A Physiologically-Based Early Warning Score for Postpartum Patients: Does it Equalize the Decision-Making of RNs Along the Novice-to-Expert Continuum?

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A Physiologically-Based Early Warning Score for Postpartum Patients: Does it Equalize the Decision-Making of RNs along the novice-to-Expert Continuum?

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Submit completed original form to the Graduate Program office.

Section I: The Clinical Problem

Description and Significance of the Clinical Problem

The clinical problem.

At many hospitals, the postpartum unit is an entry point into obstetrics for newly graduated Registered Nurses (RNs) and others without obstetrical experience. Patient safety may be affected, as there is a greater risk for errors in care among novice and inexperienced nurses than among experienced nurses (Berkow, Virkstis, Stewart, & Conway, 2008). Less experienced nurses are more likely than experienced nurses to miss cues of pending patient deterioration (Berkow, Virkstis, Stewart, & Conway, 2008). They generally take longer to recognize which pieces of their assessments are most important and indicative of a worsening condition. Because of inexperience, they can miss cues that an experienced nurse would not (Smith & Crawford, 2003). Lack of confidence in their assessments may also be a factor. As a result, their decisions to call the rapid response team or provider may be delayed (Smith & Crawford, 2003).

Consulting with more-experienced colleagues to validate one's decision-making is a common RN practice (Thompson, et al., 2001). In some cases, an RN may be considered an expert with a limited number of years of experience. The range of experience required to be considered an "expert" RN varies from two years (Uhrenfeldt & Hall, 2007) to five years (Conway, 1998). Other researchers have found this expertise continuum to be of undetermined duration (Daley, 1999). In Benner's classic work (1984) she suggests that a minimum of five years of full-time nursing practice is necessary for one to achieve expert status. Benner describes the novice-to-expert process as a range of experience on a continuum that moves from novice to advanced beginner, competent, proficient, and then expert. The novice nurse depends on rules

and pre-approved plans in a linear, rigid fashion. In contrast, the expert has a deep, intuitive grasp of patient care situations and can anticipate very quickly what needs to be done. For the expert, responses to emergency situations are fluid; many tasks are accomplished and analyzed at the same time. Unfortunately, the supply of expert RNs is diminishing. Forty-five percent of the current nursing force is age fifty or older (Buerhaus, Donelan, Ulrich, Norman, & Dittus, 2006). By 2020, when these nurses retire, a projected shortage of one million nurses has been projected (Health Resources and Services Administration/Bureau of Health Professions [HRSA/BHP], 2007). With a shortage of available expert RNs for consultation, novice RNs will need other devices to assist them in providing safe patient care.

Visual aids, known as *early warning systems* or *early warning scores* (EWS), have proven useful for standardizing criteria that identifies a deteriorating patient condition and prevents delays in escalating patient care (Jablonski, DuPen, & Ersek, 2011; Saintsing, Gibson, & Pennington, 2011). The National Institute for Health and Clinical Excellence (NICE) and the Institute for Healthcare Improvement (IHI) have reported that a variety of EWS have become the standard of care within acute care hospitals in the United Kingdom (IHI, 2011; NICE, 2007). In 2011, the IHI added the use of a EWS scoring system to their 5,000 Lives Campaign (IHI, 2011).

While the majority of research and implementation of EWS has been for medical-surgical patients, the United Kingdom has modified the EWS to correlate with physiologic changes of pregnancy and refers to it as the *Modified Early Obstetric Warning System* (MEOWS). Although there has been no firm research on the effectiveness of MEOWS for perinatal patients to date, its use has been endorsed and encouraged by the Royal College of Obstetricians and Gynaecologists for use in all hospitals in the United Kingdom (Royal College of Obstetricians and Gynaecologists, 2008). For pregnant and newly-delivered obstetric patients, hypertension

and hemorrhage are the most common conditions leading to admission to critical care (Swanton, Al-Rawi, & Wee, 2009). Timely recognition, intervention, and transfer of these patients to critical care are associated with a decrease in mortality (Swanton, Al-Rawi, & Wee, 2009). A study on use of the MEOWS tool to improve patient safety was selected by the researcher, since recognition of deteriorating patient conditions by inexperienced nurses is a potential problem at the hospital where the researcher works.

Population and epidemiology.

The target population of this clinical inquiry project was postpartum RNs working in a tertiary care hospital in the Pacific Northwest. All of the RNs were female, so female pronouns are used in this paper where indicated. The postpartum unit was selected because in the project-site hospital, it is an entry point into obstetrics for newly graduated RNs and RNs without obstetrical experience (K. Larison, personal communication, July 22, 2011). Larison, Director of the obstetrical service, has noted that approximately 40% of the perinatal patients have high risk conditions (personal communication, August 5, 2011). These patients require careful nursing assessments to identify possible deteriorating conditions.

Background knowledge.

Failure to rescue is a patient safety indicator (PSI) identified by the Agency for Healthcare Research and Quality (AHRQ) for surgical patients (2003). It refers to the short period of time when hospital staff fails to notice or respond when a patient is moving from stable to critical, and is at risk of dying of preventable complications in a hospital (Clarke & Aiken, 2003). Two processes identified as necessary in these situations include: (a) identifying a deteriorating patient condition in a timely manner, and (b) responding with appropriate interventions and the appropriate staff (Clarke & Aiken, 2003). Noted perinatal researcher Rice-

Simpson (2005) has suggested that since obstetric patients share similar characteristics as surgical patients, the same patient safety indicators may be applicable to obstetrical patient care. However, since the number of perinatal patients with poor outcomes per hospital would not be statistically significant, perinatal care should emphasize *processes* for rescue rather than poor outcomes as quality measures (Rice-Simpson, 2005).

Organizational/local knowledge.

The perinatal unit of the study hospital averages around 500 to 600 births each month. The staff included a mix of RNs and certified nursing assistants (CNAs). Because of the high patient census, the pace of patient turnover is rapid, the stress level is high, and interdisciplinary communication is often difficult. A research study on the use of EWS for medical-surgical and pediatric units had been initiated in 2011 and was ongoing. The perinatal unit was not included in the implementation of EWS or MEOWS because of other initiatives already being implemented regionally.

Importance to advanced practice nursing and desired outcomes with impact.

While front-line RN staff care for patients, it is the responsibility of the advanced practice clinical specialist to anticipate and identify processes to improve the safety of perinatal patient care. With this goal in mind, the author chose to generate hypotheses around use of MEOWS to improve the ability of all postpartum RNs to identify a deteriorating patient sooner, leading to increased patient safety. If the results showed improvement, further studies could be generated to support implementation of the MEOWS for perinatal patients. It was anticipated that using the MEOWS could have positive outcomes that would benefit patients, nurses, and the hospital's financial standing by reducing the risk of malpractice claims.

Purpose statement.

The purpose of this study was to determine if use of the MEOWS tool prevented failure to rescue by equalizing the decision-making of nurses on the novice-to-expert continuum when a patient's condition was deteriorating.

