of critical events have not been available to small, rural hospitals because of lack of talent and equipment, creating a gap in resources. Other than demonstrations by manikin companies, this author has currently been unable to sufficiently document the existence of active, non-academic resources for in-situ simulations available to small, rural hospitals in California.

The California Simulation Alliance (CSA) is uniquely positioned as a state consortium for healthcare simulation to solve the deficiencies of talent and equipment by bringing the benefits of in-situ simulations to rural and urban community hospitals. The CSA Onsite Sims project described in this proposal initiates the move to in-situ scenarios from simulation center scenarios by expanding the CSA nurse-based scenarios into interprofessional, in-situ team simulations while maintaining the validity, repeatability, and integrity of the CSA scenarios. The CSA Onsite Sims scenarios promote the identification of desired behaviors, communication, and patterns that improve outcomes satisfying the medico-legal need for documented patient safety practices.

Section II

Present Situation and Summary of Existing Conditions

The National Institute of Medicine's safety mandate for hospitals to practice high-risk critical events has created the need for shoulder dystocia simulations in order to offset obstetrical malpractice claims (Draycott et al. 2008; Gardner, Walzer, Simon and Raemer, 2008). Accrediting organizations such as the U.S. Joint Commission on Accreditation of Healthcare Organizations and the American College of Obstetricians and Gynecologists (Joint Commission, 2004; American College of Obstetricians and Gynecologists, 2002) recommend simulation of obstetrical emergencies including shoulder dystocia for hospital teams (Joint Commission, 2004; American College of Obstetricians and Gynecologists, 2002; Athukorala, Middleton, & Crowther, 2006). The recommendations have generated workshops at medical conferences that assist providers in maintaining readiness (Miller, Riley, Davis, & Hansen, 2008). More recently the 2011 national conference of the Association of Women's Health, Obstetric, and Neonatal Nurses hosted shoulder dystocia workshops (Liner & Wheeler, 2011). Simulation training for shoulder dystocia has also been recognized by midwifery educators in the United States, (Fahey & Mighty, 2008; Jevitt, 2005; Lathrop, Winningham & VandeVusse, 2007), and by Elliott, Murrell, Harper, Stephens, and Pellowe (2011) in Australia.

Over the last decade select academic settings and tertiary care hospitals have been using simulation training for multidisciplinary scenarios both *in-situ* (Deering, Poggi, Macedonia, Gherman & Satin, 2004; Miller, Riley, Davis & Hansen, 2008) and in simulation centers (Miller, Riley, Davis & Hansen, 2008; Crofts, et al. 2006; van de Ven, et al. 2010). Recent evidence that simulation team training improves outcomes (Riley, et al., 2011) is expected to promote such training in community hospitals in order to facilitate accreditation and to mitigate

medico-legal concerns (Miller, Riley, Davis & Hansen 2008; Riley, et al., 2011; McGaghie, Issenberg, Petrusa, & Scalese 2010; Ribner et al., 20111; Riley, Davis, Miller, Hansen & Sweet, 2010). The Agency for Healthcare and Quality (AHRQ) believes in the potential of simulation to improve safety outcomes and is currently sponsoring investigations targeting rural hospitals (Gaba, 2011). Unaffiliated community hospitals lag behind the national simulation experience because of the barriers of cost, talent, and the often-prohibitive distance to simulation centers. Community hospitals also have more fluid roles in obstetrical simulations as the emergency room physicians or pediatricians or nurses stand in for the obstetrician, family practice physician or midwife who does not arrive in time. Including and scheduling all the possible participants in obstetrical simulation programs can be complicated and costly. These barriers increase medico-legal risk and pose an unmet need for community hospitals.

Urban and rural hospitals lacking resources for simulation cannot take advantage of simulation training to decrease their malpractice premium. Simulation training is a potential mitigator of untoward outcomes by decreasing medico-legal risk through team practice. Harvard Medical Institutions' (HMIs) Controlled Risk Insurance Company (CRICO) in 2004 began offering a 10% malpractice discounts to participants in the CRICO Patient Safety's OB Risk Reduction Program (AHRQ Health Care Innovations Exchange, 2011). The decline in malpractice claims among participants substantiated the two–tiered program established in 2011 that offers a 16 percent less premium for those obstetricians who complete the safety program. If insurers decide on malpractice premiums based on simulation attendance then obstetrical simulation will become a common hospital activity.

As hospitals and educational sites embrace obstetrical simulation drills and training, the increasing variability of design, personnel, location, and outcomes impede external comparisons

between simulations. Other authors have lamented the lack of simulation standards and the problems associated with external comparisons (Fahey 2008; Steckler & McLeroy 2008). The current lack of national guidelines defining adequate shoulder dystocia simulations causes uncertainties for the simulation designer, the participants, the accreditation body, and insurers.

Local Problem

Shoulder dystocia is an unpredictable event with a low frequency 0.6 to 1.4% but carries the potential for neonatal morbidity of 20% and represents the largest number of obstetrical malpractice claims (Gherman, et al., 2006). Practitioners expect to occasionally manage a shoulder dystocia but not routinely. Because of such infrequency, teaching and reviewing the specific shoulder dystocia maneuvers at the bedside are difficult to demonstrate and to assess. Relieving the stuck shoulders is a cognitive dance of hands countering the inherent and primal response to pull the head. Studies that examined the efficacy of shoulder dystocia maneuvers uniformly agree that the maneuvers must be performed calmly, but quickly, in order to decrease fetal morbidity (Gherman, Ouzounian, & Goodwin, 1998).

As a practicing Certified Nurse Midwife, I can validate personal improvement of clinical skills over the last ten years of performing simulations. My enthusiasm for simulation has spawned my interest in expanding simulation to clinicians without the same opportunities, hence the concept of a remote, mobile in situ program sponsored by the California Simulation Alliance. The new venture is unofficially named CSA Onsite Sims.

Intended Improvement

California Simulation Alliance Onsite Sims is an emergent mobile education project focused on filling the gaps in critical events training by planning and implementing remote, quality simulations for community hospitals. The simulations are designed to promote balanced internal

and external validity, and to demonstrate reproducibility by enhancing integrity and generalizability in evidenced based content and structure (Jefferies, 2007, Fahey, 2008). The CSA Onsite Sims project is an on-site, interprofessional education program focused on preparing hospital teams to improve low frequency, high-risk critical event outcomes. CSA Onsite Sims acknowledges the national Perinatal Safety Goals (ACOG, 2002) by providing valid, repeatable practice, evidenced based education sessions, and drills that meet the needs of the hospital or insurer

The mobile program is presently restricted to Northern California but theoretically has few geographical barriers in providing quality, scheduled team simulations tailored to in-situ constraints. There are two markets for CSA Onsite Sims: hospitals and insurers. The multiple gains from potential contracts with insurance companies and partnership with hospital systems are difficult to estimate but could reasonably increase profits. And ensure success.

Goals and Objectives

The primary goal of this project is to design a mobile shoulder dystocia program for in-situ obstetrical teams shoulder. The program features simulations that can be tailored to in-situ constraints, and offer the advantages of unbiased observers, a procedural consistency in education, materials, treatments, and assessments, followed up by program evaluation. The innovative aspect of this program is the focus on alternative personnel such as Emergency Room physicians and nurses for shoulder dystocia simulation training.

The secondary goal is to develop a structured approach for the conversion of the CSA scenarios into interprofessional in-situ scenarios regardless of subject matter. Scenario expansion possibilities range from team critical events to normal delivery scenarios for community hospital nurses.

Review of the Evidence

Shoulder dystocia simulations can be practiced in low-fidelity simulations or by utilizing practice and drills of complex emergency events involving high-fidelity scenarios and full multi-disciplinary teams (Fahey & Mighty, 2008; Marzano, Frankel, Smith & Andreatta, 2011). The well-defined, short duration, and singular focus of infant delivery in shoulder dystocia simulations facilitate comparison between studies by examining the design characteristics of the simulation. Shoulder dystocia simulations are limited to a specialized and stratified student and professional population who share a code of performance. Locations are restricted to educational sites, simulation labs, or modified hospital rooms with scenario capability. The short duration of the event, two and a half to four minutes for most simulations, circumscribes a standardization of action and replicability standard for reliable communication. In addition, the singular most important outcome, a safe delivery can be practiced by a short list of seven maneuvers (Ferguson, 2004; Gherman, Chauhan, Ouzounian & Lerner, 2006). The restrictions of personnel, location, time, action, and communication describe the inherent structure of shoulder dystocia simulations. With few exceptions the expected commonalities between studies that are supported and guided by national standards establish the foundation for external validity (Ferguson, 2004).

Interprofessional or multi-disciplinary simulations have the potential to decrease errors (Maslovitz, Barkai, Lessing, Ziv, & Many, 2007; Meri**é**n, van de Ven, Mol, Houterman, & Oei, 2010) in acute obstetrical events although the cost effectiveness is not presently known (Eppich, Howard, Vozenilek & Curran, 2011). Sharing the same goals would homogenize the differences in theoretical frameworks between nursing, medicine, and military education simulations. The Institute of Medicine recognizes the team training in interprofessional education (IPE) as the

next step in improving health care outcome (Agency for Healthcare Research and Quality, 2008)

Guidance on Scenario Design

The *Nursing Education Simulation Framework* concisely sets the range of commonality of simulations reflecting the 12 best practices specified by Simulation Medical Evidenced Based Education (SMEBE) (Issenberg, McGaghie, Petrusa, Gordon & Scalese, 2005), the Mobile Obstetric Emergencies Simulator System (MOESS) (Guise, et al. 2008), and the TeamSTEPPS principles (King, et al. 2010) The components are:

- Teacher factors
- Student factors
- Required educational practices
- Simulation design characteristics
- Expected student outcomes.

These components were developed and tested (Jeffries, 2005) by the National League for Nursing/Laerdal Simulation Study. Each component has variables that can be operationally described, tracked, and evaluated and will be used in the CSA Onsite Sims project.

The simulation design characteristics of scenarios are: Objectives, Fidelity, Problem Solving, Student Support, and Debriefing. The expression of these characteristics can balance or distort internal and external validity. Internal and external validity are inversely related to and affected by the integral uniqueness of each the scenario, and are also impacted by the external generalizability to other scenarios. Design templates and protocols exhibit specificity and enhance the internal validity of the scenario. Comprehensive, descriptive design protocols increase internal validity by strictly defining the education, communication, structure, and process, thereby enhancing the validity of reproducibility, reliability of instruments and

procedures. A scenario design that is highly specific tends to become unduly idiosyncratic especially when national safety initiative language or knowledge is not used. Such simulations are not readily transferable or generalizeable.

Reports from civilian and military quality and safety simulations combining Mobile Obstetric Emergencies Simulator System (MOES) with Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) demonstrate the generalizability of the OB simulations with program adherence (Agency for Healthcare Research and Quality, 2008). The Crofts (2006, 2007) studies of the SaFE shoulder dystocia simulations for English midwives and physicians are comparative within the series across participants and locations. The results of these studies gathered from multiple labor and delivery units, strengthens their reports of delivery improvement after team and individual practice. Such structured programs extend comparable external validity to all who conform to the series restrictions.

Designing quality simulations to function at the highest level necessitates developing clear objectives and content. It also requires a reliability of the experience built on consistent trainers, documentation and thoughtful feedback (Jefferies, 2007; Kneebone, 2005). Each of these is important for maintaining internal and external validity and adds integral value of the simulation. Quality can be observed and tracked by process checklists, and assessment forms (Verdaasdonk, et al. 2009; Stufflebeam, 2002). Participants recognize quality in the form of learner support and excellent feedback, with an emphasis on a coherent reflection of real life events (Prion, 2008). They are necessary parts and, it is to be hoped, the sufficient conditions of the excellence of the whole that promote an efficacious simulation.

Objectives

Multiple authors have emphasized the need for clear objectives (Daniels, et al., 2010;

Gardner, Walzer, Simon & Raemer 2008; Jefferies 2007) for the goals of the simulation. The complexity of the objectives is directly related to the roles and anticipated actions of the participants. Scenario objectives structured for deliberate practice of the shoulder dystocia maneuvers should promote individual practice apart from a multidisciplinary team scenario.

Provider-centered objectives.

The objectives of a provider-centered, simple shoulder dystocia simulation should reflect the five performance check points.

Performance Checks in a Provider-Centered Shoulder Dystocia Simulation

1. Identify the problem,
2. Call for help: assistants, nurses, pediatricians, and code team,
3. Communicate with the staff, patient, and family,
4. Call out and perform the maneuvers, (Gherman, Ouzounian & Goodwin, 1998)
5. Document the delivery (Goffman, Heo, Chazotte & Merkatz, 2008).

Nurse-centered scenario.

The objectives of a nurse-centered scenario could include:

1. Call for help: assistants, nurses, pediatricians, and code team,
2. Multi-task assist the obstetrician, the pediatrician, code team,

3 Document the maneuvers,

4. Communicate with the staff, patient and family (Grobman, Hornbogen, Burke, & Costello, R. 2010).

Multidisciplinary scenario objectives.

The objectives for a multidisciplinary team scenario have multiple performance checks anticipating the actions of all the participants. Excellent objectives should clearly describe the

performance checkpoints and learning goals for the simulation.

The objectives for an interprofessional simulation focused on alternative personnel must be reduced to the basic performance checkpoints. The basic performance checkpoints reference the traditional doctor and nurse roles for hospital delivery. Appendix B Table B1 Distribution of skills for a shoulder dystocia simulation: In-House OB Model. The distribution of skills only involves the labor and delivery nurse, the midwife and the obstetrician.

Community hospitals are often staffed by the OB MD On-Call Model, This model requires crossover of skills when the most skilled person must be called in from home. The crossover of skills crosses credential limitations when emergency situations present. See Appendix B Table B2 Distribution of skills for a shoulder dystocia simulation: OB On-Call Model. The OB On-Call model demonstrates the fluidity of skills and personnel needed in a shoulder dystocia in a community hospital. Staff who must act in place of the most skilled person are Alternative personnel. They need the essential knowledge of the three main roles during an emergency, the person performing the specialized task, the helper to the person performing the specialized task, and the person documenting the event (the *baby catcher,* the *birth assistant*, and the *recorder*). . These checkpoints are reinforced in the pre-scenario education and during the introduction on the day of the seminar. The checkpoints for each role are listed on the Role Lanyards worn during the simulation and are on posters. See Appendix C Figure C1 Lanyards. See Appendix C Figure C2 Visual Prompts for an example of the birth assistant poster.

