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## Teamwork in obstetric critical care

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### Abstract

Whether seeing a patient in the ambulatory clinic environment, performing a delivery or managing a critically ill patient, obstetric care is a team activity. Failures in teamwork and communication are among the leading causes of adverse obstetric events, accounting for over 70% of sentinel events according to the Joint Commission. Effective, efficient and safe care requires good teamwork. Although nurses, doctors and healthcare staff who work in critical care environments are extremely well trained and competent medically, they have not traditionally been trained in how to work well as part of a team. Given the complexity and acuity of critical care medicine, which often relies on more than one medical team, teamwork skills are essential. This chapter discusses the history and importance of teamwork in high-reliability fields, reviews key concepts and skills in teamwork, and discusses approaches to training and working in teams.

### Keywords

patient safety; patient care team; humans; interprofessional relations; communication; crew resource management; organizational culture; obstetric emergencies; obstetric delivery; pregnancy; simulation; human factors; aviation; medical errors

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Management of critically ill patients is an important part of obstetrics and requires multidisciplinary care. While the percentage of obstetric patients that require care in intensive care units (ICUs) is relatively low at approximately 0.7–0.9%,<sup>1,2</sup> the incidence of severe maternal morbidity appears to be increasing.<sup>3</sup> Reports over the last decade indicate that many adverse obstetric events may be the result of poor teamwork.

Reviews from malpractice claims, sentinel events and the literature have reported consistently that communication and teamwork are among the top contributors to adverse

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events and malpractice claims. A review of closed obstetric malpractice claims in one system found that 31% of adverse events were attributable to communication problems.<sup>4</sup> Forster et al's recent prospective, surveillance study in one teaching hospital showed that 5% of obstetric patients experienced an important 'quality problem' defined as an adverse event or potential adverse event. Upon review, 87% were deemed potentially preventable and were attributed to systems issues such as teamwork.<sup>5</sup> National reports echo these findings. The UK Confidential Enquiry into Sudden Unexpected Deaths in Infancy reported that 'suboptimal care' was responsible for two-thirds of unexpected intrapartum fetal deaths, and that more than half were potentially preventable.<sup>6</sup> Similarly, the Confidential Enquiry into Maternal Deaths found that half of all maternal deaths were potentially preventable.<sup>7</sup> In the USA, the Joint Commission reported that communication and teamwork issues were the most common contributors to both unexpected perinatal deaths and injuries (accounting for 72%) and maternal deaths and injuries (accounting for 85%).<sup>8,9</sup>

Obstetric personnel appear to be aware of deficiencies in teamwork; however, their perceptions of teamwork differ based upon their role. In a survey of over 44 US hospitals, the majority had fewer than 50% of respondents reporting 'good teamwork' in their labour and delivery units. Furthermore, they found significant differences in perceptions of teamwork based upon role, with 52–62% of obstetricians, paediatricians and perinatologists reporting good teamwork compared with 37–39% of labour and delivery nurses and anaesthesiologists.<sup>10</sup>

The magnitude and consistency of these findings have led organizations to recommend obstetric team drills and multidisciplinary teamwork training as primary interventions to reduce sentinel events.<sup>7,11</sup>

## **HISTORY AND IMPORTANCE OF TEAMWORK IN HIGH-RELIABILITY FIELDS**

The Institute of Medicine recommended that healthcare organizations should 'promote effective team functioning' as one of five interventions to ensure safe health care.<sup>11</sup> Specifically, they urged health care to look at aviation as a model. This section will discuss the foundational theories for teamwork and patient safety, briefly summarize aviation's approach to teamwork, and present the teamwork concepts and skills that have been adapted to health care.

Obstetrics, with its acuity and complexity, falls into the category of a 'high-hazard industry'.<sup>12</sup> Other high-hazard industries include aviation, nuclear power plants, chemical manufacturing and the military. Two major theories provide the foundation for understanding the relationship between teamwork, human factors and safety in high-hazard fields: Normal Accidents Theory (NAT) and High-Reliability Organization Theory (HROT). These theories will be reviewed briefly in this paper but are reviewed in greater detail elsewhere.<sup>12</sup> NAT provides the foundation for Reason's 'Swiss cheese' theory for medical safety,<sup>13,14</sup> and focuses on the complexity of systems and the 'tight coupling' of system components. According to this theory, there are latent features of organizational structures that, when triggered, start a cascade of events that ultimately result in an accident.