Clinical inquiry questions.

The clinical inquiry questions proposed in this study included, "Does use of the MEOWS tool equalize RN recognition of a deteriorating patient condition?", "Do the measures of RN confidence improve with the use of the MEOWS tool?", and "Does provider notification by the RN occur sooner with use of the MEOWS tool?"

Synthesis of Evidence

Introduction.

The purpose of the literature review is to examine two areas: (a) briefly summarize what is currently known about nurse decision-making and (b) identify a strategy that assists nurses at all experience levels in decision-making and provider notification in the obstetrical area. Nurses work in a very complex environment that requires continuous, sometimes complicated interpretation and decision-making (Ebright, 2010). This can be especially difficult for nurses new to the profession or to the clinical specialty area since they have not yet developed the intuition or pattern recognition used by experts (Tanner, 2006). Regardless of one's experience, however, the skill and accuracy with which an RN takes in data, interprets it, and then intervenes, can make a difference in patient outcomes (Ebright, 2010; Lunney, 2008). Sometimes a patient's condition changes so incrementally that a nurse might not notice the danger in time to prevent a bad outcome (Ebright, 2010). Unless those changes are plotted on a

visual map, especially a color-coded visual map, it may be difficult for a nurse to recognize that a patient's condition is deteriorating (Chatterjee, Moon, Murphy, & McCrea, 2005).

Critical synthesis of relevant literature.

Four primary nursing functions may be paramount in identifying a deteriorating patient condition. These functions are (a) vital sign assessments, (b) intuition, (c) decision-making processes, and (d) early warning systems. Their use or misuse by skilled and unskilled personnel and the resulting impact on patient care will be included in the discussion that follows.

The clinical decision-making of novice nurses has been compared to that of experienced nurses in several studies (Benner, 1984; Berkow, Virkstis, Stewart, & Conway, 2008; Tanner, 2006). Clinical judgments include noticing deviations from expected patterns, making an analysis and inference about a patient's condition, deciding whether to take action or wait and see, weighing the alternatives, then selecting the appropriate action or modifying it if necessary, based on the patient's response (Tanner, 2006).

Tanner (2006) reported a marked difference in the speed and methods used by experienced nurses to make clinical judgments versus those employed by novices. Experts have the benefit of pattern recognition (Benner, 1984; Cranley, Doran, Tourangeau, Kushniruk, & Nagle, 2009). This is in contrast to nurses new to the profession or to the practice context, who use a slower, more analytical and task-centered approach because they lack an understanding of the relevance of patient symptoms (Tanner, 2006).

Between 49% to 53% of novice nurses are involved in errors with patient care (Smith & Crawford, 2003). Delays in recognizing patient deterioration and appropriately intervening make up 37% of novice nurse errors (Smith & Crawford, 2003). A primary theme identified with the nursing care by novice nurses who were involved in near miss and adverse-event

situations was a loss of the big picture and difficulty sorting out relevant from non-relevant data (Ebright, Urden, Patterson, & Chalko, 2004). Even with Rapid Response Teams (RRT) in place, nurses are often not confident enough to call early, fearing they will look stupid (Cioffi, 2000).

Without objective, visual data points for comparison of trending, vital changes can go undetected. Unfortunately, the practice of recording vital signs has become an almost robotic routine (O'dell, Victor, & Oliver, 2009). This task is often assigned to unlicensed assistive personnel (UAP) or certified nursing assistants (CNAs). As a result, it has become a ritualized task by staff who collect disconnected data points, but lack the skill and knowledge to recognize the significance of incremental changes (O'dell, Victor, & Oliver, 2009). Of all patient vital signs, the respiratory rate is the most critical but the least often recorded (CMACE, 2011). An elevated respiratory rate above 24 is one of the first and most specific predictors of a "serious adverse event such as cardiac arrest or unplanned intensive care unit admission" (Cretikos, et al., 2008, p. 658). Unless RNs are notified of incremental changes in a timely manner, patient conditions can silently and steadily deteriorate.

Intuition, defined by Benner's classic work (1984) as knowing what needs to be done without having to think about it, was initially considered a soft science. However, Rew and Barrow (2007) have reported that for the past two decades, nurse clinicians and researchers alike have acknowledged it as a component of clinical decision-making. Currently, intuition has become an accepted part of the nursing process, but it is still considered a skill that belongs primarily to expert nurses (Tanner, 2006). No matter how much experience an RN has, however, every nurse experiences uncertainty with clinical intervention decisions (Cioffi, 2000; Hedberg & Larsson, 2003). Uncertainty has been noted to play a major part in variation and inconsistency in clinical decision-making (French, 2006). It is essential to identify strategies to

help reduce inconsistency and help novice nurses to practice more like experienced nurses as quickly as possible after employment.

As noted earlier, early warning systems have been used successfully for more than a decade in the United Kingdom to identify patients who need more active interventions (Andrews & Waterman, 2005; Subbe, Kruger, Rutherford, & Gemmel, 2001; Swanton, Al-Rawi, & Wee, 2009). Early warning systems provide quantifiable evidence that a patient's condition may be deteriorating and more skilled clinicians must be notified. Core parameters scored are pulse, respiratory rate, blood pressure, consciousness, temperature, oxygen saturation, and urine output. Pre-determined set points in a color-coded chart trigger a nurse to escalate the assessment frequencies and to notify the rapid response team or provider as a patient's condition deteriorates. This allows for transfer to the intensive care unit in a more timely manner (Subbe, Kruger, Rutherford, & Gemmel, 2001). In addition, use of the EWS score has been shown to improve nurses' communication with providers by quantifying and correlating five specific vital signs with physical deterioration, increasing the credibility of the nurses' concerns (Andrews & Waterman, 2005; Cioffi, Conwayt, Everist, Scott, & Senior, 2009).

Qualitative studies have suggested that EWS may help inexperienced staff to identify deteriorating patients by standardizing the criteria (Gao, et al., 2007). Their use can make it difficult to procrastinate in escalating care. Experienced RNs have reported they are often alerted to a patient's deteriorating condition by using intuition, and they confirm their concerns with the EWS (O'dell, Victor, & Oliver, 2009). In contrast, less experienced nurses who lack intuition, may rely on an objective early warning score to identify a deteriorating condition (O'dell, Victor, & Oliver, 2009). Early warning systems provide a framework for identifying and managing deteriorating patients. This equalizes the RNs' knowledge base (Robb & Seddon,

2010). Researchers in New Zealand found visual aids to be particularly useful for new RN graduates and foreign-trained nurses who were less familiar with that country's patient care guidelines (Robb & Seddon, 2010).