The checkpoints for the person conducting the delivery, the *baby catcher* begin with problem identification, requests for help, communication with staff, patient and family, call out and perform the maneuvers (Gherman, Ouzounian, & Goodwin 1998) and document the delivery (Goffman, Heo, Chazotte & Merkatz 2008).

The checkpoints for the *birth assistant* duplicate the *baby catcher's* responsibility to call for help: assistants, nurses, pediatricians, and code team, and to communicate with the staff, patient and family (Grobman, Hornbogen, Burke, & Costello, R. 2010). Either role may identify the problem, call for help, and communicate with the staff, patient and family. The redundancy of two roles with duplicate responsibilities is a safety factor and should improve overall success.

The checkpoints for the *recorder* are: repeat the call outs for position closed loop communication, the hand maneuvers used, the maternal positions, the head to body times and minute markers and the participants and time of arrival. Documentation needs to be on the fetal monitor strip or linked to the fetal monitor strip.

Evidenced-based and standardized content fulfills patient safety initiatives, thus improving the transfer of knowledge (Fahey, & Mighty, 2008). The commonality of the knowledge pool can offer external validity to simulations when both pre-training and post-training testing cover commonly accepted knowledge and standardized practices. Reliability in testing also requires a national body of knowledge not confined to physicians.

Presently the Agency for Healthcare Research and Quality tasked with improving patient safety is testing the potential for a national standard for communication and teamwork for healthcare teams (AHRQ, 2008). Consistency in language affects the internal and external validity of the simulation. A common rubric creates situational awareness. Examples of standardized phasing are "I have a shoulder dystocia", "Code shoulders" etc. Though colloquial unofficial terms increase specificity, such local, unit-specific language decreases external validity when standardized patient safety language is not used. The utilization of national patient safety language protocols would enhance communication and patient safety advocacy. The standardized language is an important marker of external validity and excellence.

Team Training

The initial reports of the TeamSTEPPS National Implementation Project note improvement of OB teams after training (AHRQ, 2008). Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS), are enhanced by consulting modified military training techniques to improve communication and teamwork skills among health care professionals (King, 2010; Rosen et al., 2010). Other authors have reported communication gains by using structured team training programs. Guise, et al., 2010, tested a standardized curriculum for simulation of obstetric events in rural Oregon using crew resource management (CRM) principles as part of AHRQ grant. They found improvement after the scenario training with better communication scores. The AHRQ states that the ready-to-use materials and well-defined training curriculum could "successfully integrate teamwork principles into any health care system" (AHRQ, 2008). The comprehensive evaluation materials for TeamSTEPPS provide a model for examining the scenario communication, teamwork, and criteria to measure excellence (Guise et al. 2008).

Deliberate Practice of Shoulder Dystocia Maneuvers

The components of shoulder dystocia simulations lend themselves to repetition. Issenberg in 2005 reported that 39% of simulation articles noted repetitive practice as an important element in high-fidelity medical simulations (Issenberg, et al, 2005). Though the frequency or amount of repetition is not sufficiently specified, participant success noted in the English SaFE studies supports repetitive practice (Crofts 2007). Deliberate practice, and focused repetition in a structured environment with skill assessment and feedback should be standardized practice with measurable outcomes (Ericsson 2008; Kardon-Edgren, Adamson, & Fitzgerald 2010; Moulart, 2004). Simulations that provide a structure and a process for debriefing along with the feedback

requirements of deliberate practice and that lack standardization are often idiosyncratic. Study reports on deliberate practice for nursing students learning CPR noted improvement. Croft in 2008, measuring the use of the shoulder dystocia maneuvers also noted improvement after deliberate practice (Oermann, et al. 2011). The operational logic behind such processes can be used to set standards and a comparable measure for simulations and efficacy (Guise, et al. 2008).

Replicability and Integrity

Within a series of simulations, replicability, consistency of treatments, and soundness of the observers' assessments all enhance internal validity. Replicability describes the potential for the scenario to be reenacted arriving at the same desired outcomes. Comprehensive, descriptive design protocols promote replication and also enhance internal validity by adhering to the scenario script (Prion, 2008). A consistent thread of replicability within the Objectives, Fidelity, Problem Solving, Student Support, and Debriefing components promotes excellence and efficacy. This is not a mere assertion or hope, but must be a measurable goal for each simulation.

The consistency of simulated treatments also adds to the internal validity by ensuring that all participants experience the same event. An example of event consistency would be the treatment of the neonate and maternal manikin in a shoulder dystocia simulation. The treatment of the neonate manikin refers to the action of the facilitator or confederate who holds the baby manikin, thereby providing resistance during a shoulder dystocia. Lack of consistency in the treatment of the head-body delivery time, the physical resistance to the rotation of the shoulders, or the endpoint maneuvers interfere with the replicability of that event. Various and random treatments of the facilitator enacting the laboring mother, along with variations in controlling the neonatal manikin, impede comparisons of delivery times between studies, thus diminishing excellence and efficacy.

Until national simulation standards for shoulder dystocia are declared, simulation designers must design scenarios that have external and internal validity as a best practice for simulation education.

Conceptual/Theoretical Framework

The conceptual framework for scenarios is derived from, but not limited to, learning (Abrahamson, Denson & Wolf, 2004). Cognition instructional strategies distilled from socio-cultural learning studies, constructivist learning, and learner-centered theories also have vital roles in simulation design (Clapper, 2010; Jeffries, 2007; Patel, Prion, & Ruggenberg, 2008). Yoskowitz & Arocha, 2009). Lave and Wenger's theory on communities of practice (1998) offers a foundation for situated learning in the hospital.

The inconsistent and uneven development of simulation over the last forty years has spawned competing models to the detriment of standardization confounding nursing practice and medical education (Cooper & Taqueti, 2004). Kneebone (2005) proposes that medical simulation designers use theory and not just technology in simulation design. He proposes that scenario design should incorporate four key areas: (1) technical proficiency, with repeated practice and regular reinforcement, (2) expert individualized support based on the Vygotsky tutor model, (3) situated learning and apprentice models and (4) " the affective component of learning". The hand skill proficiency needed by surgeons, obstetricians/ gynecologists, anesthesiologists and others requires repeat practice and individualized learning. The nursing community's equivalent need for hand skills is determined by the specialties of surgical assistant, nurse-anesthetists, nurse-midwifery and other advanced practice specialties.

The National League of Nursing's simulation programs articulated in the *Nursing Education Simulation Framework* are based on learning and cognition theorists who emphasize focusing on

learner-centered practices, constructivism, and collaboration (Smith, 2009: Jeffries, 2007). Sharing constructivism and cognition foundations medical and nursing simulations differ according to the nature of their respective roles. On the basic level, medical simulations are designed to promote MD hand skills and critical thinking. Nursing simulations also promote critical thinking, but are more focused on multitasking, and the support of the patient and physician. These differences challenge the development of interprofessional scenarios (Lorente, Hogg & Ker, 2006).

Section III

Methods

Ethical Issues

During the initial scenario testing the Project Manager does not have any financial disclosures. A successful project may lead to a commercial business plan for the Project Manager of the California Simulation Alliance. Secondly no patients will be involved and the staff participation is voluntary.

Setting

The setting is an in situ setting within a San Jose, California community hospital's obstetrical unit.

Planning the Intervention

The planning milestones to develop, test, and run a simulation are adopted from various project management methods and the LEAN perspective. This project profits from the combination of both methods. Accepted project management practices were used to develop the financial analysis.

LEAN thinking developed from my interest in symbology to describe processes during the summer of 2012. The LEAN perspective focuses on identification and elimination of waste in time, energy, resources, and product manufacturing processes (Campbell, Gantt, Condon, 2009). It is useful in assigning symbols for discovering relationships, increasing motion and action efficiencies, and decreasing wasted resources. Utilizing the principle of parsimony, the LEAN technique asks the following questions: What is the basis of common shoulder dystocia simulation design? Are there redundancies? Can low-capacity processes be improved to high-capacity processes? Can the workflow be altered? The answers established the foundation for

examining common shoulder dystocia practice for identification and elimination of waste.

What is the basis of common shoulder dystocia simulation design?

Common shoulder dystocia design is based on the participants and location respecting the hierarchy of nurses, midwives, and doctors. Multidisciplinary simulations are often associated with academic sites with 24/7 in house OB coverage. The variance between sites and participants does not change the role of the obstetrician to conduct the shoulder dystocia maneuvers.

Are there redundancies?

Redundancies in the nursing staff, the respiratory staff and management are sometimes seen.

Can low-capacity processes be improved to high-capacity processes?

There is an overlap of almost all skills.

Can the workflow be altered?

What if the obstetrician does not arrive? What happens next?

Kolb and LEAN

Kolb's instructional sequences: of concrete experience, reflection, abstract conceptualization, and active experimentation also structured my thinking about shoulder dystocia simulation (Kolb, 1984). Kolb coupled with LEAN scrutiny created a reductionist vision of the personnel leading to the constellation of mother, midwife and support person in the classic pose. The arrangement of the midwife at the foot of the mother and the support person behind or to the side of the mother is the classic pose in birth art and can be found with some variation throughout birth history (Ashford, 1988; Injoy Productions, 1998). The classic pose is also the smallest number of people required to conduct a safe delivery. See Appendix D The Classic Pose, a LEAN Perspective.

The LEAN perspective is also represented by the pre-scenario multi-media education on a

website, the construct simplicity of the shoulder dystocia simulation, and the novel feature of incorporating alternative personnel.

Steps to Building a Remote Simulation Program

The general order of the milestones represents basic business and PDCA principles. See Appendix E for a visual display of the PDCA principle. The first phase of application and evaluation uses a focus group for information. The second phase is a test run of the simulation and the third phase is a contracted simulation at a target hospital.

The bulleted steps below outline the milestones required in building a mobile simulation program. The steps are not restricted to a linear timeline. Steps one through four may be synchronous or asynchronous with each other. This paper details step one through seven.

Three Phases and milestones

First phase milestone.

1. Gather a team, write a business plan
2. Procure funding
3. Locate and contract the in-situ site for the simulation
4. Prepare the pre-scenario education
5. Gather the equipment, staff, supplies
6. Interview a focus group (Certified Nurse-Midwives, labor and delivery nurses)
7. Re evaluate scenario materials, scenario progression and testing

Second phase test run.

1. Locate and contract the in-situ site for the simulation
2. Prepare the pre-scenario education
3. Run a test run (El Camino Hospital Mountain View, CA)

4. Re evaluate scenario and materials

Third phase commercial product run.

1. Locate and contract the in-situ site for the simulation
2. Prepare the pre-scenario education
3. Run a simulation in a target community hospital. (St Louise, Morgan Hill, CA)
4. Revise and evaluate scenario, materials and equipment.
5. Begin commercial distribution

Seven Steps

Step One Gather a team, write a business plan.

This project was originally a class assignment so the team was not assembled before the business plan. Team members were found within the California Simulation Alliance and coalesced into a small team of three. The business plan followed the outline in the A Practical Guide to Finance and Budgeting by Waxman (2008). The financial characteristics of a business plan are represented by a SWOT analysis displayed in Appendix F Tables 1-4. The startup costs for a minimal cost venture and or a midrange cost program are compared in Appendix G Tables G1 and G2. A net profit scenario with and without travel costs based on a net profit of $700 per 4-hour session shows a net profit of $1,400 per two sessions in Appendix H Table Net Profit Scenarios. The best and worst case return on investment (ROI) found Appendix I covers the return on a $3,000 investment and a benefit based on a $700 net profit per 4-hour scenario. The worst case which is two sessions per month for ten months a year is a 4.7% ROI. The best case has an ROI based on 160 sessions in 10 months of 37.3%.

Step Two Procure funding.

Funding is required for developing and implementing this innovative shoulder dystocia

simulation. The costs are minimized in this case as the principle instructor declines development or implementation fees in exchange for mentoring and equipment sponsored by the California Simulation Alliance. The basic cost assumes manikins on loan, free development, and free implementation by the principle in fulfillment of the DNP project.

The basic costs of the focus group ($148.) and the trial run ($250) are attributed to materials and printing. The expected costs of a 4-hour session on the day of simulation are $1300.00 with $1,100 in salaries, $200 for the restocking of equipment and supplies. See Appendix J Table J1 Expected Costs on the Day of Simulation the costs for a two hour and four hour session. Table J2 Variable Costs for Travel and Housing on the Day of Simulation shows the need to have a travel premium when making contracts. Salary costs can be reduced by volunteer assistants or by barter arrangements.

Step Three Locate and contract the simulation site.

Site selection and the requisite permissions must be in place before committing equipment or advertisements efforts. This period of negotiation is variable in length. Issues for hospital managers are: mandatory or voluntary attendance, stipends for physician attendance, the in-situ location, the number of sessions and the timing of sessions. Representatives of the California Simulation Alliance will conduct the contract negotiations.

Step Four Prepare the pre-scenario education.

Healthcare professionals are familiar with pre-scenario education as it is required for participation in the life saving programs of the American Academy of Pediatrics and the American Heart Association. The pre-scenario education assumes that the participants have had some education and have a professional duty to perform their role at a shoulder dystocia event. The need for the participants' to understand and perform their function at a shoulder dystocia

event is an intrinsic motivator for reviewing the pre-scenario education.

The pre-scenario education is focused on meeting the scenario objectives via Print and Web materials. Drawing from the ACOG Patient Safety Checklist and key communication behaviors from the American Academy of Pediatrics Neonatal Resuscitation Program (2011), guidelines for role expectations, key behaviors, terms for alternative personnel are listed in the "Interprofessional Roles; Shoulder Dystocia: Alternative Personnel" booklet. The complete ACOG checklist is found in Appendix K ACOG Patient Safety Checklist Figures 1 and 2. The American Academy of Pediatrics Neonatal Resuscitation Program is the source of the Key Behavioral Skills in Appendix L.

Web Resources.

Web resources present a comprehensive view of shoulder dystocia management ranging from technique to team interactions. Besides live patient and manikin simulations the web resources also include multi-media 3-D depictions that offer a better view of a shoulder dystocia than at the bedside or the blackboard. See Appendix M for the list of the Pre-Scenario Education Materials.

The first of the five videos presented in the order of suggested viewing is the "Shoulder Dystocia" animation by High Impact Graphics, a medical animation company. The video clearly illustrates the fetus, maternal pelvis, the application of suprapubic pressure, and the stretching of the brachial nerve. One minute and three seconds (High Impact Graphics, 2011).