According to the 'Swiss cheese' model, all systems have gaps or holes. If all holes align perfectly, an accident will occur. HROT, on the other hand, believes that the proper organization of people, technology and processes can ensure safety in complex and hazardous conditions and avoid accidents. According to this theory, safety must be the priority for the organization, systems can be made more reliable through redundancy, and continuous drillings, simulations and other training can achieve and maintain reliability.

### History of teamwork training in aviation

Since many of the principles of teamwork training in health care are adaptations from aviation, it is useful to briefly review aviation's Crew Resource Management (CRM) programme and history. 'CRM' is a term used in the aviation industry to describe the safety team training provided for air crews. Initially called 'Cockpit Resource Management', CRM was developed after aviation experts found that 60–80% of air accidents were attributable to human error.<sup>15</sup> CRM encompasses team training, simulations (referred to as 'line-oriented flight training'), interactive participant debriefings, evaluations and feedback. It focuses on optimizing team performance and minimizing error, and was designed for flight crews and pilots to assist them in operating in a high-risk, high-stress, error-intolerant environment. This programme has been so successful that it is required for all US flight crews. Although each airline customizes CRM training for their crews, the general curriculum focuses on communication skills, situational awareness and task allocation, role clarity, problem solving and decision making.<sup>16</sup> There are three components to CRM training: (1) introduction of CRM theory, intent and skills (commonly including videotaped examples of good and bad teamwork); (2) feedback and recurrent practice (participants self-evaluate their performance during structured debriefings and review of videotaped exercises); and (3) ongoing reinforcement. The philosophy behind CRM is that 'practice of desirable behaviours during times of low stress increases the likelihood that emergencies will be handled effectively'.<sup>16</sup>

## TEAMWORK CONCEPTS AND BEHAVIOURAL SKILLS

CRM teamwork concepts have been adapted for team training in health care. The following is a brief description of these teamwork concepts and behavioural skills.

### Communication

As stated earlier, communication issues are among the leading contributors to patient harm; therefore, effective communication is essential for effective teamwork. Effective communication establishes and maintains a shared mental model for the team. Over time, providing structure to certain communications has been found to be important for ensuring reliability. The first communication technique that initiates the shared mental model is orientation or briefings. When new team members are entering a situation or when teams are passing off care to one another, a concise orientation to the patient and the clinical situation is essential. Similarly, periodic summaries of the clinical situation and progress on clinical goals are useful to keep all team members working in the same direction. Studies have shown that failures in orientation such as occurs during hand-offs are a major cause of errors and have been referred to as 'the Bermuda Triangle of health care'.<sup>17</sup> Conversely, structured briefings have been found to improve care, reduce wrong-site surgery and reduce staff

turnover (Level II-3).<sup>18,19</sup> A format that is being used by many healthcare organizations, particularly in the non-operative environment, to transmit critical information in a predictable format is ‘situation, background, assessment and response’ (SBAR). SBAR has been proposed for use in a variety of settings (change of shift hand-offs, telephone calls, orienting new team members, periodic summaries, etc.). An example of how SBAR may be used during a telephone conversation in obstetric critical care is given below:

**S:** I calling about Mrs X who is 4 h post-op from a caesarean for placental abruption and admitted to the ICU in haemorrhagic shock due to DIC.

**B:** She has received 10 units of packed red blood cells and 2 units of fresh frozen plasma so far.

**A:** I am worried that she is bleeding because her pressures are dropping, she's tachycardic, and her abdomen is becoming quite distended.

**R:** I would like you to come and evaluate her right away.

In this example, the SBAR structure efficiently communicated essential clinical information quickly, and directly communicated the intention of the call.

Transparent thinking is another important communication technique to promote a shared mental model among team members. Transparent thinking involves saying out loud what you think is going on, so others can begin to anticipate what might be needed as well as contingencies. For example, ‘we have a shoulder dystocia’.