Clinicians form practice communities with their own standards of practice, including provider notification indications and mechanisms, and shared expectations about practice and expertise of team members (Benner, Hughes, & Sutphen, 2008). Some of these standards may include *normalization of deviance*, where "violations of standards of practice may become 'normalized' in healthcare delivery systems" (Banja, 2009, p. 139). Some of these standards may include delaying notification of a provider or not calling a provider to the bedside appropriately. These practices might be revealed and changed by use of an early warning system. A United Kingdom study found that before use of an early warning scoring system, the respiratory rates of just 30% of medical-surgical patients were recorded at least once a day. A year later, after implementation of an early warning system, this had improved to 90% (Cretikos, et al., 2008). Another study found similar results as well as improved confidence of nurses in assessing and prioritizing their patient care (Cretikos, et al., 2008).

In the United Kingdom, a specific version of EWS for obstetrical patients, the Modified Early Obstetric Warning System (MEOWS), has been designed to correlate with physiologic changes of pregnancy and other nursing assessments. The MEOWS is a color-coded chart on which a nurse records a patient's respiratory rate, oxygen saturation, temperature, heart rate, blood pressure, urine output, level of consciousness, and pain score. In addition, the MEOWS includes the intuitive measurement "looks unwell" as part of a nurse's assessment. Rows on the chart, where the nurse enters these assessments, are one of three colors: white, yellow, or red. Instructions on the top of the chart instruct the nurse to notify the provider if the patient triggers

one red or two yellow scores at any time. Several iterations of the MEOWS have been developed. Research on the MEOWS to improve recognition of deteriorating obstetrical patients began in 2009 and is ongoing (Swanton, Al-Rawi & Wee, 2009). In 2011, the Centre for Maternal and Child Enquiries (CMACE), which reports to the National Patient Safety Agency in the United Kingdom, recommended use of the MEOWS for all pregnant and newly delivered patients as one of their top 10 safety recommendations.

Gaps.

The researcher noted two gaps in the literature. First, an extensive literature review did not show any published research on use of the MEOWS tool in the United States. Second, although the literature has shown that early warning systems equalize the knowledge base of expert and less experienced nurses (Robb & Seddon, 2010), the researcher did not find published literature on the effectiveness of early warning systems, particularly the MEOWS, for equalizing the decision-making and confidence of nurses along the novice to expert continuum. This is important since early warning scores do not improve patient care unless the findings are reported and acted upon (CMACE, 2011).

Critique.

While the advantages of early warning systems for non-obstetric patients is clear, to date there is no data on the efficacy of the MEOWS for obstetric patients and no published data on its validity (Swanton, Al-Rawi, & Wee, 2009). Some authors who have used the non-obstetrically-modified EWS have criticized the early warning tool for being unable to predict a patient's outcome (Cuthbertson, & Smith, 2007), including pregnant women with intrauterine infections (Lappen, Keene, Lore, Grobman, & Gossett, 2010). However, supporters have been quick to respond that the EWS was never intended to predict a patient's outcome but primarily to identify

when to summon additional, skilled helpers or the provider to the patient's bedside (Morgan & Wright, 2011; Swanton, Al-Rawi, & Wee, 2009).

Other sources of evidence.

Patient safety has become a national and global health policy issue since the Institute of Medicine's (IOM, 2000) report alerted healthcare professionals to the shocking statistics that between 44,000 and 98,000 patients die in hospitals each year from preventable adverse events. A preventable adverse event is defined by the IOM (2000) as a "preventable injury resulting from a medical intervention" (p. 4). The IOM recommends designing healthcare processes at all levels to prevent errors (IOM, 2000). As a result, change is occurring nationally. Algorithms such as EWS and MEOWS, meet the aims of the IOM, and their use is recommended by the IHI in their 5,000 lives patient safety campaign for 2011.

Summary.

Patients in the postpartum period can experience deterioration in their physiological status fairly slowly in contrast to medical-surgical patients because of the physiological changes of pregnancy. Recognizing these changes can be difficult for RNs without obstetrical experience. Although currently there is no shortage of experienced RNs in most hospitals, the supply of experienced mentors is expected to decline fairly quickly at some point as experienced nurses retire, leaving a much larger proportion of less experienced nurses at the bedside (Ebright, Urden, Patterson, & Chalko, 2004; Orsolini-Hain & Malone, 2007). Strategies to assist novice RNs in decision-making may become more important as the presence of experienced nurses declines. Early Warning Systems have been recommended by several healthcare organizations as a tool to assist nurses in identifying patients whose condition is deteriorating. In the United States, their use in the obstetric population has not yet begun.

Section II: Methodology

Clinical Inquiry Design

This project used a quantitative, test/re-test design. This design was selected to compare current decision-making practices with decision-making based on using the MEOWS tool.

Setting.

The setting for this project was the postpartum unit of a 450 bed, Level III hospital in the Pacific Northwest. The 50-bed postpartum unit employs an approximate total of 150 RNs with a range of experience from five to more than 30 years experience. The average daily census is 40 postpartum patients.

Documentation in the postpartum unit was done by staff from two different roles: (a) the RN, and (b) the certified nursing assistant (CNA). Three different tools were used for documentation: two non-interfacing computer programs and paper charting. CNAs took vital signs on all of the patients and entered the vital signs in the Centricity Perinatal (CPN) program. Some, but not all vital sign assessments had defined reporting parameters on the providers' order sets. If a patient's vital signs were within normal limits, they were not reported to the RN; the CNA reported only vital signs within defined parameters on the provider's order set.

RNs documented fluid balance and medications in a second computer system known as Horizon Clinicals (HC). Consents and progress notes were documented on paper. As a result, the components of the vital signs, patient intake and output, and general patient status were not charted together as a package. This resulted in the information being collected through a series of disconnected, ritualized tasks. The documentation that a patient "looks unwell" overall was not used unless an RN annotated this observation.

The average patient assignment was three to four postpartum patients per RN per 12-hour shift. The number of patients assigned to a nurse was determined by patient acuity. High-risk patients, including mothers delivering twins and triplets, and those with pre-eclampsia or cesarean births, were limited to three per RN, per shift. Low risk patients, including mothers with normal vaginal deliveries or mothers with babies who were in the neonatal intensive care unit (NICU), were assigned four per RN per shift. All RNs were responsible for the newborns and the mothers unless the baby was in the NICU.

Several factors were identified as possibly preventing a nurse's noticing a patient's deteriorating condition. The first was non-RN care providers (CNAs) doing patient assessments. Other factors included a limited number of standardized reporting parameters for patient assessments, rapid patient assignment changes, patients leaving the unit to visit their babies in the NICU, and time-intensive procedures related to breast-feeding promotion that sometimes delayed an RN from doing hourly rounding. These factors singly or in combination contributed to occasional irregular or missed vital signs and incongruent RN assessments of all elements of a patient's condition (physical assessments plus vital signs).

Elements most likely to influence change.