"Steps to Overcome shoulder Dystocia" is in the second position because of the in-depth presentation of statistics and multi-media methods. It reinforces that "all birth attendants need to know what to do", the basic premise of this project. Hosted by the WHO Reproductive Health Library "Steps to Overcome shoulder Dystocia" demonstrates the MAPS sequence of maneuvers (McRoberts, Anterior shoulder, Posterior shoulder, and Salvage) for the South

African management of shoulder dystocia. The video is the longest using animation, clinical simulation and real patients to demonstrate the mechanisms and remedies of shoulder dystocia. The section with the real life shoulder dystocia patient is compelling and can be recognized by obstetrical staff in spite of cultural differences. Eight minutes and 34 seconds (WHOrhl, 2012).

The third video "Shoulder Dystocia Delivery, Manoeuvres, Management, Simulation, published on July 7, 2012 is one of free training videos from Maternity TrainingInternational available on YouTube. Based on English obstetrical management a realistic clinical simulation demonstrating all of the maneuvers is enacted with on-screen explanations over four and a half minutes. The essential checkpoints are easily identified: problem identification, requests for help, communication with staff, patient and family, call out and perform the maneuvers (Gherman, Ouzounian, & Goodwin 1998) and document the delivery. (Goffman, Heo, Chazotte & Merkatz 2008). The abdominal cover of the manikin permits supra pubic pressure and precludes viewing the rotational effects on the fetal manikin. Five minutes and 44 seconds (Maternity TrainingInternational, 2012).

The fourth video "Shoulder Dystocia Delivery" by the Laerdal Medical Company showcases teamwork and communication during a shoulder dystocia simulation featuring a hybrid manikin and woman patient. The realistic depiction is a model for in situ clinical simulation. The American obstetrical management emphasizes clear team communications and family involvement. Three minutes and 18 seconds. (Laerdal, 2010).

The fifth video is a film clip from the Doctor's Channel titled "Secondary maneuvers for shoulder dystocia have high success rates". This segment reports the evidence that is shifting practice away from McRoberts the traditional maneuver to the secondary maneuvers, Rubins and Woods. The information is backed statistically and should change practice. One minute and 43

seconds. (Doctor's Channel, 2011). The print and web resources and the pre test together make up the pre-scenario education.

Step Five Gather the equipment, staff and supplies

The four categories of equipment needs are office supplies, audio/ visual equipment, the Manikin and accessories, and educational and documentation needs generated by the Scenario. See Appendix N. Table N1 Minimal Equipment List for Remote Shoulder Dystocia Simulation. The Table N1 shows the advantages of decreased equipment needs when the principle develops the scenario and deploys personal equipment. This is an advantage for testing the market with a small investment. Appendix N, Table N2 Equipment Costs for Low end, Midrange, and High-end budgets compares the equipment similarities and differences between the three budgets. The High-end budget required funding that was not evident at the time of this proposal.

Step Six Interview a focus group

A focus group on March 14th 2013 was held after the Midwife Meeting at Kaiser San Jose reviewed the booklet a discussion of the results can be found in Section IV.

Step Seven Evaluate scenario materials, progression and testing.

The focus group is the first evaluation of the scenario materials, scenario progression. The participants are Certified Nurse-Midwives with current labor and delivery responsibility, experienced with shoulder dystocia workshops, and in situ simulation of multi-disciplinary critical events. Their commentary is useful because of their broad experience and their exposure to the potential shoulder dystocia on every shift.

The focus group participants evaluated the Interprofessional Roles Shoulder Dystocia: Alternative Personnel booklet on its applicability, usefulness, and personal effect. The simple questionnaire was adjunctive to the discussion of the focus group. See Appendix O for the

Program Evaluation Questionnaire that was used to evaluate the response to the booklet.

Implementation

Detailed statement of the work.

The deliverables for the CSA Onsite Sims program are content and the scenario system along with its implementation. Specific deliverables within the scenario system are: pre-scenario education, the objectives, the scenario script, the pre and post tests, the key elements checklist, the site evaluation, the setup and take down checklists, and the internal evaluation.

The California Simulation Alliance shoulder dystocia scenario is the base for developing the interprofessional in situ scenarios. See Appendix P Table 1 Transference of Information. The completed scenario will have individual and team objectives, scripting and pre and post tests for the expected participants: obstetricians, emergency room physicians, midwives, and nurses.

In situ critical events training is often complicated by competing patient care when participants are not scheduled to participate. Preference for scheduled participants and reserved patient rooms is desirable but not always possible for in-situ training. Understanding the unpredictability of patient acuity and provider availability on an obstetrical ward, the CSA Onsite Sims' shoulder dystocia simulation is designed to accommodate shifting participants. The pre-education is designed to duplicate the didactic portion anticipating a fluid group of participants. The mixed media pre-education package of web videos, and handouts provides general and role specific resources for team communication and subject knowledge.

The didactic, scenario and debrief can be completed in two hours and repeated up to four times in eight hours. Suggested times for the two-hour program are morning sessions, lunch hour, change of nurse shifts or afternoon sessions.

The program on site will consist a two-hour program per scenario group beginning with a

pretest, confidentially attestations within a 30-minute presentation regarding the review of the maneuvers, the participant roles, expected behaviors and communication. Participants will then spend 10 minutes becoming familiar with the model, with a five minute or less scenario followed by a fifteen minute debrief, review, posttest and evaluation. See Appendix Q for the Simulation Schedule of activities. The scenario will be filmed and may be discussed at debriefing for clarity. Subsequent scenarios will insure participation by all. A final review of the scenario experience and the posttest will measure knowledge and clinical confidence gained by participation and program effectiveness. See Appendix R Trial Run Simulation Schedule: Two-hour program.

Description of projected resources requirement.

The four categories of equipment needs are office supplies, audio/ visual equipment, the Manikin and accessories, and educational and documentation needs generated by the Scenario. See Appendix N. Table N1 Minimal Equipment List for Remote Shoulder Dystocia Simulation for the basic equipment list. Appendix N, Table N2 Equipment Costs for Low end, Midrange and High end Budgets shows the range of equipment possibilities.

Information flow requirements.

A job description for the per diem simulator clinicians will be posted for 30 days on the simulation websites. Both the manager of the partner company and myself will interview the top candidates. Communication will be in-person, web meetings, or by email. A formal presentation of CSA Onsite Sims will be presented to the managers before presenting it to the Board of Advisors and the Finance Chief Officer.

Time and Cost Summary

GANTT milestone projections.

The project consists of three phases. Phase 1 is the scenario design phase can be completed in

30 days or less. See Appendix S Table S1 Phase 1 Thirty Days to Create and Test Scenario.

Phase 2 is the test run and could be tested and analyzed within 30 days. The third phase is the preparation and run of the commercial product. The commercial product timeline begins with the preparation for the multiple presentations to the decision makers. This period is variable and could take up to six months before the program is accepted. See Appendix T, Gantt Chart for Trial Run Preparation Schedule: Two hour program.

Time, cost and performance constraints.

The CSA Onsite Sims program is scalable, and can be developed, and tested by one energetic principle, with assistance from paid or trade per diem simulator teams. The California Simulation Alliance offers name recognition, and the infrastructure for procuring hospital contracts, organizing and staffing the simulations, equipment, and legal fees. The ability for remote simulations is a temporary competitive advantage in an emergent market.

The timeline for developing a CSA Onsite Sims scenario is one month. All of the adjunctive materials must be completed and available one week before implementation. Timing implementation is dependent on contracts with hospitals, and other payers.

Proposed budget and assumptions.

The proposed budget covers the cost of producing the pre-education package, the equipment list, and travel expenses. Financial assumptions are that the project leader is not paid for developing or implementing the scenario and the audio/visual equipment, manikin, advertising, and contracts will be funded by the California Simulation Alliance. The basic budget for developing and implementing the shoulder dystocia simulation is $1300.00 per session including the payment of two assistants at $300 each, reproduction of scenario educational materials, and the restocking of batteries, cords. Appendix G Table G1 Minimal Startup costs for Remote

Shoulder Dystocia Simulation Program and Table G2 Medium Startup costs for Remote Shoulder Dystocia Simulation Program displays the costs at the most basic level with free development and implementation. Appendix H displays the Expected Costs on the Day of Simulation.

Return on investment analysis.

This cost benefit analysis looks at the return on investment (ROI) for a simulation company that has computerized mannequins, audiovisual equipment, and could benefit from the addition of a CSA Onsite Sims unit. These costs are calculated at fair market prices with no one producing free development or free scenario implementation. The start up costs including a reserve of $2000 range between $4300 and $1180. The development and equipment costs are the main variable costs.

Low-end costs and breakeven point

The low-end estimate is based on a no cost scenario development, borrowed equipment a production cost of the booklet and materials of $800, an advertising and miscellaneous budget of $100. The total startup costs are $1000. The operation cost is $1300 for one session with a net profit of $700 per session. The total startup cost including a one-session cost of $2300 and a reserve of $2000 requires an initial investment of $4300. The breakeven point with profit of $700 per session is after the seventh session.

Midrange costs and breakeven point

Total startup cost including one session is $7,500 + $1,300. A reserve of $2000 requires an initial investment of $10,800. The breakeven point with profit of $700 per session is after the sixteenth session.

The difference between the high-end budget of $53,345 and the midrange budget of $5,795 did

not warrant pursuing the high-end budget. See Appendix N2. The return on investment is dependant on the number of contracted sessions. See Appendix H Net Profit Scenarios. The range for the return on investment (ROI) is from 37.3% the 160 sessions/yr to 18.7% ROI on 80 sessions a year to a low ROI of 4.7% for 20 sessions/ yr. See Appendix I ROI Best and Worst Case for Low-end Budget, Investment of $3,000.

Planning the Study of the Intervention

Methods of evaluation participant learning indicators.

Participant learning indicators will be accessed by the Prion (2008) assessment categories of Pre-training testing and Post-training testing, Video Feedback, the Clinical Elements Checklist, and Repeat Demonstration. Standardization of written assessment of these skills promotes a universal platform for evaluating external validity and is a goal of this project.

Pretraining and post-training testing.

The direct measurement assessment category of knowledge in pre-training testing and post-training testing is based on the ACOG Practice Bulletin on shoulder dystocia that defines the knowledge any obstetrical provider must know in order to successfully manage a shoulder dystocia (AGOG, 2002). The commonality of this knowledge pool offers external validity as the pre-training and post-training testing covers commonly accepted knowledge and practices. This makes the testing transferable to other populations, which is a powerful marker for external validity. The knowledge pre-training and post-training testing may exhibit some variance regarding the site and the time administered. The variance regarding site is restricted to: educational sites, schools of nursing, and schools of medicine, hospitals, clinics, and simulation centers. The time of the testing could have an influence when the participants are sleep deprived, or if they are anticipating testing, or have been recently been trained.

Clinical element checklist.

The clinical element checklist lends itself to comparability even when the site and the complexity of the simulation design influences the elements of the checklist. Differences between hospitals and educational sites are reflected in the checklist. Generally, complex multi-disciplinary team scenarios in tertiary care facilities generate complex checklists and more graders. In this way the assessment category, the clinical elements checklist defines levels of complexity, adding a greater range of applicability and generalizability to the checklist. The CSA Onsite Sims checklists are based on the surgical checklists adapted from the Civil Aviation Authority guidelines (Shufflebean, 2002; Verdaasdonk, 2008). The American College of Obstetricians and Gynecologists (ACOG) released in 2012 the Patient Safety Checklist Documenting Shoulder Dystocia (ACOG, 2012). This checklist is a complete documentation form that guides and structures shoulder dystocia scenarios. It serves as the clinical elements in the CSA Onsite Sims. See Appendix K Patient Safety Checklist Documenting Shoulder Dystocia.

Repeat demo/other.

The category of repeat demonstration is shaped by the topic, the language, and by the behavior of the participant. This category can reinforce the information covered by any of the previous tests or performances. Such repetition is crucial and its value is increased by the comparison between the initial and the subsequent performances (Prion, 2008). The hand maneuvers for shoulder dystocia, applying pubic pressure, and locating the back of the baby (Leopold's) are potential repeat demonstration points.

Video feedback.

The student self report and clinical feedback categories are indirect measurements and are

more variable in structure and quality, as they are primarily personnel and equipment dependent. The category of clinical feedback also has extensive variability as the range for feedback varies from formal, structured and taped, to informal, lacking structure or transcripts verifiable by external reviewers. Discussion of the recording during a debriefing is personnel dependent, and is usually confidential, and therefore harder to examine. The video recording of scenarios increase external validity by permitting external examination and confirmation of the simulation design characteristics.

Student self report.

The student self report is an indirect measure of learning which has more significance when coupled to direct measure assessments such as the pre-training, post-training testing and the written in class exam. Prion (2008) in the National League of Nursing web course Evaluating Simulation explains, "Students should have the opportunity to evaluate their own performance during the simulation." The privacy of the self-report offers an honest and protected space for self-disclosure. The self-report can be written, oral, or introspective, and could be either private or shared. As consumers, the RNs and the MDs are emotionally and professionally motivated to mitigate their risk of an avoidable event. Considering this sense of responsibility, an honest self-report can be directed to acquiring the skills and knowledge needed to be successful.

Methods of Evaluation Productivity

The exploratory nature of new markets makes productivity data essential for decision-making. Productivity data regarding marketing efforts, contracts, and simulation production time (from set up to take down) is required for forecasting and making adjustments to goals and policies. Pre-production weekly tracking of all preparation categories will ensure on-time performance and uncover problems areas. Cyclic evaluation of simulation participant testing and

data collected from each session will be analyzed for clinical and statistical significance. The holistic analysis of the scenario includes revising the educational materials as guided by the participant learning.

The evaluation questionnaire given to participants offers scoring on a four point Likert scale. Typical questions regarding student comfort and environment, education materials, learning, simulation experience, and overall value of the course comprise the evaluation form. The results of those evaluations will shape revisions in any of the scenario areas lacking clarity or that show a decrease in participant satisfaction.

Internal evaluation will examine difficulties in executing the scenarios, the reception of the educational materials, and the potential for revision and improvement.