Directed communication and closed loop communication are particularly important during critical situations such as emergencies where rapid response is critical. Directed communication involves specifying who is intended to receive an order or communication, either by using their name or visually directing the request; for example, ‘Sue, can you start a second 18 gauge IV in her left arm?’ Closed loop communication then involves acknowledgement of receiving the order and completion of tasks; for example, Sue replies ‘I am starting an 18 gauge IV in Mrs X's right arm right now’ followed later by ‘Second IV is in, Dr W’. This straightforward communication enables everyone in the room to know which tasks are being handled by whom and their status. A related concept is the idea of repeat backs where the recipient of an order repeats the full order back to the ordering clinician. This is especially important for medication names, doses, routes and frequencies.

Literature around the role of assertions to improving safety is growing. Assertions, also referred to as ‘critical language’, involve feeling free to speak up if something does not feel right. Hierarchical structures and personality characteristics can make this uncomfortable for some staff. United Airlines uses an acronym ‘CUS’ (‘I'm concerned’, ‘I'm uncomfortable,’ ‘this is unsafe or I'm scared’) as a technique to state assertions.<sup>20</sup> A recent study from Australia was able to show a reduction in in-hospital cardiac arrests through assertions, where staff members were encouraged to call early for help when they were worried about a patient (Level II-3).<sup>21</sup> As will be discussed later, leadership styles that reduce hierarchy and promote assertions have been associated with improved safety.

### **Situational awareness and resource management**

Situational awareness involves knowing all of the human and technological resources available and how to access them quickly. In obstetrics, this would involve not only knowing the human and non-human resources available in the delivery room, but also knowing the status of the operating room and anaesthesia should an emergency caesarean become necessary. When each member monitors the situation in the room constantly (vigilance), a shared mental model is maintained and each member is able to anticipate what may be needed next. Periodic team briefings or summaries discussed earlier can promote a common situational awareness among team members. Team members who survey their surroundings vigilantly can distribute workload appropriately (resource management) and help other team members to complete their tasks. Overall, this shared sense of purpose and status allows the team to move efficiently together, to cross monitor each other for possible problems, and support each other with back-up behaviours. Maintaining situational awareness allows the group to remain nimble to adapt in dynamic situations. One concept that works at cross purposes to situational awareness is target fixation. Target fixation, otherwise known as tunnel vision, is when an individual becomes fixated on one item at the expense of others. Common items that are subject to target fixation in obstetrics include pre-occupation with the fetal monitor when other things are happening, or fixation on documentation of actions when hands are needed to respond to an emergency.

### **Leadership/followership and role clarity**

Good leadership/followership and role clarity are particularly important during crises situations as occur frequently in critical care. Leaders who flatten out the hierarchy to promote informational exchange (e.g. team members feel it is safe to speak up) among all team members are more effective leaders. Studies in aviation have shown that 'macho' personalities who do not recognize their own limitations due to stress were less likely to be seen as effective leaders and had less team coordination.<sup>22,23</sup> It is especially important in crises situations for there to be a clearly identified leader who is guiding the overall care of the patient. Particularly in critical care units, where multiple teams from several specialties may be responding to an emergency or managing care, it is vital to make it explicitly clear who is responsible for leading and coordinating medical care and events in order to ensure effective, efficient care. In situations where numerous individuals respond to provide care, some places have found it helpful to have an event manager who is not responsible for medical decision making, but is exclusively responsible for monitoring the resources and people in the room. The event manager becomes the primary person to whom the medical leader reports orders, and becomes responsible for assigning tasks (resource management).

## **APPROACHES TO WORKING AND TRAINING IN TEAMS**

Good teamwork has been associated with improved productivity, innovation and job satisfaction.<sup>24,25</sup> Ultimately, a team consists of individuals who work closely together and are interdependent to achieve a common goal. Team behaviours are required of individuals to achieve effective team performance.<sup>26</sup> There is a growing consensus that teamwork training is important in medicine and obstetrics, although there is no agreement regarding the ideal timing or method for teamwork training. Teamwork training is likely to be a

continuum where the foundation for the importance of teamwork and teamwork skills are introduced early in training, and then knowledge, behaviours and attitudes are refined and maintained during actual clinical practice. Currently, there is a debate about the best format for teamwork training. Since evidence is limited and format may depend on an obstetric unit's intent and/or resources, this chapter will briefly present the range of formats and their potential benefits.