In order to improve communication and patient safety, the perinatal unit had recently begun to hold multi-disciplinary debriefings on unusual occurrences, near misses, and sentinel events. These meetings were by invitation only and generally included the staff involved in the patient care situation, the quality management facilitator, managers, and the perinatal clinical specialist. RNs looked forward to this opportunity to discuss patient care and had begun to notice the differences in decision-making among their peers. As a result, RNs were becoming more aware of the need for standardization of nursing care.

Organizational readiness to change.

At the time of this project, regional leadership had just begun to take an interest in adopting the MEOWS tool in all perinatal units in the system as a result of a tragic patient outcome. As a result of the researcher's informing the leadership of the MEOWS tool, some wondered if perhaps the outcome could have been prevented if the MEOWS tool had been used.

Driving forces and restraining forces.

Because the hospital is certified by the American Nurses Credentialing Center (ANCC) as a magnet hospital, many of the RN staff have chosen to work there because of the culture of improving patient care through ongoing research. As a result, the researcher anticipated that many RNs would be interested in participating in a project that could impact themselves and their patients.

Restraining forces included the overtime hours already required for education on the new electronic medical record (EMR) documentation system. Other restraining forces included family demands of many of the younger staff who might not want to spend more time in the hospital during their time off, without pay, and nurses who were resistant to changes in practice.

Protection of Human Subjects/ethics

Approvals were granted for the study from Institutional Review Boards (IRB) at both the Oregon Health & Science University (OHSU) and the project-site hospital. The researcher was an employee of the same hospital as the participants but did not oversee or evaluate the performance of the postpartum nurses in annual reviews. Recruitment information clearly stated that participation in the study was in no way linked to the nurses' employment or annual review. All response packets were kept in a locked file in the researcher's locked office at the hospital. The researcher inputted the data into a password-protected computer, which was maintained in a

secure, non-public environment. After all data were entered and analyzed, the response sheets were shredded and disposed of in a protected patient information bin at the project-site hospital.

Sample

Inclusion and exclusion criteria.

After obtaining permission from the Women's and Children's Services Director, the Postpartum Manager, and the two Postpartum Associate Managers, a convenience sample from all postpartum nurses were recruited to participate in the study. Inclusion criteria were limited to: (a) registered nurses at the project-site hospital; (b) full-time or part-time employment; (c) at least 90% of scheduled hours on the postpartum unit at the project-site hospital; and (d) English speaking. Exclusion criteria were (a) non-RN; (b) resource RN; (c) RN not employed by the project-site hospital; (d) less than 90% of scheduled hours on the postpartum unit; and (d) non-fluent in English.

A recruitment flyer (Appendix A) was prepared by the researcher and posted in the report room. The announcement and flyer included an approximation of the time required, risks, benefits, and remuneration of a movie ticket in appreciation of the RNs' participation in the project. At a monthly meeting of shared governance known as Postpartum Partnership Council, the researcher announced the project, distributed flyers, and invited RNs who met the criteria to participate. Participants were asked to indicate their interest by email to the researcher within a specified two-week period of time. They were informed that their return email to the researcher with a stated intent to participate would be considered consent for inclusion in the project. The researcher sent a return email with a copy of the information/consent form (Appendix B).

Size and rationale.

The project's goal was to enroll 15-20 participants. This represented at least 10% of the potential sample.

Description of the Project

Personal and professional information.

Packets were prepared for each participant. The first page requested demographic information from each participant. Eight background variables identified from the literature review as having an effect on RN confidence and use of intuition in decision-making were used. Variables included the following:

- RN experience in general
- Obstetrical RN experience
- Obstetrical RN experience on the project-site unit.
- RN's personal assessment of her expertise on the novice-to-expert continuum.
- Average number of hours worked per week.
- Usual shift worked.
- General level of confidence in ability to identify diminishing patient status.
- Level of assertiveness in calling provider to report rising patient risk and make a request.

Data Collection Procedures.

Packets.

Two packets of handouts were prepared, titled Group A and Group B. Group A Packets differed from Group B packets only in the specific case studies included. Each packet was

identified solely by the Group letter and a number such as A-1, A-2, B-1, B-2. This number was written on the outside of the envelope and on all of the papers inside.

Three items were placed inside a manila envelope: (a) a copy of the consent form that participants previously received by email, for their personal reference; (b) a demographic and professional experience sheet (Appendix D); and (c) two copies of the three case studies/response sheet, identified as Test and Re-Test (Appendices E and F). In order to prevent the participants from inadvertently seeing the MEOWS tool (Appendix G) when they pulled out the consent form and case studies, the MEOWS tool was not in the packet; it was passed out at the beginning of the re-test portion after the researcher read and demonstrated its use.

Case studies.

The researcher created five case studies. The case studies were written so that vital signs and other patient assessment data associated with hypertension and hemorrhage would trigger escalation of care on the MEOWS tool. They were written ambiguously enough that an RN might choose to continue assessing the patient or discuss the patient situation with a colleague if she were not using the tool. Case studies in each group were written so that when using the MEOWS score, each numbered scenario would trigger the same colored response (e.g., case one triggered one yellow score in the first step and two yellow scores in the second step for both group A and group B; case two triggered one red and two yellows in both groups, etc.). All case studies were reviewed for feedback on clarity, equal difficulty, and authenticity by three experienced postpartum RNs who practiced within the same health system but not at the project-site hospital. Very minor changes, such as prenatal blood pressure trends, were added.

Each group consisted of three case studies with two unique case studies and one shared case study (see appendices B and C for case study groupings). The reason for the shared case

study was to determine the validity of the case studies in measuring the similarity of RN responses between both groups. Each participant evaluated three case studies. The test and re-test case studies were the same in content.

Each case study had two parts. Each part required three steps. The first step of the case study responses was an ordinal response on a four-point Likert scale to indicate the RN's assessment of how likely it was that the patient was at risk for a critical event. The use of a four-point scale was selected in order to force the participant toward one end of the scale or the other. The scale ranged from one (very unlikely) to four (very likely). A definition of *critical event* was intentionally omitted in order to allow the participants to determine a deteriorating patient condition for themselves.

The second step was an assessment of how confident the RN was in her assessment of that risk. Each participant was allowed to interpret the concept of *confidence* individually. Anchor points on the scale were one (not at all confident) to four (absolutely confident).

Thirdly, the nurse was asked to identify her next three responses in ranked order. This was intended to indicate the nurse's recognition that care must be escalated. Choices included (a) continue to observe the patient; (b) consult with a colleague; (c) consult with the charge nurse; (d) call the rapid response team; (e) call the provider; or (f) other, where the nurse could explain her next response.

In addition, the protocol on the MEOWS tool was re-written to include a requirement for calling the provider to the bedside if the nurse's patient assessment showed two or more red scores. Because the culture of the project-site hospital was to avoid calling the provider to the bedside if possible, this requirement would show if the nurses' decision-making was strictly per

protocol or by individual decision-making if they chose not to follow the MEOWS' direction to call the provider to the bedside.

Survey Process.