Reporting Requirements

The report of the findings will be given to the Director of the California Simulation Alliance and the Board if desired. An oral and written presentation of this project will be produced in fulfillment of the Final Project requirement for the University of San Francisco DNP program. Disclosure to hospital administration will be offered in the form of a written analysis and oral presentation if desired. See Appendix U Communication Matrix

Evaluation Criteria

The progression of the mobile program has specific evaluation methods for each of the three phases of development.

Phase One evaluation.

The Phase One's evaluation uses a focus group questionnaire for feedback on the pre-scenario education. The questionnaire examined the reception, impact, and problems of the pre-scenario education and tested the concept of alternative personnel performing deliveries. The

focus group was asked to examine the pre-scenario education booklet for ease of use, applicability and for its personal effect on the reader. The nine questions on a Likert scale of four points asked the participants to rate their responses from one to four, worst to best. Question number nine was not clearly labeled and was disregarded. (Appendix O.)

Phase Two evaluation.

The second phase uses four instruments and direction from the California Simulation Alliance to evaluate the test run simulation. The instruments are pre- and post-tests, the program evaluation forms, and the mobile team debrief forms. The pre and post-tests knowledge responses determine the need to alter the tests before the first commercial simulation in Phase Three. The tests cover the basic roles, actions and documentation to successful cope with a shoulder dystocia. See Appendix V Pretest Trial Run, Appendix W Posttest Trial Run

The California Simulation Alliance (CSA) created the program evaluation form and has used successfully used it at their simulations. The CSA's history with the form strengthens the evaluation of the responses. See Appendix X, Program Evaluation form.

The mobile team debrief covers communication, roles and responsibilities, situational awareness, workload distribution equitable, task assistance requested or offered, were errors made or avoided, availability of resources and overall analysis. Results from those observations will be discussed with mentors and incorporated appropriately.

Direction from the California Simulation Alliance will serve as another evaluation during Phase Two. Their history and wide exposure to simulation can improve materials and process difficulties and improve the Interprofessional Roles Product.

Phase Three evaluation

The third phase uses three updated instruments to evaluate the first commercial simulation.

The instruments are the pre and post-tests, the program evaluation forms, and the mobile team debrief form. Informal discussion by participants or observers will be considered feedback.

Results on the pre- and post-tests will demonstrate the degree of participant learning, increases in confidence, documentation, understanding of hand maneuvers and team communication imparted by the simulation. A majority of "very good or good" responses to the question on the program evaluation form "How would you rate this program," repeat business contracts, and referrals to new sites will define success. See Appendix X Evaluation Form.

Analysis

The Interprofessional Roles Shoulder Dystocia: Alternative Personnel program's focus on alternative personnel performing deliveries demonstrates the anomalous adaptations common to hospitals without 24/7 obstetrical in-house care. Exciting for its ability to fill the gap in community hospitals the CSA Onsite Sims program fits with the California Simulation Alliance (CSA)'s mission "to help hospitals integrate simulation into their patient safety programs to meet the national patient safety goals". Association with the CSA brings name recognition, expertise, and equipment. These advantages are priceless.

Positive features of the program.

Rooted in the American College of Obstetricians and Gynecologists (ACOG 2002) recommended theory and practice the clinical information reflects the National Institute of Health recommendations for a national patient safety language, the Patient Safety Checklist for shoulder dystocia (ACOG, 2012). The use of national standards supersedes and suspends local culture during the simulation. The national standards offer authority and benchmarks.

Hospital staff members may not be aware of the standards for shoulder dystocia or for communication. In order to promote current standards the Interprofessional Roles Shoulder

Dystocia Simulation: Alternative Personnel is pre-scenario education for in-situ obstetrical simulation. Designed as a method to decrease simulation performance anxiety, the interactive booklet introduces simulation concepts, expected behaviors and the process of simulation to participants.

A positive feature is the low cost of the development, the use of low budget manikins and audio -visual equipment and production of the scenario. Development of the scenario, booklet and adaption of forms was freely done in part of completing the requirements for a DNP at the University of San Francisco. The author's expertise negated the paying for an expert to create and review the information thus decreasing common costs.

The costs before the day of simulation are printing costs of $10 per participant, cost from contract negotiations and equipment refurbishment. The main costs the day of simulation are travel and wages earned that day. The low overhead offers the program profitability with the first full price customer and self-sustainability after the first multiple session program is signed. The good return on investment of 37.3% makes for a self-sustaining venture.

Potential Difficulties

All new ventures experience obstacles and delays that are difficult to anticipate. The most problematic obstacles for this new venture are poor reception in the marketplace, and unexpected competition. In-situ hospital simulations will become ubiquitous in the near future. The lure of business expansion for brick and motor simulation sites, patient safety companies and others will cause a rush for contracts. Early entrants to the marketplace can be trampled by the influx of competitors making attention to the marketplace and planning important for survival.

Section IV

Results of the Focus Group

The focus group was conducted after the March 14 Midwife Monthly Meeting. Participants were six Certified Nurse Midwives (CNM) colleagues and two Obstetrician/Gynecologists. A secondary focus group of labor and delivery nurses formed on the night shift that allowed for more discussion. Each reviewer looked at the booklet and was given a short questionnaire. See Appendix O.

Participants.

The Certified Nurse-Midwives and RN participants all worked on labor and delivery. Two result confounds particular to this study group are the participants' multiple exposures to shoulder dystocia simulation and the melded clinical role of these nurse-midwives as providers/nurses.

Previous experience with shoulder dystocia simulation.

The CNM participants had participated in a required training that featured practice of shoulder dystocia hand maneuvers in 2010 and in a 2008 midwifery workshop on shoulder dystocia and maternal positioning using the Noelle manikin. The labor and delivery nurses has attended the required training on shoulder dystocia but had never practiced the maneuvers. This experience with shoulder dystocia simulation influences responses in the evaluation categories of familiarity with simulation, new confidence and appreciation of information.

Certified nurse-midwives dual roles of providers and nurses.

Particular to nurse-midwives is the clinical role of the assistant and the baby catcher. The physiological limits of patient normalcy define the CNM's scope of practice. Midwives are accustomed to becoming birth assistants when the obstetrician takes over the delivery. This

clinical role gives them experience in two of the basic roles, baby catcher and birth assistant. Their experience with both roles may not show a large increase in learning or appreciation in the roles of others. Hospital staff not accustomed to clinical simulation is expected to report larger increases in learning, appreciation in the roles of others and comfort with simulations.

Pre scenario Educational Materials

The pre scenario educational materials were a bundle of the pre test, the "Interprofessional Roles; Shoulder Dystocia & Alternative Personnel" booklet augmented by print and web resources. The printed materials included the ACOG Patient Safety Checklist, a review of the terms, hand maneuvers and key behaviors from the Neonatal Resuscitation Program.

Web resources included various approaches in shoulder dystocia management ranging from animation on the High Impact Graphics site, the Laerdal manikin simulation video on shoulder dystocia to a real person shoulder dystocia managed in South Africa. The variety of approaches may stimulate the viewers to examine their habits and encourage the adoption of the best practices.

Additional suggested resources can be purchased or shared by the participants. A suggested resource is the Ina May Gaskin "A Breech Birth & Shoulder Dystocia" DVD (1999) featuring the evidenced based Gaskin maneuver. This video is the classic demonstration of hands and knees. The ACOG video on shoulder dystocia *Shoulder Dystocia Drill* by William Young, MD□Time: 18 minutes (1995) features a full enactment and explanation of a shoulder dystocia practice drill.

Equipment and other costs.

The focus group costs were primarily the printing costs of the instructional booklet of $92 for 10 booklets. No travel was required. Total costs for printing and miscellaneous was $148.00.

Program evaluation/outcomes of the focus group.

Without relevance, a self-sustaining simulation program cannot establish a reputation and survive in the marketplace. The California Simulation Alliance's history with simulation programs offers a foundation to analyze and review the success of programs. Because this program is a new venture more testing and evaluation is needed before the first commercial program is presented. The evaluation of the questionnaire completes the first phase milestones.

Response to the pre-scenario education questionnaire.

The Phase One questionnaire had a dual purpose; a.) Understand the reception, impact, and problems of the pre-scenario education and b.) Test the concept of alternative personnel delivering babies. The questionnaire revealed a universal approval in the booklet's "ease of use," the reality of the process and the order, and the overall improvement in knowledge and positive feelings about simulations. Some variations between respondents reflected the amount of information desired, and the self-confidence participating in a simulation. The questionnaire results regarding confidence and positive feeling about simulation will be added to the program evaluation of the test run. See Appendix Y Pre-scenario Education Questionnaire Results.

Informal conversations also captured the reviewers' reaction to the booklet. The concept of alternative personnel was recognized by all of the reviewers. Each of them knew of births when the doctor or midwife did not arrive in time. Those personal experiences prompted a quick recognition of the problem. Everyone agreed on the importance and value of the pre-scenario education materials. Overall the reviewers gave positive reviews and voiced appreciation for the information.

Two colleagues reviewed the booklet and requested the program be taken to their other workplaces. Their interest may lead to a trial run location and the first commercial program site.

Suggestions from the focus group.

Several focus group members voiced a preference for a web interactive document. In order to satisfy that need for interactivity the revised booklet will be housed on a website and will have embedded QR (quick response) codes linking the booklet to videos and animation to shoulder dystocia. The QR codes are expected to be operational by July. The website is temporarily hosted by the University of San Francisco, San Francisco under private settings.

Section V

Discussion

Healthcare professionals welcome opportunities to improve performance and patient outcomes. The adage "practice makes perfect" applies to the advantages of clinical simulation in the hospital setting. In frequent but high morbidity events can be practiced without endangering a live patient during a clinical in-situ simulation. Numerous studies have reported improved situational awareness and overall performance when individuals and obstetrical teams practice communication, expected roles and best clinical practices in a safe and familiar environment.

The innovation in this project is the concentration on alternative personnel for delivery. Generally not a consideration in stimulation scenarios designed for 24/7 obstetrical coverage, the focus on alternative personnel is an acknowledgement of the reality of community hospital birthing, the obstetrician, family practice physician or midwife does not always arrive in time to relieve the anecdotal reports of "tight shoulders ", "pulled kinda hard" and "stuck too long."

The infancy of obstetrical in-situ simulation is an opportunity to include all the expected and alternative personnel to the educational process. Recent history from the 1900's document the deleterious effects when American midwives were left out of the educational process regarding antiseptic practices while European midwives were included in the new practices. Alternative personnel performing the necessary proxy duties for the designated obstetrical person must be included in the education of teams and best practices.

Another innovation is the pre-scenario education component of the "Interprofessional Roles Shoulder Dystocia Simulation: Alternative Personnel" program. Designed as a method to decrease simulation performance anxiety, the booklet introduces simulation concepts, expected behavior and the process of simulation to participants. The clinical information reflects the

National Institute of Health recommendations for a national patient safety language, the American College of Obstetricians and Gynecologists (ACOG) Patient Safety Checklist for shoulder dystocia, and evidenced based practice (ACOG 2002).

The booklet was tested in a focus group of ten participants made up from Certified Nurse-Midwife, labor and delivery nurses and obstetrician/gynecologists. The results cannot be generalized to other groups all of the reviewers had multiple exposures to simulation that would not be expected in target community hospitals. The participants' reported comfort with the simulation and appreciated the educational offerings. They also increased their awareness of the roles of other team members. The participants' previous simulation experience may have influenced the uniform high rating in confidence and familiarity.

Relation to other evidence.

Similar to other shoulder dystocia simulation studies, the participants in the focus group appreciated the review of the shoulder dystocia maneuvers, documentation and the hands-on practice. They also gained a new awareness of the roles of others during, which is a typical finding in studies of interprofessional education.

Many shoulder dystocia simulation studies mention using print materials to augment learning on the day of simulation but few used pre-scenario education as an integral part of the program. Like the pre-scenario education videos of the life saving programs of the American Academy of Pediatrics and the American Heart Association the videos in the pre-scenario booklet provide a mental model for the participants before the simulation day.

All participants expanded their understanding of the documentation requirements of the ACOG Patient Safety Checklist. Similar results were noted in the shoulder dystocia studies that focused on documentation.

The participants agreed that having access to the materials before the scenario decreased performance anxiety. Performance anxiety is not usually addressed in shoulder dystocia simulation studies.

The small sample size of the focus group run disallowed statistical or clinical significance.

Barriers to implementation/limitations.

There were few barriers to implementation other than time limitations. The focus group was scheduled after a long four meeting that ran over time prohibiting discussion.

Conclusions

Credentials shape obstetrical clinical simulation in academic centers. The hierarchy of physicians and nurses is reflected in the simulations in which the physician always comes. Roles shape obstetrical clinical simulation in community hospitals because the physician does not always arrive in time. When the doctor is not close the alternative personnel needs to know the role of the baby catcher. Simulations that reflect the hospital specific roles and personnel increase the realism of the scenario.

The simple triad of the person with the specialized skill, the assistant, and the recorder is a basic formation that can be used to analyze patient care simulation roles. In a complex simulation there could be multiple assistants and persons with the specialized skill.

Section VII

References

Abrahamson, S, Denson, J. S, & Wolf, R. M. (2004). Effectiveness of a simulator in training anesthesiology residents. 1969. *Quality and Safety in Health Care*, 13(5), 395-7.

Agency for Healthcare Research and Quality (AHRQ) (2008). *Improving Patient Safety Through Simulation Research*. Rockville, MD. Retrieved from AHRQ website http://www.ahrg.gov/qual.simulproj.

Agency for Healthcare Research and Quality (AHRQ). (2008). *TeamSTEPPS, Strategies & tools to enhance performance and patient safety, (*Pocket Guide). Retrieved from AHRQ website http://www.ahrq.gov/teamsteppstools/instructor/essentials/pocketguide.htm

Agency for Healthcare Research and Quality (AHRQ) Health Care Innovations Exchange. (2011). Crisis management simulation course receives positive reviews, enhances communication and teamwork among labor and delivery practitioners during crisis. Retrieved from AHRQ website www.innovations.ahrq.gov/content.aspx?id=265

American Academy of Pediatrics. (2012). NRP simulation poster. Retrieved from www.nfaap.org/netFORUM/eWeb.Dynamicpage.aspx?WebCode=aapcc

American College of Obstetricians and Gynecologists. (2002). Shoulder dystocia. ACOG practice Bulletin No. 40. *Obstetrics & Gynecology*, 100:1045-50.