Table 1 describes various team training programmes. Teamwork training formats range from motivational talks to high-fidelity simulations. Didactic team training (ranging from 2 h to several days in length) with either clinical tools, small group learning activities or both is the least expensive option to address a large group of people and is the most common teamwork education format currently available. Didactics set the stage for the importance of human factors, such as the relationship between communication and teamwork with errors, review the history of team training in other high-hazard fields, and review teamwork behavioural skill concepts. Often, video examples are given for what the behavioural skill looks like in clinical care, and the audience may be divided into small groups to discuss or practice a concept. Didactics have been shown to influence attitudes towards teamwork (Level II-3).<sup>27</sup> An intervention that combined didactic instruction, interactive vignettes, video examples and implementation of a structured briefing tool in the operating theatre improved surgeons' and anaesthetists' perceptions of communication but did not affect nurses' perceptions (Level II-3).<sup>18</sup> A quasi-experimental study of a structured 8-h didactic with video vignettes and small group practice exercises in nine emergency departments, self-selecting to be in the intervention or control arm (six chose intervention, three chose control; two of the controls were under administrative review), found improved quality of team behaviours, reduced errors and improved staff teamwork attitudes after the intervention (Level II-3).<sup>28</sup> However, a large multicentre randomized controlled study of MedTEAMS didactic-based teamwork training with interactive vignettes and video examples in obstetrics failed to show benefit.<sup>29</sup>

Gaba, one of the pioneers of medical teamwork training and simulation, stated that didactic training 'may address knowledge and can influence attitudes, but to fully develop skills and alter attitudes, experiential training is likely to be the most effective'.<sup>30</sup> Simulation is a technique used to recreate aspects of the real world.<sup>31</sup> Simulation of error-inducing and/or stressful situations plays an important role in teamwork training. Simulations that are conducted in the real clinical environment (referred to as 'in-situ simulation') are a particularly useful technique for institutions to identify latent safety issues ('aspects of the system predisposing to threat or error such as staffing'),<sup>32</sup> and simultaneously offer an active framework for team members to learn, rehearse, evaluate and improve teamwork skills.<sup>11</sup> When teams participate in simulations, they are often videotaped. The videotape enables participants to view and evaluate their performance during structured debriefings. This opportunity for practice and feedback is thought to be important for learning, maintaining and re-inforcing teamwork skills.<sup>32,33</sup> Three programmes involving obstetric simulations and standardized teamwork training have suggested improvements in safety and teamwork performance for clinical obstetric teams. A large randomized controlled trial of simulated obstetric emergencies with and without team training from the UK has shown significant improvements in health outcomes (reduced hypoxic ischaemic encephalopathy from 27.3/1000 to 13.6/1000), attitudes and responses.<sup>34,35</sup> Although the authors are still

completing the final phase of a federally-funded (AHRQ U18HS015800-02 & AHRQ U18HS016673-02) multicentre study, involving a mobile simulation and structured team training programme taken to a range of US hospitals ranging from small rural frontier hospitals (with 48 deliveries per year) to large hospitals (with thousands of deliveries per year), institutional improvements in safety and improved teamwork have been seen, and the programme has been very well received by both hospital administration and clinical teams.<sup>36–38</sup> The Beth Israel experience is also important to mention. They participated in the OB MedTEAMS<sup>29</sup> trial mentioned earlier; however, they supplemented this training with additional interventions and reported substantial improvements. Their groups participated in obstetric and teamwork training simulations through the Harvard Simulation Centre, and they had an active roll-out schedule for structured clinical teamwork tools (e.g. pre-operative briefings tool). Following the intervention, they experienced a 23% decrease in adverse outcomes, and their high-severity malpractice claims were reduced by 62%.<sup>39</sup>

### Emergency behaviours

Effective teamwork is critical during obstetric emergencies regardless of setting. The Confidential Enquiry into Maternal Deaths<sup>7</sup> recommends the use of fire drills to improve responses during clinical emergencies. Although a detailed review can be found in the obstetric emergencies issue of this journal<sup>40</sup> and a Cochrane review of obstetric emergency training programmes was conducted by Black and Brocklehurst,<sup>41</sup> three obstetric safety or obstetric emergency programmes are important to mention. One study of eclampsia fire drills, involving adoption and rehearsing use of an eclampsia kit, reported clinical improvements in care for response time and time to administer medications (although data were not given).<sup>42</sup> MOSES (Multidisciplinary Obstetric Simulated Emergency Scenarios) similarly provides obstetric emergency drills where ‘candidates are given opportunities to practice labour ward and obstetric theatre based emergency drills within a framework of promoting effective multidisciplinary team working’.<sup>43,44</sup> Lastly, the Society of Obstetricians and Gynaecologists of Canada’s MORE<sup>OB</sup> (Managing Obstetrical Risk Efficiently) programme is a ‘comprehensive patient safety, quality improvement, and professional development program for obstetricians, family physicians, nurses, midwives and administrators in hospital obstetrical units. The programme integrates evidence-based professional practice standards and guidelines with current and evolving patient safety concepts, principles and tools’.<sup>45</sup>