Testing was offered in two different formats: (a) group; or (b) individual. Two group sessions took place in a conference room at the hospital outside the normal work hours of both the researcher and participants. Three participants attended one of the sessions; the other group consisted of four participants. The other three participants chose to be tested individually.

For the group sessions, packets were distributed alternately between Group A and B as the participants arrived. For the individual sessions, the researcher alternately used packet A for the first participant, packet B for the second, packet A for the third, and so forth. This formed the two random groups. At the start of each session, the researcher read a prepared welcome and explanation about the project (Appendix C). Participants were reminded that as they had read in the email invitation, their participation and completion of the personal and professional experience sheet was considered proof of consent. The participants removed the materials from their packets and were given a short time to review the materials and ask questions. The questions in each group and in the individual sessions were very similar. Primarily, they addressed protocol questions such as whether or not the RN had the freedom to not follow the MEOWS protocol if her nursing judgment differed. When all questions had been answered, participants were asked to fill out the personal and professional experience portions of the questionnaire and begin the case studies. This was not a timed survey. The researcher remained in the room throughout testing to confirm that participants did not discuss the case studies with each other.

When all participants had finished the first portion, the researcher distributed a copy of

the MEOWS tool (Appendix G) to each participant. The researcher then read a short, prepared explanation about the history of the MEOWS tool, its use in the United Kingdom, the recommendation of the Institute for Healthcare Improvement for use of EWS color-coded tools (Appendix C), and concluded by giving a demonstration of how the MEOWS tool was used. Reading the explanation allowed the researcher to keep the information consistent for all groups and individuals.

After all questions were addressed, participants were asked to remove the second copy of the case studies/response sheet from their packets. They were asked to plot the patient's vital signs on the MEOWS tool before responding to the case studies and then indicate their answers once more. When completed, this second answer sheet was returned to the manila envelope, sealed by the participant, and handed to the researcher in exchange for one coffee coupon. A coffee coupon was used instead of a movie ticket because the discounted movie tickets available to the researcher as an employee of the hospital, were out of stock.

Measures

Originally, the researcher had planned to use a one tailed *t* test consisting of one single sample, test and re-test group and a Pearson's Product Moment Correlation Coefficient to determine if an RN's experience was correlated with a common mean response. This was not possible because of the small number of participants so descriptive statistics were used to report the findings and generate hypotheses. A two tailed *t*-test was used to measure the two groups of nurses for similarities in their assessments and responses.

Analytic Methods.

Data was entered with appropriate coding of fields and values from the survey instrument into an Excel spreadsheet. It was analyzed with the use of the IBM Statistical Package for the

Social Sciences (SPSS) Statistical Student Version 18.0 ™. The coded fields and values were grouped into intervals and frequencies of the range, means, and distribution.

Timeline for Project

The project planning began in the summer of 2011 when a topic was finalized. The timeline for finishing the project is shown below.

10/23 to end of January, 2012	February, 2012	March, 2012	April, 2012	May 23
Proposal, IRB, Alpha test case studies with postpartum RNs	After IRB approval: Recruit volunteers, do the research, enter data, begin finding correlations	Analyze data and begin final report	Write Final report and review with committee	Project presentation

Section III: Results

Sample

Personal and Professional Information.

Ten postpartum nurses volunteered to participate. Table 1 presents personal and professional information. The range in age was 27-51 years (mean age 39 years). Overall RN experience was 5-26 years (mean years of RN experience were 11). The range of experience as an obstetrical RN was 5-24 years (mean of 10 years). Years of experience on the project-site hospital unit ranged from 3-16 years, with a mean of eight years.

Table 1.

Age and Professional Experience

Measure	Range	Mean	Standard Deviation
Age	27-51 years	39 years	7.6
Overall RN Experience	5-26 years	11 years	6.4
Obstetrical RN Experience	5-24 years	10 years	5.6
Postpartum Experience in the Project-site Hospital	3-16 years	8 years	4.1

Benner's 5-point novice-to-expert classifications were used for participants to assess their professional skills. All but one participant rated their professional skills as "expert." One of the nurses with the least number of years as an RN did not select expert status. Instead, she ranked herself *competent*, a rank of 3 on the 5-point scale. This is consistent with Benner's more recent suggestion that years of experience may not adequately predict expertise (Benner, Hughes, & Sutphen, 2008). All but two RNs worked on the day shift. Six of them worked 36 hours a week, and four worked 24 hours weekly.

Each of the case study packets had a shared case study in order to assess the similarity of decision-making between the two groups. Results of a two-tailed *t*-test showed no statistical significance between the two groups. This validated that both groups interpreted the case studies similarly.

Overall Confidence.

On the 4-point scale of one (not at all confident) to four (always confident), six of the participants rated themselves as four (always confident) in their ability to identify diminishing patient status. Four of them rated themselves as three (somewhat confident).

Overall Assertiveness.

On a similar 4-point scale of one (not at all assertive) to four (always assertive), three participants ranked themselves a three (somewhat assertive). Seven selected a four (always assertive).

Experience, Confidence, and Assertiveness.

Seven of the participants rated themselves at the same level on both confidence and assertiveness. Four of them selected *somewhat confident* and *somewhat assertive*. Three of them were *always confident* and *always assertive*. Two participants were *somewhat confident* and *always assertive*. Only one participant chose the assessment of *always confident* and *somewhat assertive*.

Survey Sessions.

Two unanticipated questions asked by the participants during testing sessions included, 1) may we choose not to follow the MEOWS guidelines if we do not agree; and 2) what if the doctor has given us parameters for calling that are different than the MEOWS guidelines? They were told they could choose not to follow the MEOWS guidelines if their judgment was different than the MEOWS guidelines.

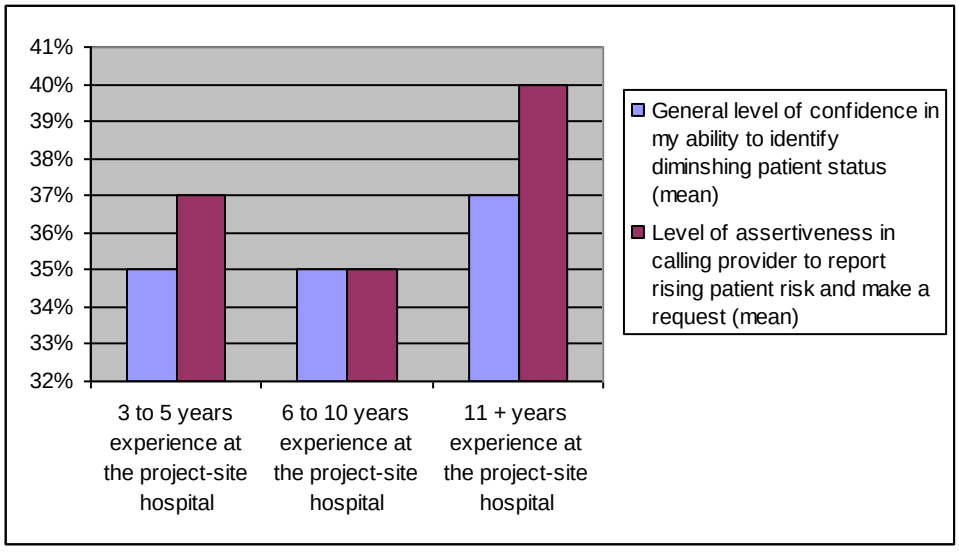
Findings

The total number of participants (10) was less than the projected number of 15 to 20. The primary question of this clinical inquiry project was whether or not use of the MEOWS tool would equalize the decision-making of RNs along the novice-to-expert continuum. However, because all of the RNs had at least five years of either RN or obstetrical experience, or both, none of them could be considered novices when using Benner's (1984) findings that a minimum