American College of Obstetricians and Gynecologists. (2012). The Patient Safety Checklist Documenting Shoulder Dystocia, *Obstetrics & Gynecology*, 120 (2), Part 1 430-431 doi: 10.1097/AOG.0b013e318268053c

Ashford. (1988). *George Engelmann and "Primitive Birth",* Mendocino, California: Janet Ashford.

Athukorala, C., Middleton P. & Crowther, C. A. (2006). Intrapartum interventions for preventing shoulder dystocia. *Cochrane Database of Systematic Reviews*, issue 4. Art. No.: CD005543. doi:10.1002/14651858.CD005543.pub2.

Campbell, R. J., Gantt, L., Congdon, T. (2009). Teaching workflow analysis and lean thinking via simulation. *Perspectives Health Information Management,* 6(3), PMCID:PMC2671290. Retrieved from http://www.ncbi.nih.gov/pmc/articles/PMC2671290/

Cooper, J. B., & Taqueti, V. R. (2004). A brief history of the development of mannequin simulators for clinical education and training. *Quality and Safety in Health Care*, 13, 1:i11-8. doi:10.1136/qshc.2004.009886. Supp

Clapper, T. C. (2010). Beyond Knowles: What those conducting simulation need to know about adult learning theory. *Clinical Simulation in Nursing*, 6, e7-e14. doi:10.1016j.ecns.2009.07.003

Crofts, J. F., Bartlett, C., Ellis, D., Hunt, L. P., Fox, R., & Draycott, T. J. (2006). Training for shoulder dystocia, A trial of simulation using low-fidelity and high-fidelity mannequins. *Obstetrics & Gynecology*, 108(6), 1477-1485.

Crofts, J. F., Bartlett, C., Ellis, D., Hunt, L. P., Fox, R., & Draycott, T. J. (2007). Management of shoulder dystocia, Skill retention 6 and 12 months after training. *Obstetrics & Gynecology*, 110(5), 1069-74.

Crofts, J. F., Fox, R., Ellis, D., Winter, C., Hinshaw, K., & Draycott, T. J. (2008). Observations from 450 shoulder dystocia simulations: lessons for skills training. Obstet Gynecol, 112(4) 906-12. doi 10.1097/AOG.0b013e3181865f55

Daniels, K., Arafeh, J., Clark, A., Waller, S., Druzin, M., & Cheuh, J. (2010). Prospective randomized trial of simulation versus didactic teaching for obstetrical emergencies. *Simulation in Healthcare*, doi:10.1097/SIH.0b013e3181b65f22

Deering, S., Poggi, S., Macedonia, C., Gherman, R., & Satin, A. J. (2004). Improving resident competency in the management of shoulder dystocia with simulation training. *Obstetrics & Gynecology*, 103(6), 1224-28. doi:10.1097/01.AOG.0000126816.98387.1c

Draycott, T. J., Crofts, J. F., Ash, J. P., Wilson, L. V., Yard, E., Sibanda, T., & Whitelaw, A. (2008). Improving neonatal outcome through practical shoulder dystocia training. *Obstetrics & Gynecology*, 112. 14-20. doi: 10.1097/AOG.0b013e31817bbc61

Doctor's Channel (Uploaded to You Tube). Secondary maneuvers for shoulder dystocia have high success rates https://www.youtube.com/watch?v=Pi2UXkDihGI Length

Elliott, S., Murrell, K., Harper, P., Stephens, T., & Pellowe, C. (2011). A comprehensive systematic review of the use of simulation in the continuing education and training of qualified medical, nursing and midwifery staff. JBL Library of Systematic Reviews, 9(17), 538-587.

Eppich, W., Howard, V., Vozenilek, J., & Curran, I. (2011). Simulation-based team training in healthcare. *Simulation in Healthcare*, 6, S14-S19. doi:10.1097/SIH.0b013e318229f550

Ericsson, K. A. (2004). Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. *Academic Medicine*, 79 (10 Supple), S70-S81.

Fahey, J. O., & Mighty, H. E. (2008). Shoulder dystocia using simulation to train providers and teams. *Journal of Perinatal Neonatal Nursing*, 22(2), 114-112. doi: 10.1097/01.JPN.00003197097.05415.1d

Ferguson, L. (2004), External validity, generalizability, and knowledge utilization. *Journal of Nursing Scholarship*, 36(1), 16-22.

Gaba, D. (2011). Preparing Rural and Urban Hospitals to Improve Safety Culture Through Simulation. *AHRQ Annual Highlights 2011*, AHRQ Publication No. 11(12)-0008, December 2011. Agency for Healthcare Research and Quality, Rockville, MD. Retrieved from http://www.ahrq.gov/qual/simulproj.htm

Gardner R., Walzer, T. B., Simon, R., & Raemer, D. B. (2008). Obstetric simulation as a risk control strategy. *Simulation in Healthcare*, 3(2) 119-127. doi:10.1097/SIH.0b013e318671bbe

Gaskin, I. M., (1999) A Breech Birth & Shoulder Dystocia DVD. Birth Gazette Video

Gherman, R. B., Chauhan, S., Ouzounian, J. G., Lerner, H. Gonik, B., & Goodwin T. M. (2006). Shoulder dystocia: the unpredictable obstetric emergency with empiric management guidelines. *American Journal of Obstetrics & Gynecology*, *1*95, 657-672. doi:10.1016/j.ajog.2005.09.007

Gherman, R. B., Ouzounian, J. G., & Goodwin, T. M. (1998). Obstetric maneuvers for shoulder dystocia and associated fetal morbidly. *American Journal of Obstetrics & Gynecology*, *178*, 1126-1130.

Goffman, D., Heo, H., Chazotte, C., & Merkatz, I. R. (2008). Using Simulation training to improve shoulder dystocia documentation. *Obstetrics & Gynecology*, 112(6), 1284-87. doi:10.1097/AOG.0b01323181c177b

Grobman, W. A., Hornbogen, A., Burke, C., & Costello, R. (2010). Development and Implementation of a Team-Centered Shoulder Dystocia Protocol. *Simulation in Healthcare*, 5(4), 199-203. doi: 10.1097/Sih.0b013e3181da5caa

Guise, J. M., Deering, S. H., Kanki, B. G., Osterwell, P., Li. H., Mori, M., & Lowe, N. K. (2008). Validation of a tool to measure and promote clinical teamwork. *Simulation in Healthcare*, 3(4), 217-223. doi: 10.1097/SIH.0b013e31816fdd0a

Guise, J. M., Lowe, N. K., Deering, S., Lewis, P. O., Blaser M., Wood, L., & Kanki, B. G. (2010) Mobile in situ obstetric emergency simulation and teamwork training to improve maternal-fetal safety in hospitals. Jt Comm J. Qual Patient Safety, 36(10), 443-53

HighImpactGraphics (Uploaded to You tube August 13, 2011). Shoulder dystocia animation. https://www.youtube.com/watch?v=EtS8udepMCM

Injoy Productions (Producer). (1998). A timeless way: A history of birth from ancient to modern times. [DVD] Available from www.childdevelopmentmedia.com/development/61346a.html

Issenberg, S. B., McGaghie, W.C., Petrusa, E.R., Gordon, D. L., & Scalese, R. J. (2005). Features and uses of high-fidelity medical simulations that lead to effective learning: A BEME systematic review. *Medical Teacher,* 27(1), 10-28. doi:10.1080/01421590500046924

The Joint Commission. (2004). Preventing infant death and injury. *Sentinel Event Alert*, 30, 1-3. http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_30.htm Accessed July 04 2010

Jefferies, P. R. (Ed.). (2007). *Simulation in Nursing Education*. National League for Nursing, New York, New York ISBN 0-9779557-4-5

Jevitt, C. M. (2005). Shoulder dystocia: Etiology, common risk factors and management. *Journal of Midwifery & Women's Health*, 50, 485-497. doi:10.1016/j.jmwh.2005.07.005

Kardong-Edgren, S., Adamson, K. A., & Fitzgerald, C., (2010). *Clinical Simulation in Nursing,* vol 6, e25-e35. doi:10.1016/j.ecn/2009.08.004.

King, H. B., Battles, J., Baker, D. P., Alonso, A., Salas, E., Webster, J., & Salisbury, M. (2010) TeamSTEPPS™. Team strategies and tools to enhance performance and patient safety

Kneebone, R. (2005). Evaluating clinical simulations for learning procedural skills: A theory-based approach. *Academic Medicine*, 80(6), 546-553.

Kolb, D. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs New Jersey: Prentice Hall

Laerdal Inc. (Uploaded to You Tube August 13 2010). Shoulder Dystocia Delivery https://www.youtube.com/watch?v=K5kLHkl5RsI

Lathrop, A., Winningham, B. L., & VandeVusse, L. (2007). Simulation-based learning for midwives: Background and pilot implementation. *Journal of Midwifery & Women's Health*, *52*(5), 492-498. doi:101016/jmwh.2007.03.018

Lave, J. & Wenger, E. (1998). *Communities of Practice: Learning, meaning, and identity*. Cambridge: University Press

Liner, M. A., & Wheeler, M. (2011, June). *Shoulder dystocia safety strategies: a multidisciplinary learning experience*. Workshop conducted at the AWOHNN Conference, Denver, Colorado.

Lorente, M., Hogg, G., & Ker, J. (2006). The challenges of initiating a multi-professional clinical skills project. *Journal of Interprofessional Care*, 20(3), 290-301. doi: 10.1080/1356182060006469755

Marzano, D., Frankel, J., Smith, S. B., & Andreatta, P. (2011). A simulation-based scenario to help learners in the management of obstetric emergencies. *Simulation in Healthcare*, 6(6), 364-369. doi:10.1097/SIH.0b013e318228630b

Maslovitz, S., Barkai, G., Lessing, JB., Ziv, A., & Many, A. (2007). Recurrent obstetric management mistakes identified by simulation. *American Journal of Obstetrics & Gynecology*, *109*, 1295-1300. doi: 10.1097/01.AOG.0000265208.16659.c9

Maternity TrainingInternational (Uploaded to You Tube July 7, 2012). Shoulder dystocia delivery, manoeuvres, management, simulation. https://www.youtube.com/watch?v=YB3_fPhgmUM

McGaghie, W. G., Issenberg, B., Petrusa, E. R., & Scalese, R. J. (2010). A critical review of simulation-based medical education research: 2003-2009. *Medical Education 2010*, 44:50-63. doi: 10.1111/j.1365-2923.2009.03547.x

Merién, A. E., van de Ven, J., Mol, B W., Houterman, S., & Oei, S. G. (2010). Multidisciplinary team training in a simulation setting for acute obstetric emergencies: a systematic review. Obstetrics Gynecology, 115(5), 1021-31. doi: 10.10.1097/AOG.0b013e3181d9f4cd

Miller, K. K., Riley, R., Davis, S., & Hansen, H. (2008). In situ simulation a method of experiential learning to promote safety and team behavior. *Journal of Perinatal & Neonatal Nursing*, 22(2), 105-1. doi: 10.1097/01.JPN.0000319096.99790.f7.

Moulaert, V., Verwijinen, M. G. M., Rikers, R. & Scherpbier, J. J. A. (2004). The effect of deliberate practice in undergraduate medical education, Medical Education 38(10) 1044-1052. doi:10.1111/j.1365-2929.2004.01954.x

Oermann, M. H., Kardong-Edgren, S., Odom-Maryon, T., Hallmark, B. F., Hurd, D., Rogers, N., Haus, C., …Smart, D. A. (2011). Deliberate practice of motor skills in Nursing Education: CPR as Exemplar. Nursing Education Perspectives [serial online]. 32(5), 311-315 Http://0-serarch.ebscohost.com.ignacio.usfca.edu/login.aspx?Direct=true&db=aph&AN=65325801&site=eds-love&scope=site

Orlando Medical Institute-EMT Birth Simulation Scenario (Uploaded to You Tube December 26, 2012). http://video.search.yahoo.com/video/play;_ylt=A0S00MzHZzpRtVkAGzj7w8QF;_ylu=X3oDMTBvMGQzcTByBHNlYwNzcgRzbGsDdmlkBHZ0aWQDVjEzMg--?p=ob++simulation&vid=0fd9510e59b8111c7a2a3b046291e649&l=6%3A21&turl=http%3A%2F%2Fts2.mm.bing.net%2Fth%3Fid=V.4661629603610917%

Patel, V. L., Yoskowitz, N. A., & Arocha, J. F. (2009). Towards effective evaluation and reform in medical education: a cognitive and earning sciences perspective. *Adv in Health Sci Educ*, 14: 791-812 doi: 10.1007/s10459-007-9091-1

Prion, S. (2008). Web based course http://sirc.nln.org/. Evaluating Simulations. Simulation Innovation Resource Center (**SIRC**) http://sirc.nln.org/mod/resource/view.php?id=99

Prion, S. & Ruggenberg, S. (2008). Cognitive theory foundations of clinical simulation practice. (Unpublished manuscript). University of San Francisco & Pacific Union College, San Francisco, California

Riley, W., Davis, S., Miller, K. M., Hansen, H., & Sweet. R. M. (2010). Detecting breaches in defensive using in situ simulation for obstetric emergencies. Quality and Safety in Health Care, 19 (supp 3), 153-156. doi:10.1136/qshc.2010.040311

Riley, W., Davis, S., Miller, K., Hansen, H., Sainfort, F. & Sweet, R., (2011). Didactic and simulation nontechnical skills team training to improve perinatal patient outcomes in a community hospital. *Jt comm. Journal on quality and patient safety/ Joint commission Resources,* 37(8), 357-64.