The field of teamwork training is relatively new for obstetrics. However, overall, it appears that didactics are effective to introduce teamwork concepts and influence safety attitudes, whereas greater hands-on experience and integration into clinical care is needed to change behaviours and systems. Didactics may be particularly useful for students and clinical trainees who need to be familiar with concepts but may find it difficult to focus on learning new clinical skills and teamwork skills simultaneously. They are also likely to be a cost-effective mechanism to introduce teamwork terminology and concepts. However, studies to date suggest that translation of teamwork concepts into clinical care behaviours and system improvements requires a deeper level of integration and hands-on experience through clinical team simulations/drills combined with a structured teamwork curriculum (where clinical teams can practice responding to emergencies and evaluate and improve their

teamwork) and/or integration of clinical tools to promote teamwork such as structured briefing tools, SBAR, operative checklists, etc. The following section describes why learning to work together as teams is important to clinical care.

### Working in teams

Incorporating a multidisciplinary team approach into clinical care has been shown to improve patient outcomes, decrease length of stay, decrease cost and improve the quality of work life for participants. Although there are no studies specifically regarding obstetric teams, four studies from medical and surgical ICUs provide evidence that clinical teamwork improves care (Level II-2 and Level II-3). Uhlig et al introduced patient-centred multidisciplinary team rounds using structured team communication, and evaluated the impact on quality of care and quality of work life for team members in a surgical ICU (Level II-3). Their multidisciplinary team included the patient and his/her family, a bedside nurse, a cardiac surgeon, a nurse practitioner or physician assistant, a social worker, a spiritual care counsellor, a home care coordinator, a pharmacist, a physical or occupational therapist, a respiratory therapist, a dietician, a diabetic educator, an office coordinator, a cardiac rehabilitation specialist and a clinical care coordinator.<sup>46</sup> In this model, the entire team met at the patient's bedside for daily rounds to share information and develop a plan of care for each patient (using structured team communications). The patient and family members were active participants in the process, and assisted in the development of the plan of care. This new multidisciplinary approach led to a statistically significant decrease in patient mortality while concurrently improving the quality of work life for the entire team. The project was so successful that Concord Hospital won the John M. Eisenberg Patient Safety Award for this intervention. Three other studies promoting a multidisciplinary team approach to rounding and care have also shown improvements. A multidisciplinary approach to ventilator care that involved daily collaborative rounds, monthly meetings and implementation of guidelines and protocols for the care of ventilator-dependent patients in one large ICU significantly decreased ICU length of stay, hospital length of stay, costs and charges (Level II-3).<sup>47</sup> Similarly, implementation of multidisciplinary rounds and emphasis on evidence-based best practices significantly reduced the incidence of ventilator-associated pneumonia and bloodstream infections in another study (Level II-3).<sup>48</sup> These initiatives also decreased adverse events significantly in the ICU and produced a 21% reduction in cost per ICU discharge. Lastly, the specific addition of a pharmacist to multidisciplinary daily ICU rounds reduced the rate of prescribing errors significantly by 66% (Level II-3).<sup>49</sup> These few studies suggest that the team approach to clinical care leads to significant improvements in health outcomes and safety.

Not only does teamwork affect patient outcomes, but it also affects job satisfaction and staff retention (Level II-2). In a large cohort study of 28 561 nurses, Estryn-Behar et al found that the quality of teamwork affects a nurse's decision to leave the profession, with poor-quality teamwork being associated with a five-fold increase in a nurse's intention to leave.<sup>50</sup> As the quality of teamwork improved, a nurse's intent to leave the profession decreased significantly.