of five years of full-time nursing practice is necessary for one to achieve expert status. As a result, the findings were analyzed by years of obstetrical experience on the project-site unit. This data was compared with 1) decision-making with and without use of the MEOWS tool and 2) the participant's general level of confidence in her ability to identify a deteriorating patient condition. Not surprisingly, there was a correlation between confidence and assertiveness ratings with experience at the project site (see Figure 1). Those with the least experience on the unit ranked themselves lower in confidence and assertiveness than those with more experience, even though most of them considered themselves experts. Mean ratings of RNs with 11 or more years of experience at the project site showed higher ratings in both confidence and assertiveness overall than RNs with less than 11 years experience on the unit (see Figure 1).

Figure 1.

Overall Confidence and Assertiveness



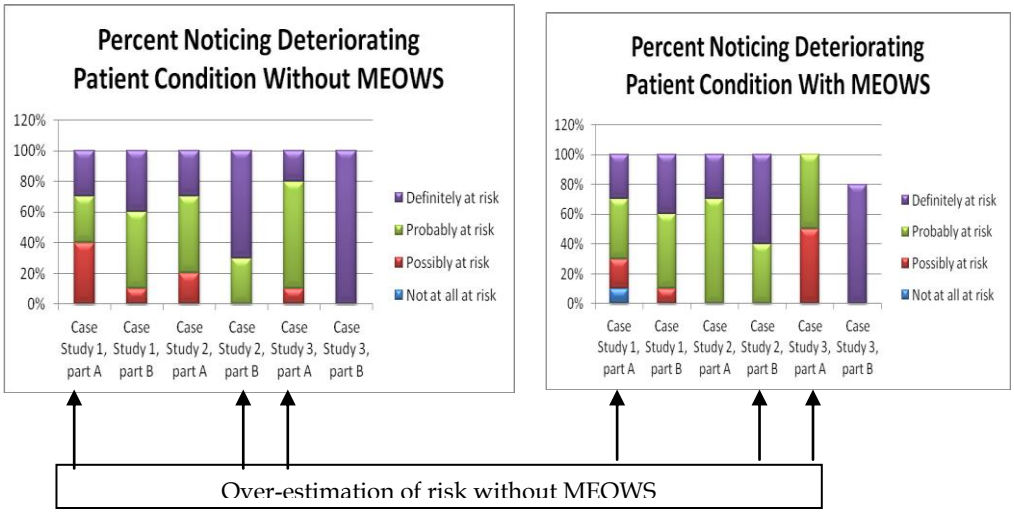
Three parts of decision-making were assessed: 1) noticing that the patient was likely at risk of a critical event; 2) the level of confidence in that assessment; and 3) the ranked order of who they would notify first to escalate care. Although all the participants had at least five years

of obstetrical nurse experience, a wide variety of decision-making was demonstrated without use of the MEOWS tool. This is another consistency with the data showing that years of experience do not always correlate with expertise (Benner, Hughes, & Sutphen, 2008) and that uncertainty contributes to variation and inconsistency in clinical decision-making (French, 2006). Use of the tool resulted not only in (a) more equal assessments of patient risk, and (b) an increase in confidence of those assessments but also (c) an equalization in the ranked order of notification and escalation of care (see Figure 7). Each of these different findings will be discussed separately, below.

Assessment of Risk Status.

The frequency distribution of four levels of risk assessment was calculated with use of SPSS. Findings were calculated in three ways: first, by calculating the percent of each response per each case study (see Figure 2). A second calculation was done to show the mean frequency of risk assessments for all case studies, with and without use of the MEOWS tool (see Figure 3). Mean risk assessments were also correlated with the number of years of experience on the project-site hospital postpartum unit (see Figure 4). Two of the nurses did not give an assessment of risk with use of the MEOWS, which skewed the mean frequency by 20% (see Figure 2).

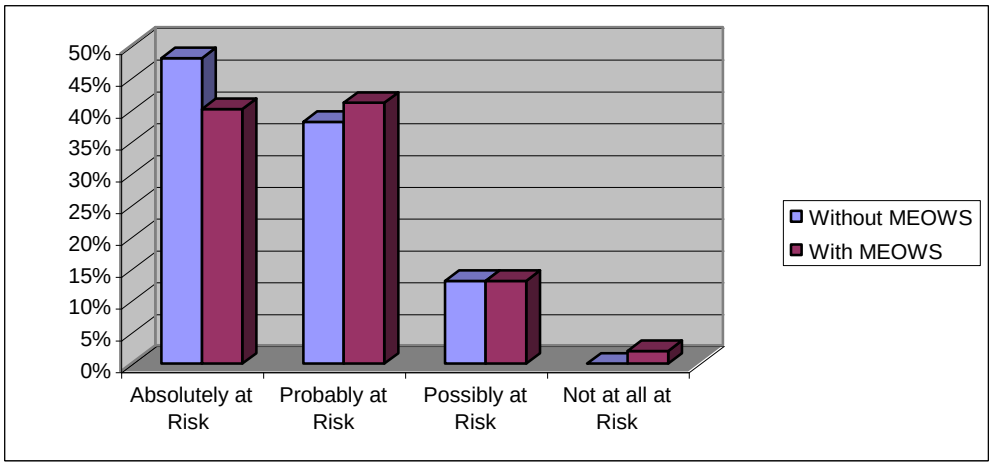
Figure 2.
Risk assessment with and without MEOWS tool



Without use of the MEOWS tool, nurses over-estimated the patients' risk in some cases (see Figure 2). Overall, in answer to the question, "How likely is it that this patient is at risk of a critical event?" the combined frequency of level four (absolutely at risk) was 48% without the MEOWS tool, and 40% with use of the tool (see Figure 3).

Figure 3.

Mean percentages for "How likely is the patient at risk of a critical event?"