Ribner, B. S., Hall, C., Steinberg, J. P., Bornstein, W. A., Beasley, K., Duffell, J. M., & Garner, D. (2011). A Web-based program to ensure compliance of medical staff providers with mandated health care facility requirements. *Am J Infect Control*, 39(6), 511-4. Epub 2011 Apr 15. doi:10.1016/j.ajc.2010.08.021

Rosen, M. A., Weaver, S. J., Lazzara, E. H., Salas, E., Wu, T., Silvestri, S., Schiebel, N., Almeida, S., King, H. B. (2010) Tools for evaluating team performance in simulation-based training. *Journal of Emergencies, Trauma and Shock*, 3(4), 353-359. doi:10.4103/0974-2700.70746

Smith, S. J. (2009). Looking for simulation resources? Try SIRC! *Clinical Simulation in Nursing*, (5). doi: 10.1016/j.ecns.2009.04.095

Steckler, A., & McLeroy, K. R. (2008). The Importance of external validity, *American Journal of Public Health* 98: 9-10 1doi:10.2105/AJPH.2007.126847. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2156062

Stufflebeam, D. L. (2000). Guidelines for developing evaluation checklist: the checklist, Retrieved from http://www.wmich.edu/evalctr/archive_checklists/guidelines_cdc.pdf

van de Ven, J., H., Steinweg, S., Rob, A. J. Q., Scherpbier, A., Wijers, J. J. J., Mol, W., …TOSTI-trial group (2010). Reducing errors in health care: cost-effectiveness of multidisciplinary team training in obstetric emergencies (TOSTI study); a randomized controlled trial. *BMC Pregnancy and Childbirth* 10:59. doi:10.1186/1471-2393-10-59 accessed May 2011 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2964561/pdf/1471-2393-10-59.pdf

Verdaasdonk, E. G. G., Stassen, L. P. S., Widhiasmara, P. P., & Dankelman, J., (2009). Requirements of the design and implementation of checklists for surgical processes. *Surg Endosc* , 23, 715–726. doi: 10.1007/s00464-008-0044-4

Waxman, K.T., (2008). A practical guide to finance and budgeting, Skills for Nurse Managers. HCPro, Inc. Danvers MA, ISBN:978-6014611360

WHOrhl, (Uploaded to You Tube April 3, 2012). Steps to overcome shoulder dystocia https://www.youtube.com/watch?v=jsC9aUzx510&oref=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DjsC9aUzx510&has_verified=1

Young, W. (1995). Shoulder Dystocia Drill. American College of Obstetricians and Gynecologists DVD 103

Section VIII

Appendix A

IRB or Non-Research Approval Documents

University of San Francisco
School of Nursing and Health Professions
DNP Department
DNP Project Approval: Human Subjects Protection
(Non-research Status Form)

- **Title of DNP Project: Interprofessional Roles Shoulder Dystocia:** Maximizing Patient Safety in Community Hospitals
- **Brief Description of Project:** Community hospitals often lack access to obstetrical team simulations because of location and resources. This project satisfies this need with in-situ interprofessional simulation designed to promote team safety practices in obstetrical units. Built on scenarios validated for QUSEN practices and on medical scenarios the Interprofessional Roles scenarios are tailored for personnel and resource challenges common in community hospitals.
- Shoulder dystocia is the first interprofessional scenario in the Obstetrical Series. The in-situ simulation is augmented by pre-scenario education requirements for all participants, an overview of safety practices, debriefing, post testing and evaluation. Project success will lead to the development of other Interprofessional Roles scenarios.
- **Name of DNP Student: Elizabeth Yznaga, CNM, MSN**

- To qualify as a QI/ Process Improvement Project, rather than a research project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)
- **x** This project meets the guidelines for a Quality Improvement Project as outlined in the Clinical Quality Improvement Checklist (attached)
- ☐ This project involves research with human subjects and must be submitted for IRB approval
- Comments:
-
- **Signature of DNP Committee Chair**
  (date)
- **Signature of DNP Program Coordinator**
  (date)

CLINICAL QUALITY IMPROVEMENT CHECKLIST *
STUDENT NAME: Elizabeth Yznaga DATE: 2/2/13 .

DNP COMMITTEE CHAIR: Dr. Loomis

Instructions: Answer YES or NO to each of the following statements about QI projects:

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted quality standards, or to implement change according to the agency Quality Improvement programs. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	**X**	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a QI project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	**X**	
If there is an intent to, or possibility of publishing your work, you and your DNP Committee and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as a Quality Improvement Initiative at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	**X**	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered a Clinical Quality Improvement activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist**

Appendix B

Table B1

Distribution of skills for a shoulder dystocia simulation: In house OB model

Tasks and skills for shoulder dystocia	L&D RN	OB MD	CNM	ER MD	Other MD	PA	NP
Identify the problem.	X	X	X				
Call for help: assistants, nurses, pediatricians, and code team.	X	X	X				
Communicate with the staff, patient and family.		X	X				
Call out and Perform shoulder dystocia maneuvers.		x					
Multi-task assist the obstetrician, the pediatrician, code team.	x		X				
Document maneuvers on the FHT monitor strip.	X						
Document the delivery.		X	X				

(Gherman, Ouzounian, & Goodwin 1998; Goffman, Heo, Chazotte & Merkatz 2008; Grobman, Hornbogen, Burke, & Costello, R. 2010).

Appendix B

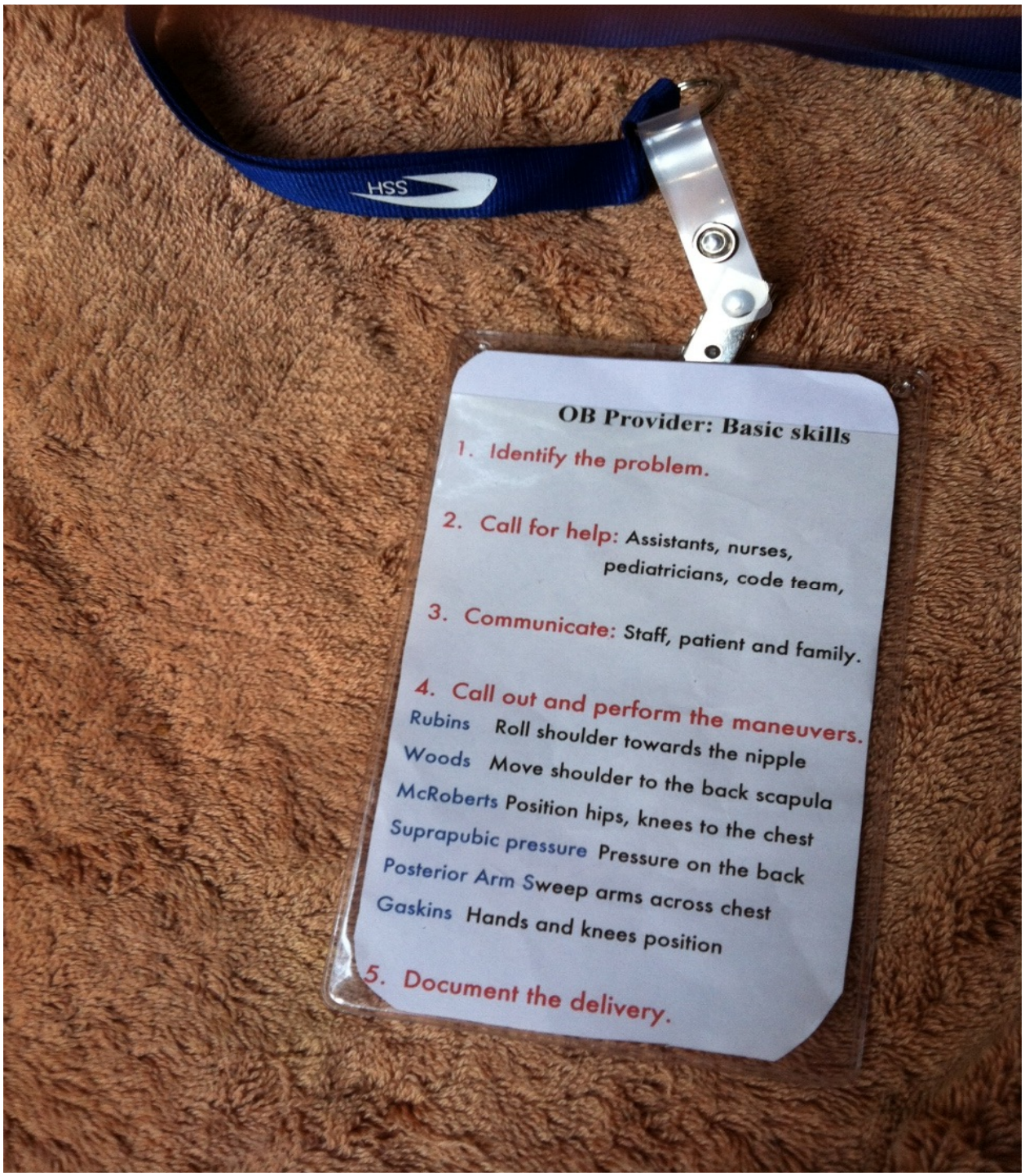
Table B2

Distribution of skills for a shoulder dystocia simulation: OB on call model

Tasks and skills for shoulder dystocia	L&D RN	OB MD	CNM	ER MD	Other MD	PA	NP
Identify the problem,	X	X	X	X	X	X	X
Call for help: assistants, nurses, pediatricians, and code team	X	X	X	X	X	X	X
Communicate with the staff, patient and family	X	X	X	X	X	X	X
Call out and Perform shoulder dystocia maneuvers	X	X	X	X	X	X	X
Multi-task assist the obstetrician, the pediatrician, code	x		X	X	X	X	X
Document maneuvers on the FHT monitor strip	X	X	X	X	X	X	X
Document the delivery	X	X	X	X	X	X	X

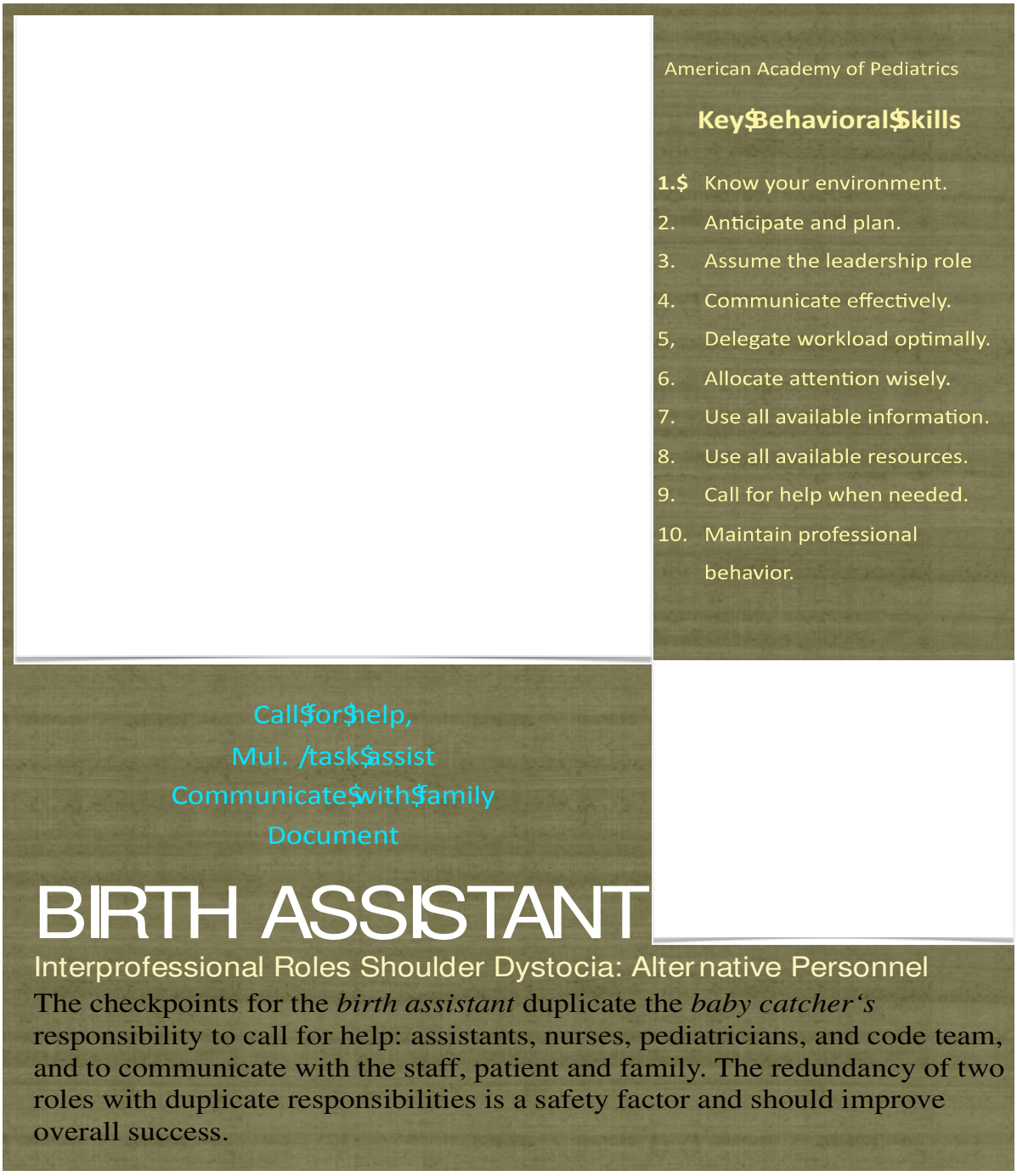
Appendix C

Figure C1 Lanyards



Appendix C

Figure C2 Visual prompts



Appendix D

Figure D1

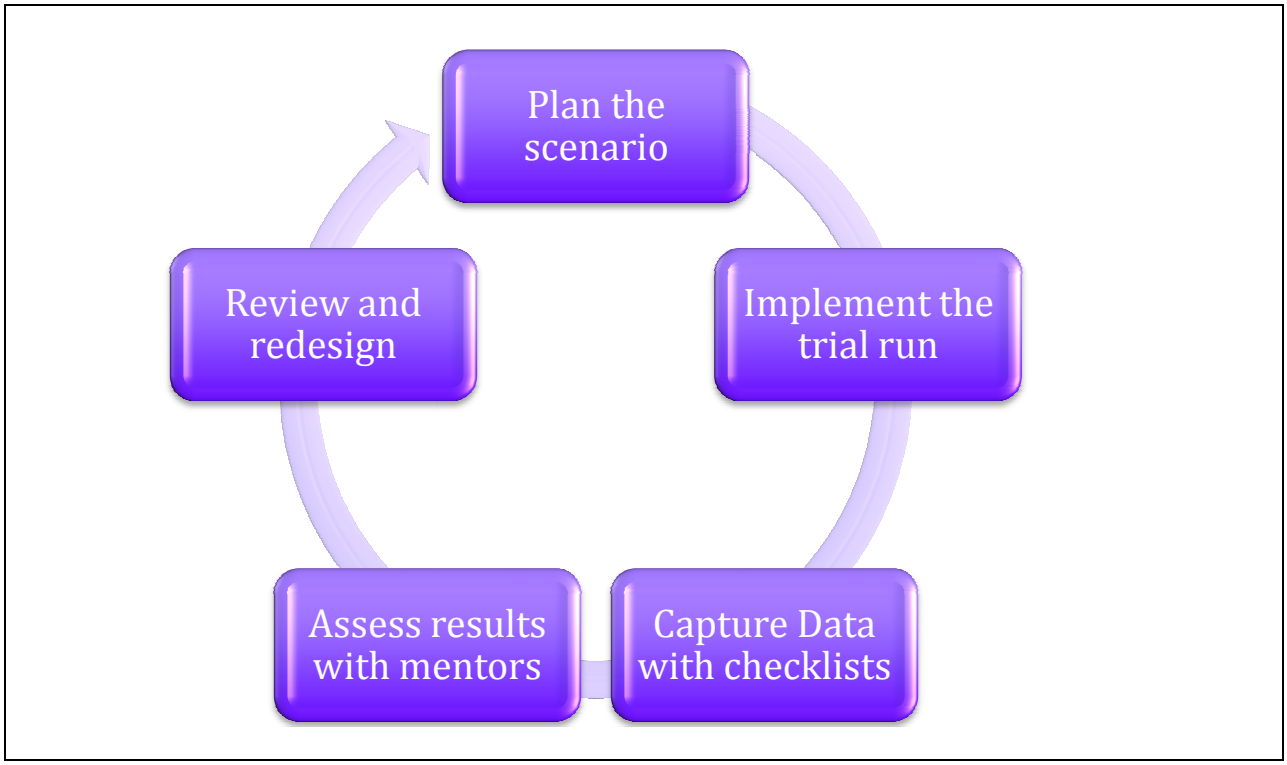
The Classic Pose, a LEAN Perspective

The classic pose of the mother, the support person, and the midwife is the basic model of birth (Ashford, 1988; Injoy Productions, 1998).