## SUMMARY

In summary, good teamwork is essential for the delivery of effective, efficient care in any clinical setting. Failures in teamwork and communication are among the most common reasons for adverse medical events. Effective teamwork has been shown to improve outcomes in the ICU, operating theatre and obstetrics, and reduce staff turnover. Despite this, initial and continued training for doctors, midwives, nurses and other healthcare staff continues to focus on clinical knowledge and technical skills learned in isolation. It is not possible to learn effective teamwork alone. Other high-risk industries have had considerable experience and success in teamwork training. This chapter has reviewed the history of these industries and the recent history of team training in medicine and obstetrics. While the literature is limited, the introduction of teamwork behavioural skills is occurring with some success. Although further studies are needed to better understand the translation of education to clinical practice and teamwork skills to improved outcomes, teamwork training is recognized to be essential to promoting patient safety. Structured didactics appear to be effective to increase awareness and influence attitudes, but the addition of tools and methods to integrate teamwork concepts into clinical practice either through in-situ simulation and/or teamwork tools embedded into clinical documents, appears to be critical to improve clinical teamwork and care-delivery systems.

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### Practice points

- deficiencies in teamwork and communication are major contributors to adverse obstetric events
- perceptions of teamwork differ based on role (doctor, nurse, etc.)
- international organizations recommend drills and programmes to improve team functioning to improve patient safety
- CRM is a programme developed by the aviation industry to improve team functioning, and consists of simulations, education, practice, evaluation and feedback on team behavioural skills
- health care has adapted CRM concepts to create healthcare-specific team training programmes
- team training programmes focus on communication issues, situational awareness, leadership/followership, and other system and human factors issues
- preliminary evidence suggests that hands-on experience through simulations/drills of critical events and/or tools that promote teamwork concepts are more likely to effect changes in the healthcare system and behaviours of clinical staff

### Research agenda

- evaluate which teamwork behaviours best predict good teamwork in obstetric emergencies versus routine care (priorities and relative contribution)
- understand which methods of teamwork training and the timing of their implementation are most effective and feasible at various stages of training, practice, role and speciality
- develop and validate reliable tools to measure team performance and teamwork behaviours
- measure the effect of teamwork training and improvement on maternal and infant outcomes
- examine the effect of teamwork in clinical obstetric practice such as multidisciplinary rounds in obstetrics, particularly examining the effect on adverse outcomes, length of stay, patient satisfaction and staff job satisfaction

**Table 1**

Descriptions of team training programmes.