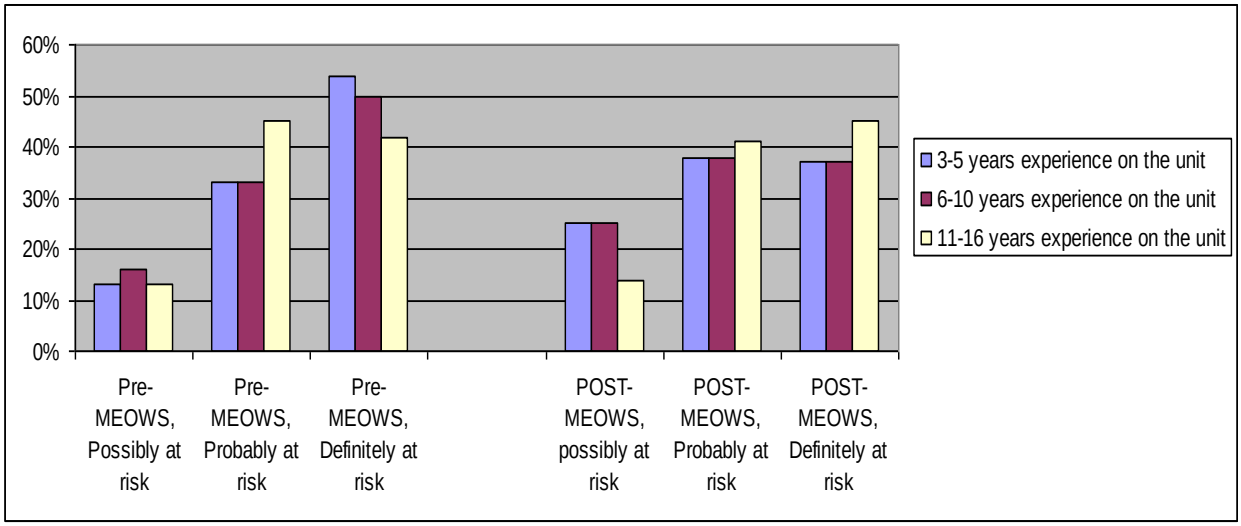


The movement was in the opposite direction for those who responded with a level three (possibly at risk). While the frequency of this response was 38% before use of the tool, the frequency increased to 40% with the MEOWS tool, showing a trend toward less estimation of risk (see Figure 3). As shown in Figure 4, however, use of the MEOWS tool equalized the risk assessments, regardless of the number of years the nurse worked on the postpartum unit of the project-site hospital. The risk assessments of nurses with 11 to 16 years of experience on the unit changed very little with use of the MEOWS tool. The most change was seen in those nurses in the categories with the least experience on the unit: 1) 3-5 years, and 2) 6-10 years. With use of the MEOWS tool, these nurses increased the frequency with which they considered a patient to be "possibly at risk," and decreased the frequency with which they considered a patient "definitely at risk." Their assessments were higher than more experienced nurses when selecting

"possibly at risk," but were more equal with the most experienced nurses for those patients who were "probably" and/or "definitely" at risk.

Figure 4.

Mean Frequencies for Determination of Risk, With and Without MEOWS



Confidence in Assessment.

A positive trend was shown in answer to the research question, "Do the measures of RN confidence improve with the use of the MEOWS tool?" As shown in Figures 5 and 6, one participant was *minimally* confident without use of the MEOWS tool and *not at all* confident with use of the tool. However, her lack of confidence might be explained by her written comments that she would have escalated care beyond what she calculated in the MEOWS tool. As a result, she might have felt that her assessment of risk was invalidated by the tool, or she might have misunderstood the anchors.

The mean frequency of response four (absolutely confident) increased from 56% without use of the MEOWS tool to 71% with use of the tool (see Figure 5). The movement from 41% to 22% in those who were *somewhat confident* with use of the tool was a positive change. Since a

measurement of 100% was used, a rise in the mean percentage of those *absolutely confident* would naturally be expected to decrease the mean percentage of those who were less confident.

Figure 5

Confidence in Assessment, by Case

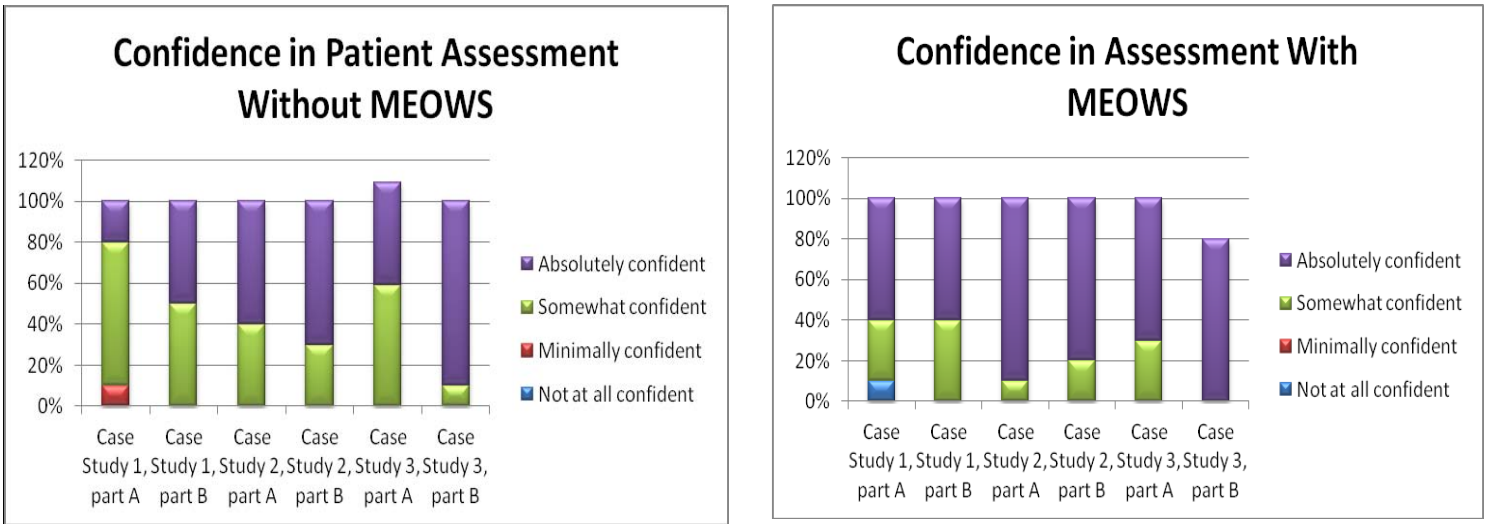
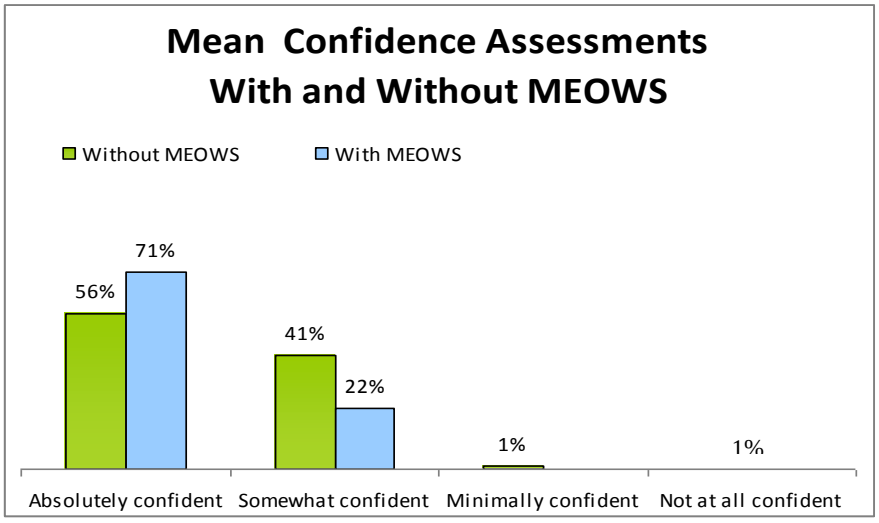


Figure 6.