Appendix E

Figure E

PDCA Plan Schematic



Note: The PDCA Schematic demonstrates a revolving process of plan, implementation, revision and implementation of the revisions. The order generally follows the illustration with some steps repeated several times before moving to the next step.

Appendix F

Table F1

SWOT Analysis of Strengths in the Current State

Criteria	Strengths
Advantages of proposition?	Establishes the standards
Capabilities?	National and international
Competitive advantages?	Early entrant
USP's (unique selling points)?	Can be extrapolated to other simulations
Resources, Assets, People?	Intellectual property,
Experience, knowledge, data?	Experienced personnel, narrow subject, deep experience
Financial reserves, likely returns?	Unknown amount, expected financial and career returns
Marketing – reach, distribution, awareness?	Presently no market awareness of product
Innovative aspects?	Alternative personnel, remote simulations
Location and geographical?	Home office in Santa Cruz Ca, San Jose Airport within 40 minutes
Price, value, quality?	All are unknown presently
Accreditations, qualifications, certifications?	Certificate in Simulation, active CNM, RN license, works in hospital

Appendix F

Table F2

SWOT Analysis of Weakness in the Current States

Criteria	Weaknesses
Disadvantages of proposition?	Unknown competitors
Lack of competitive strength?	Lack of presence: state, national
Reputation, presence and reach?	Reputation not established
Financials?	
Own known vulnerabilities?	New entrant to market
Timelines, deadlines and pressures?	Funding uncertainties
Cash flow, start-up cash-drain?	Cash flow out until booking sessions
Effects on core activities, distraction?	Unknown
Reliability of data, plan predictability?	Some history or similar products
Morale, commitment, leadership?	Burgeoning partnership will be helpful
Processes and systems, etc?	Not all in place
Management cover, succession?	None

Appendix F

Table F3

Analysis of Opportunities in the Current State

Criteria	Opportunities
Market developments?	New market
Competitors' vulnerabilities?	Unknown
Industry or lifestyle trends?	Medico-legal trend
Technology development and innovation?	Basic process and maneuvers will not change, manikins will change
Global influences?	England
Niche target markets?	Yes, insurers, hospitals, accreditation entities
Geographical, export, import?	Potential for export to English speaking countries
Tactics: e.g., surprise, major contracts?	Principle is not advised of contracts
Business and product development?	Expansion potential, mobile markets, nurse delivery
Information and research?	Potential to set a standard
Partnerships, agencies, distribution?	No formal partnerships
Volumes, production, economies?	
Seasonal, weather, fashion influences?	More hospital staff around school months

Appendix F

Table F4

Analysis of Threats

Criteria	Threats
Political effects?	Accreditation agencies may take over the market
IT developments?	Hardware and software will continue to change
Competitor intentions - various?	There could be many covert competitors
New technologies, services, ideas?	Force sensing gloves are in trial
Vital contracts and partners?	None presently
Obstacles faced?	Funding and personal and contracts
Insurmountable weaknesses?	None presently

Appendix G

Table G1

Minimal Startup Costs for Remote Shoulder Dystocia Simulation Program

Intellectual property		Est. Costs
Content develop	No charge, school project	
Production costs		
Materials production	Pre-scenario booklet	$300
Office equipment and misc.		
	Educational materials	$500.
Equipment		
Audio/ Visual	IPAD + tripod on loan	
	Manikin on loan	
Advertising		$100
Miscellaneous		$100
	Total Start up Costs	$1000

Table G2

Midrange Startup Costs for Remote Shoulder Dystocia Simulation Program

Intellectual property		Medium
Content develop	20 hrs at $75/hr	$1500
Production costs		
Web design	Pretesting, Pre-workshop education	
Office equipment and misc.		$500
Materials production	Printing	$500
Equipment		
Audio/ Visual	ETC Micro Recording and Debriefing Solution	$3,000
IPad	two	$2,000
Gaumard Manikins	S500 Advanced Childbirth Simulator	$500
	S500.5 Susie® Articulating Newborn	$295
		$ 8,295

Appendix H

Table H

Net Profit Scenarios

4 hr session 3 employees

Number of sessions	Cost per session no travel	Travel is van + two rooms + $75/day	Travel is van + two rooms + $75/day/person	Invoiced	Net Profit
One	1300			2000	700
Two	2600			4000	1400

Number of sessions	Cost per session	Travel cost one night	Travel cost two nights	Invoiced	Net Profit
One	1300	825		3000	875
Two	2600	825		5000	1575
Three	3900		1350	7000	1750
Four	5200		1350	9000	2450

Appendix I

Table I

ROI Best and Worst Case for Low-end budget, investment of $3,000

	Weekly sessions	Net Profit 700/sess	Monthly sessions	Net Profit	Sessions X 10 months	$700 profit x total sessions= benefit	ROI = benefit/ $3,000
Best case	4	$2,800	16	$11,200	160	$112,000	37.3%
	2	$1400	8	$5,600	80	$56,000	18.7%
	1	$700	4	$2,800	40	$28,000	9.3%
			3	$2,100	36	$21,000	7%
Worst case			2	$1,400	20	$14,000	4.7%

Appendix J

Table J1

Expected Costs on the Day of Simulation

Staff	Hourly rates per session	2 hr session	4 hr session
Principle	3 hrs for 2 hour session at	$250	$500
No.2	Part time, 2 hr session at $75	$150	$300
No. 3	Part time, 2 hr session at $75	$150	$300
	Total	$550	$1100
Production			
Educational materials	Folders, tests, etc $10/person	$100	$100
Supplies	Moulage, others	$100	$100
	Total	$200	$200
	Totals for Staff and Production	$750	$1300

Table J2

Variable Costs for Travel and Housing on the Day of Simulation

Category	Motel/Hotel rooms	One night	Two nights
Hotel	Two rooms at $150/night	$300	$600
Travel	$300 van rental and gas	$300.	$300
Meals	$25/meal per person $75/day	$225	$450
	Totals	$825	$1350

Appendix K

Figure K1

ACOG Patient Safety Checklist Documenting Shoulder Dystocia

Date_____ Patient _____ Date of birth _____
MR #_____
Physician or certified nurse–midwife_____
Gravidity/Parity_____
Onset of active labor_____ Start of second stage_____
Delivery of head_____ Time shoulder dystocia recognized and help called_____
Delivery of posterior shoulder_____ Delivery of infant_____

Antepartum documentation:
□ Assessment of pelvis
□ History of prior cesarean delivery: Indication for cesarean delivery:
_____
□ History of prior shoulder dystocia □ History of gestational diabetes
□ Largest prior newborn birth weight_____ □ Estimated fetal weight_ _____
□ Cesarean delivery offered if estimated fetal weight greater than 4,500 g (if the patient has diabetes mellitus) or greater than 5,000 g (if patient does not have diabetes mellitus)

Intrapartum documentation:
□ Mode of delivery of vertex:
□ Spontaneous □ Operative delivery: Indication:_____□ Vacuum □ Forceps
□ Anterior shoulder: □ Right □ Left
□ Traction on vertex: □ None □ Standard
□ No fundal pressure applied
□ Maneuvers utilized (1): □ Hip flexion (McRoberts maneuver) □ Suprapubic pressure (stand on the side of the occiput)□ Delivery of posterior arm □ Posterior scapula (Woods maneuver) □ Anterior scapula (Rubin maneuver)
□ All fours (Gaskin maneuver) □ Zavanelli maneuver
□ Abdominal delivery
□ Episiotomy:
□ None □ Median □ Mediolateral □ Proctoepisiotomy
□ Extension of episiotomy:
□ None □ Third degree □ Fourth degree
□ Laceration: □ Third degree □ Fourth degree
□ Cord blood gases sent to the laboratory:
□ Yes: Results:_____
□ No

Appendix K

Figure K2

Patient Safety Checklist

Documenting Shoulder Dystocia

□ Status of neonate prior to leaving delivery room or operating room:

Apgar scores_____

Evidence of injury_____

Birth weight (if available)_____

□ Staff present_ _____

□ Family members present_____

□ Patient and family counseled

□ Debriefing with appropriate personnel

Postpartum/neonatal documentation:

□ Delivery discussed with family

□ Perineal assessment if third or fourth degree laceration

□ Monitored for postpartum hemorrhage:

□ Yes: Results:_____ □ No

□ Communication with pediatrics department if there is evidence of injury or asphyxia

□ Coordination of follow-up care for mother and baby

□ Monitored for postpartum depression:

□ Yes: Results:_____ □ No

Procedural Elements for Shoulder Dystocia

The following steps should be taken when managing shoulder dystocia:

1. Call for help from pediatrics, anesthesia, and neonatal intensive care unit staff, and assign a timekeeper
2. Initiate maneuver (e.g., McRoberts maneuver)
3. Re-evaluate course of actions, including using other maneuvers or repeating maneuvers if unsuccessful
4. Consider abdominal delivery
5. Document event—move to documentation checklist

Reference

1. Shoulder dystocia. ACOG Practice Bulletin No. 40. American College of Obstetricians and Gynecologists. Obstet Gynecol 2002;100:1045–50.

Standardization of health care processes and reduced variation has been shown to improve outcomes and quality of care. The American College of Obstetricians and Gynecologists has developed a series of Patient Safety Checklists to help facilitate the standardization process. This checklist reflects emerging clinical, scientific and patient safety advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Although the components of a particular checklist may be adapted to local resources, standardization of checklists within an institution is strongly encouraged.

Appendix L

Key Behavioral Skills

1. Know your environment.
2. Anticipate and plan.
3. Assume the leadership role
4. Communicate effectively.
5. Delegate workload optimally.
6. Allocate attention wisely.
7. Use all available information.
8. Use all available resources.
9. Call for help when needed.
10. Maintain professional behavior.

American Academy of Pediatrics (2012).

Appendix M

Pre-scenario Education Materials

The following videos present a comprehensive view of shoulder dystocia management.

1. Childbirth simulation for EMT students for an example of a teaching simulation. Orlando Medical Institute-EMT Birth Simulation Scenario Length 6 mins 21 secs http://video.search.yahoo.com/video/play;_ylt=A0S00MzHZzpRtVkAGzj7w8QF;_ylu=X3oDMTBvMGQzcTByBHNlYwNzcgRzbGsDdmlkBHZ0aWQDVjEzMg--?p=ob++simulation&vid=0fd9510e59b8111c7a2a3b046291e649&l=6%3A21&turl=http%3A%2F%2Fts2.mm.bing.net%2Fth%3Fid=V.4661629603610917%

2. A simulation of a four and a half minute shoulder dystocia with a good review of the maneuvers. Shoulder Dystocia Delivery, Manoeuvres, Management, Simulation Maternity TrainingInternational Length 5 mins 44 secs https://www.youtube.com/watch?v=YB3_fPhgmUM

3. A hybrid shoulder dystocia simulation featuring communication and teamwork. Shoulder Dystocia Delivery Length 3 mins 18 secs https://www.youtube.com/watch?v=K5kLHkl5RsI

4. Animation, simulation and real patients demonstrate the management of shoulder dystocia. Steps to overcome shoulder dystocia Length 8 mins 34 secs https://www.youtube.com/watch?v=jsC9aUzx510&oref=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DjsC9aUzx510&has_verified=1

5. Commentary from the Doctor's Channel regarding the effects of the maneuvers. Secondary maneuvers for shoulder dystocia have high success rates Length 1 min 43 secs https://www.youtube.com/watch?v=Pi2UXkDihGI Length

6. Shoulder dystocia animation good for understanding the problem. Length 1 min 3 secs HighImpactGraphics https://www.youtube.com/watch?v=EtS8udepMCM

Appendix N

Table N1

Minimal Equipment List for Remote Shoulder Dystocia Simulation Program

Category	Item	Personal ownership	On loan	Restocking needed
Office				
	Computer	X		
	Printer	X		
Audio/ Visual				
	IPad camera	X		
	Tripods		X	
	Accessories AV connections		X	
Scenario system				
	Checklist for packing	X		x
	Checklist for setup	X		x
	Checklist for equipment	X		x
Participant materials				
	Registration forms			x
	Pre and Post tests	X		x
	Booklet	X		x
	Program evaluation		X	
Scenario equipment	Manikin		X	
	Cables Extension cords		X	
	Accessories		X	

Appendix N

Table N2

Equipment Costs for Low end, Midrange and High end Budgets

Equipment	Low end	Description	Medium	Description	Large
IPAD hardware	Own IPAD	2 IPADS at $1,000 fully equipped	$2,000	3 IPADS at $1,000	$3,000
Software				ICoda	$15,000
Audio/ Visual	Personal equipment into use	ETC Micro Recording and Debriefing Solution	$3,000	Mobile Recording and Debriefing	$15,000
Office equipment	Personal equipment into use	Personal equipment into use		Computer, printer, paper	$3,000
Maternal manikin	Borrow	S500 Advanced Childbirth Simulator	$500	S560 NOELLE®	$17,000
Fetal manikin	Borrow	S500.5 Susie Articulating Newborn	$295	S500.5 Susie® Articulating Newborn	$295
				B501 Instructor and Student Guide:	$50
	No costs		$5,795		$53,345