Name of course Organizational type Country Website	Description	Target audience	Primary training format
<p><b>BEST</b> <i>National Health System</i> Norway <a href="http://www.bestnet.no">www.bestnet.no</a></p>	<p>'Improving trauma team performance by simulation training locally at each hospital, by focusing on leadership and communication.'</p>	<p>Health care – trauma teams, anaesthesia, general surgery, nurses</p>	<p>Didactics, simulation for local clinical teams, debriefings</p>
<p><b>CORDS Team Training</b> <i>Academic</i> USA <a href="http://www.obsafety.org">www.obsafety.org</a></p>	<p>'<i>Helping Good Teams Become Extraordinary Teams</i>. CORDS is a comprehensive program with structured evidence-based teamwork training for clinical teams to rehearse responding to clinical events and to practice, evaluate and improve teamwork. This mobile program is designed to assist institutions, of all sizes and locations, to discover systems improvements, measure ongoing improvements in safety, and for evaluation and measurement of teamwork in the real-life clinical setting. Additional web-based resources provide ongoing safety evaluation and learning.'</p>	<p>Health care-all obstetric staff*</p>	<p>Mobile standardized team training evidence-based didactics, videos, in-situ simulation for local clinical teams, structured debriefings, evaluations</p>
<p><b>Harvard Institute for Medical Simulation Courses</b> <i>Academic</i> USA <a href="http://www.harvardmedsim.org/cms/instituteformedicalsimulation.html">www.harvardmedsim.org/cms/instituteformedicalsimulation.html</a></p>	<p>'Improve patient safety and the process of patient care and reduce the financial and social burden of adverse outcomes by using simulation for education, training and research to improve performance and teamwork of clinicians.'</p>	<p>Health care – executives, any healthcare staff, educators and simulation staff</p>	<p>Didactics, clinical simulations for multidisciplinary teams, train the trainer, structured debriefings</p>
<p><b>Kaiser Permanente Private Health System</b> USA Website not available</p>	<p>'Multi-disciplinary improvement program designed to improve birth injury for mothers and babies in the Kaiser Health Plan system.'</p>	<p>Health care – Kaiser Permanente perinatal unit staff, regional risk management local nurse and physician leaders</p>	<p>Train the trainer, didactics, critical events training, videos</p>
<p><b>LifeWings Private Company</b> USA <a href="http://www.safepatients.com/">www.safepatients.com/</a></p>	<p>'LifeWings Partners LLC is a team of physicians, nurses, pilots, former astronauts, physician executives, and insurance experts that have adapted, for use in healthcare, the same teamwork training concepts and safety tools that have made commercial aviation so safe and reliable.'</p>	<p>Health care – executives, nurses, physicians</p>	<p>Didactics with learning exercises, company customizes to customer</p>
<p><b>RMF Strategies' Team Performance Plus</b> <i>Private Company Academic Affiliation</i> USA <a href="http://www.rmfsstrategies.com/tpp/">www.rmfsstrategies.com/tpp/</a></p>	<p>'...a comprehensive program—by clinicians, for clinicians—that provides interdisciplinary team training, for obstetricians, midwives, nurses, and anesthesia providers to: Ensure safer deliveries, Reduce the occurrence of preventable errors, Minimize litigation exposure.'</p>	<p>Health care – risk management, all obstetric staff*</p>	<p>Train the trainer, adapted TeamSTEPPS for obstetrics</p>
<p><b>SaFE Program Bristol</b> <i>National Health System</i> UK <a href="http://www.safethealthcare.org.uk/IHI/Topics/ManagingChange/SafetyStories/Obstetric+Emergencies.htm">http://www.safethealthcare.org.uk/IHI/Topics/ManagingChange/SafetyStories/Obstetric+Emergencies.htm</a></p>	<p>'to evaluate the effectiveness of different types of training on the ability of labour ward staff to manage obstetric emergencies. The two main goals of our research were: (1)to compare the effectiveness of simulation centre training with local training on the ability of individuals and multi-professional teams to manage obstetric emergencies, (2)to evaluate whether teamwork training did improve clinical management in obstetric emergencies.'</p>	<p>Health care – all obstetric staff*</p>	<p>Centre or local obstetric simulation, debriefings</p>

Name of course Organizational type Country Website	Description	Target audience	Primary training format
<b>TeamSTEPPS</b> <i>Department of Defense</i> USA <a href="http://dodpatientsafety.usdhs.mil">http://dodpatientsafety.usdhs.mil</a>	'A teamwork system designed to improve quality, safety, and efficiency of healthcare; offering a powerful solution to improving patient safety within your organization.'	Health care – executives, any healthcare staff	Train the trainer, didactics with learning exercises, sites/units customize themselves
<b>Afterburner – Aviation Team Training</b> <i>Private Company</i> US <a href="http://www.afterburnerseminars.com/">www.afterburnerseminars.com/</a>	'Our legendary high-energy, multimedia, interactive team building event designed to equip your team with the basic principles of Flawless Execution.'	Any high-risk industry	Motivational speakers, team building workshops, seminars, leadership training programmes
<b>Indelta</b> <i>Private Company</i> Australia <a href="http://www.indelta.com.au/">www.indelta.com.au/</a>	'Our training programs focus on performance improvement through teamwork, communications, safety, leadership, compliance, marketing and sales. These programs are delivered to healthcare organizations, high-risk industries, academic institutions and corporations ranging from regional to multi-national.'	Any high-risk industry – leadership and operating personnel	Consulting, training, client development, tools
<b>Machi</b> <i>Private Company</i> USA <a href="http://m1leadership.com/index.html">http://m1leadership.com/index.html</a>	'six-phase HCL (Health Care Leadership Program) Program. We begin with an assessment of your organization or workgroup; next, your employees receive the HCL Seminar which provides the motivation, skills, and tools to reduce errors and improve communication... This comprehensive program is customized for the client, conducted over the course of 12 months'	Any high-risk industry – leadership and operating personnel	System assessment, didactics with learning exercises, videos, workshops, debriefings

\* All obstetric staff includes: obstetricians, family medicine, paediatrics, anaesthesia, certified nurse midwives, labour and delivery nurses, floor nurses, respiratory therapy, house supervisors, auxiliaries, etc.