Appendix O

Interprofessional Roles Shoulder Dystocia Simulation: Alternative Personnel

Program Evaluation Questionnaire

Your opinion counts and will help make a better product.
Have you been to a shoulder dystocia clinical simulation? Yes No

Information	Disagree			Agree
1. Ease of use	1	2	3	4
2. Too much information	1	2	3	4
3. Too little information	1	2	3	4

Comments

The Process	Disagree			Agree
4. Did the process make sense?	1	2	3	4
5. Was the order right?	1	2	3	4

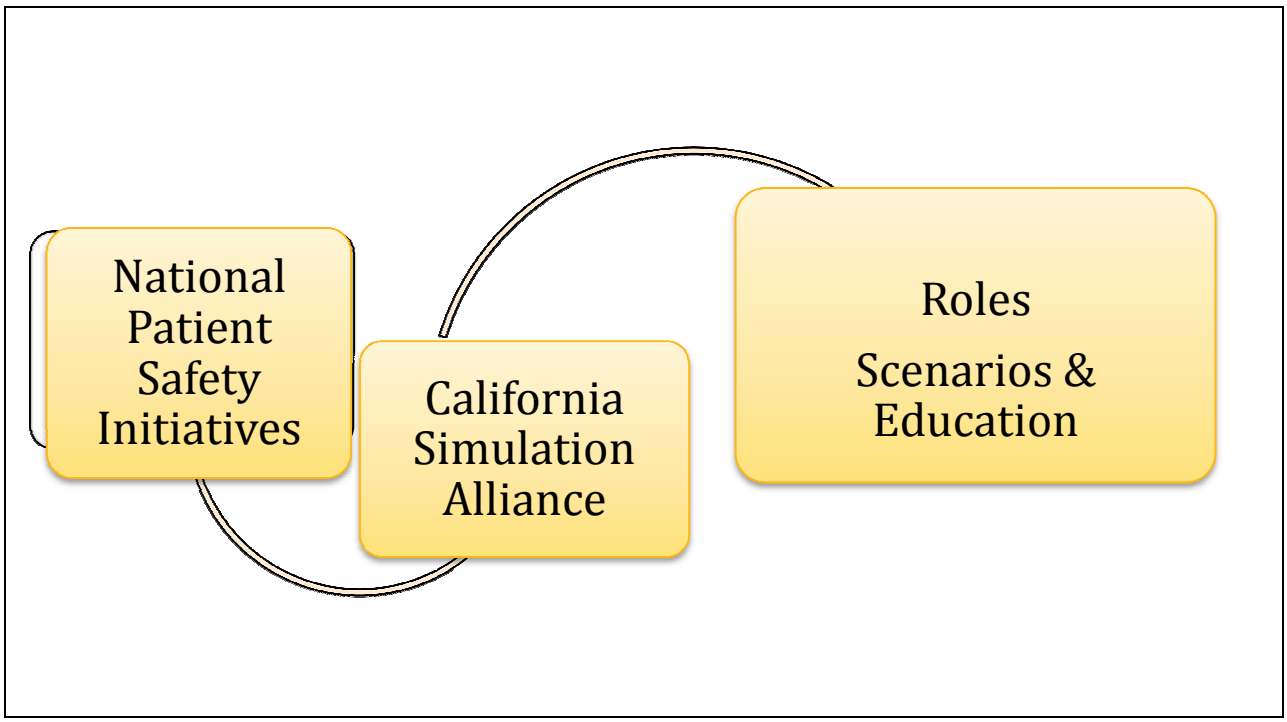
Comments

Personal Effect	Disagree			Agree
6. Reading this booklet makes me feel more familiar with simulation.	1	2	3	4
7. Reading this booklet gives me confidence that I did not have before.	1	2	3	4
8. Reading this booklet makes me excited to go to a simulation.	1	2	3	4
9. Reading this booklet makes me feel more anxious about simulation.	1	2	3	4

Comments

Appendix P

Figure P2 Transference of information

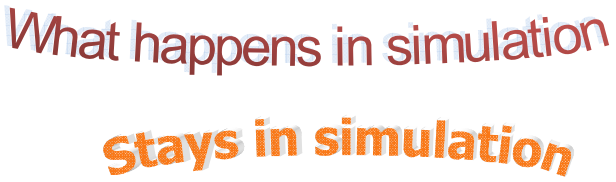


Appendix Q

Simulation Schedule

The general structure for simulation sessions follow the outline listed below.

Registration



Introduction

Agreements explained and signed
Pre test
Introduction to simulation
Overview of the clinical problem
Introduction to the manikin
Role assignment: Main roles Baby catcher, birth assistant, recorder
Extras Videographer, fetal manikin holder, and family members

Simulation

Set up of equipment and the extras
Simulation begins
Baby catcher tries to deliver the baby
_____ Calls for help
Baby catcher calls out the maneuvers.
Birth assistant moves the mother into McRoberts position or Gaskins.
Birth assistant applies suprapubic pressure on the fetal shoulder to assist rotation.
Recorder notes the maneuvers used on the fetal monitor strip.
Baby catcher completes the maneuvers and the baby is delivered.
End point of the simulation reached usually in less than five minutes

Debrief the scenario

Debrief the scenario and the participant's actions in a growth promoting and non-punitive fashion.

Wrap up

Review main points,
Clarify next steps
Posttest and evaluation

Appendix R

R1 Trial Run Simulation Schedule: Two-hour program

Activity	Staff needed	Estimated Schedule
Unload	2	6:30 am to 7:00 am
Set up	2	7:00 am to 7:30 am
Registration	2	7:30 am to 8:00 am
Didactic presentation	1	8:00 am to 8:30 am
Collect pre tests	1	8:00 am to 8:30 am
Manikin introduction	1	8:20 am to 8:30 am
Simulation round 1	3	8:35 am to 8:40 am
Debriefing	2	8:45 am to 9:00 am
Simulation round 2	3	9:00 am to 9:10 am
Debriefing	2	9:10 am to 9:20 am
Simulation round 3		9:20 am to 9:30 am
Debriefing	2	9:30 am to 9:40 am
Wrap up	3	9:45 am to 9:55 am
Post test & Evaluation	1	9:55 am to 10:00 am
Take down	2	If only session
Debrief staff	3	Same day if possible

Appendix S

Table S1

Phase 1 Thirty Days to Create and Test Scenario

Startup activities	Day 1-7	Day 8-15	Day 16-21	Day 21-31
Form team	1 meeting	1 meeting	2 meetings	2 meetings
Scope of program	Start	Revise		Revise
Scenario design	Start	Test on Run 1		
Content development	Start	Complete	Revise	Complete
Write objectives	Start	Complete		
Equipment List	Complete			
Checklists preliminary		Complete		
Run 1 Test Simulation		Run 1		
Evaluation 1		Complete		
Revised scenario			Complete	
Run 2 Test Simulation			Run 2	
Evaluation 2			Complete	
Checklists final				Complete
Written test development				
Pre test		Start	Revise	Complete
Post test		Start	Revise	Complete

Appendix T

*T*able T

Gantt Chart for Trial Run Preparation Schedule: Two-hour program

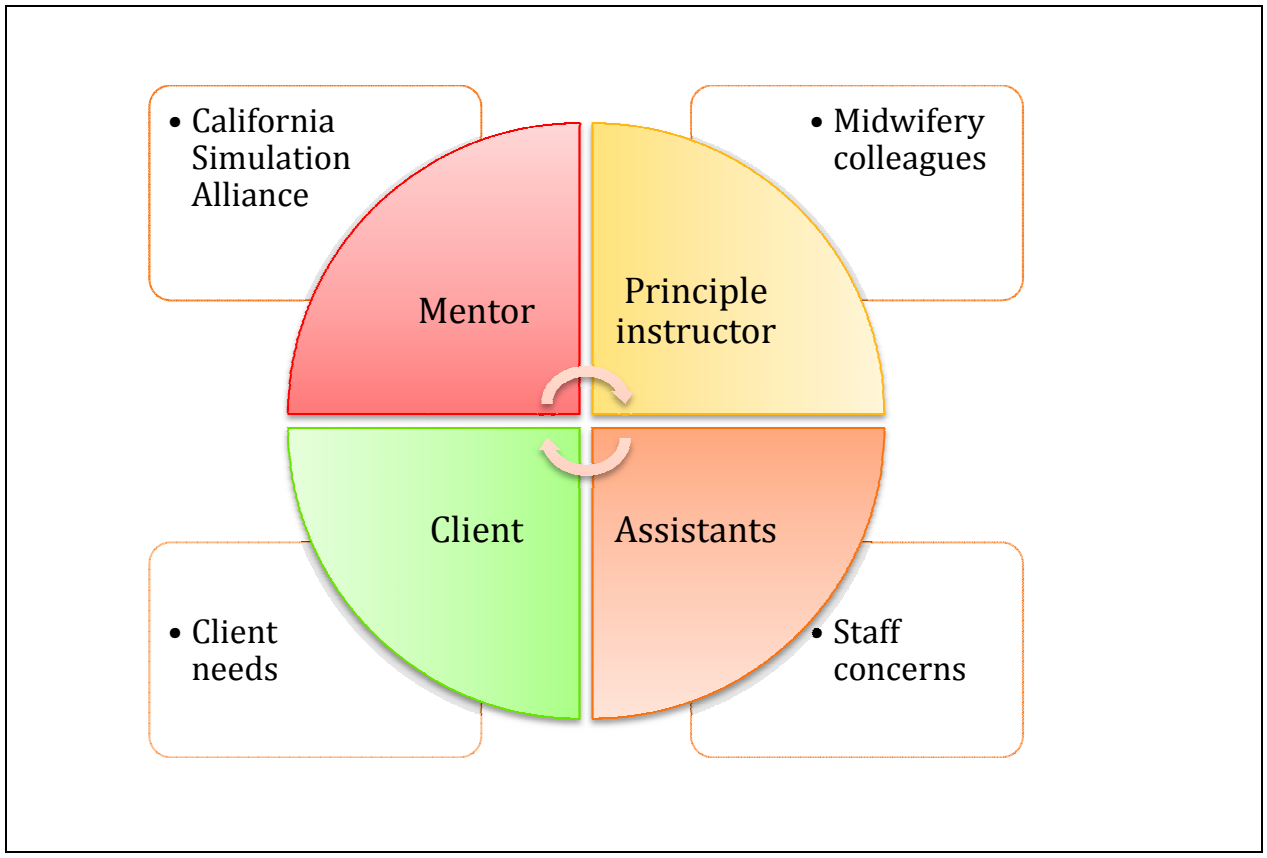
Start:	Two to four weeks	One week	Day before simulation
Equipment			
Set up equipment	Set up	Set up	
Test equipment	Test	Test	Load equipment
Pre-scenario education			
Web program	Open Web access	Maintain	Maintain
	Begin Web master	Web master	Web master
Print	Distribute booklets		
Testing			
Pre test available	Pre-scenario education	Review online results	Review online results
Post test and Evaluation	Review	Add to packets	
Scenario preparation			
Make packets	Order materials	Complete packets	Load packets
Register participants	Began pre-registration		Load registration materials
Didactic presentation	Review materials	Review materials	Review materials
Post test and Evaluation	Review	Add to packets	

Note. This 30-day schedule assumes a contracted Web host and contracted site.

Appendix U

Figure U1

Communication Matrix



Note: The new venture is a small program with one principle, mentors and a flexible day of simulation staff. Communication is structured for the team debrief and for contract negotiation.

Appendix V

Figure V1

Pretest Interprofessional Roles Shoulder Dystocia: Alternative Personnel

Name_____ Date_____

1. Have you participated in a clinical simulation? Yes No
2. Circle all that apply.
   At work at school at a conference
3. Have you been to a shoulder dystocia simulation? Yes No
4. Circle all that apply.
   At work at school at a conference
5. Name two shoulder dystocia maneuvers.
   a._____
   b._____
6. What is SBAR Communication_____
   _____
7. How is suprapubic pressure applied? Choose from the list
   From the back of the shoulder Directly down on the shoulder
   From the from of the shoulder During a rotating maneuver
8. Have you ever seen a shoulder dystocia? Yes No
9. What is a Gaskins maneuver?_____
   _____
10. Did the Shoulder dystocia booklet help you? Yes No

Thank you completing the Pre Test

Appendix W

Figure W

Post test Interprofessional Roles Shoulder Dystocia: Alternative Personnel

Name_____ Date_____

6. Have you participated in a clinical simulation? Yes No
7. Circle all that apply.
   At work at school at a conference
8. Have you been to a shoulder dystocia simulation? Yes No
9. Circle all that apply.
   At work at school at a conference
10. Name two shoulder dystocia maneuvers.
    a._____
    b._____
6. What is SBAR Communication_____
    _____
11. How is suprapubic pressure applied? Choose from the list
    From the back of the shoulder Directly down on the shoulder
    From the from of the shoulder During a rotating maneuver
12. Have you ever seen a shoulder dystocia? Yes No
13. What is a Gaskins maneuver?_____
    _____
14. Did the Shoulder dystocia booklet help you? Yes No

Appendix X

Evaluation form

Preliminary evaluation form

Interprofessional Roles Shoulder Dystocia Simulation: Alternative Personnel

Circle your response to each question

Participating in this simulation increased my understanding of the shoulder dystocia maneuvers.

Strongly Agree Agree Disagree Strongly Disagree

The practice of alternative roles is appropriate in my setting.

Strongly Agree Agree Disagree Strongly Disagree

The deliberate practice station increased my hand skills.

Strongly Agree Agree Disagree Strongly Disagree

The team communication will improve because of this simulation

Strongly Agree Agree Disagree Strongly Disagree

The debriefing was useful.

Strongly Agree Agree Disagree Strongly Disagree

I felt emotionally and intellectually safe in the scenario.

Strongly Agree Agree Disagree Strongly Disagree

My questions were answered.

Strongly Agree Agree Disagree Strongly Disagree

The presenters were knowledgeable and well prepared.

Strongly Agree Agree Disagree Strongly Disagree

Appendix *Y*

Chart Y 1

Pre-scenario Education Questionnaire Results