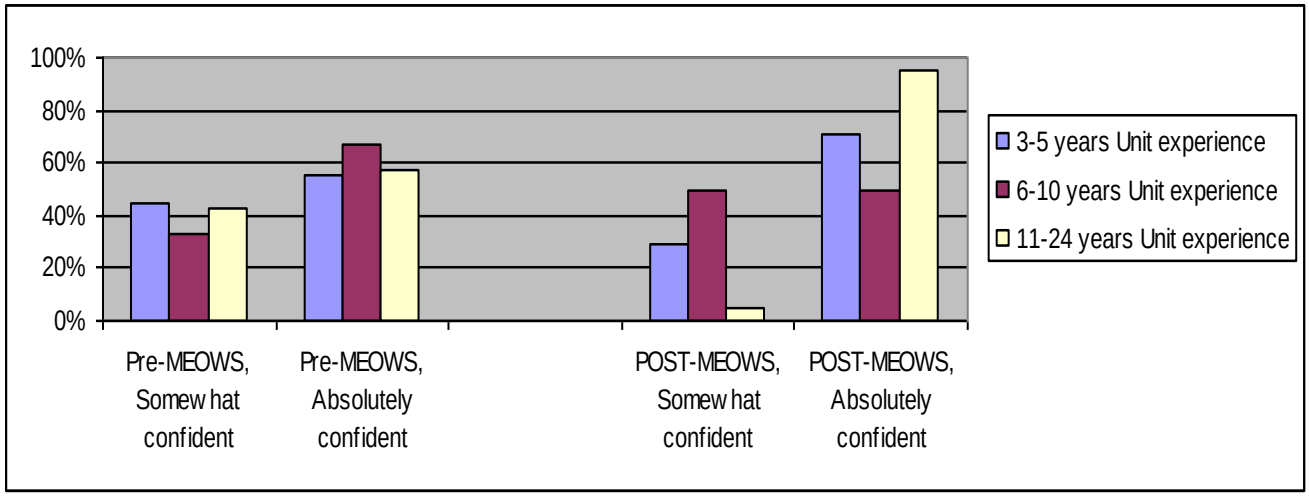
Mean frequencies for confidence levels



As shown in Figure 7, the biggest differences in confidence with use of the MEOWS tool were for those RNs at each end of the spectrum. The confidence levels of those nurses who had six to ten years of experience on the unit were the least changed.

Figure 7.

Mean of confidence levels per years of experience on the project-site hospital postpartum unit, with use of the MEOWS tool and without.



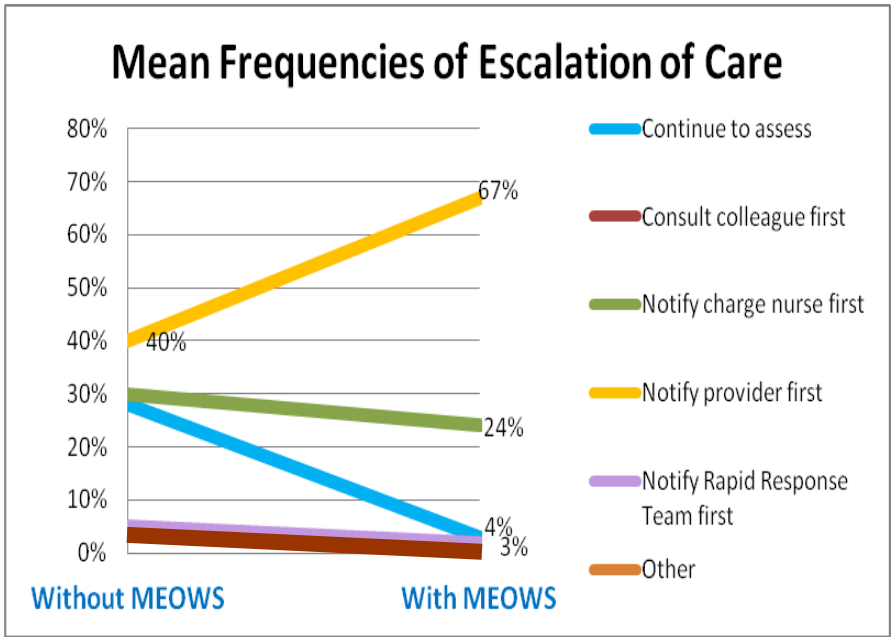
Escalation of Care.

A change was seen in the RNs' choice of whom they would notify to escalate care. Use of the MEOWS tool did result in more equal decision-making. As seen in Figure 8, there was an increase in the frequency of how often the RN would choose to notify the provider first, from 40% without use of MEOWS to 67% with use of MEOWS. Correspondingly, frequencies of continuing to assess the patient before escalating care were reduced from 30% without the tool to 4% with use of the tool. The decision to notify the charge nurse first also dropped from a 30% frequency to 24%, a small change. Although the MEOWS tool called for the nurse to request that the provider come to the bedside for a consult, only one nurse indicated she would do that. This response was for only one case study. The researcher's conclusion was that the nurses were

giving responses that reflected their professional judgment and they were not simply following the protocol.

Figure 8.

Mean frequencies for escalation of care.



Section IV: Discussion

This study analyzed decision-making and confidence levels of postpartum nurses when making assessments about a patient's risk of a critical event. In addition, the nurses' next step of escalating care was assessed using a ranking system to show what they would do first after these assessments.

Interpretation

Risk Assessments.

An unexpected finding was the nurses' overall tendency to overestimate the patient's risk of a critical event without using the MEOWS tool. One nurse even changed her assessment from

two (possibly at risk) to one (not at all at risk) with use of the MEOWS tool. This is consistent with other findings that show the overall tendency of nurses to overestimate risk (Thompson, et al., 2007). By providing an objective measure to classify a patient's risk status, the MEOWS tool might lead to more realistic and accurate patient assessments by reducing the nurse's inherent overestimation of risk. Increasing a nurse's certainty of a patient assessment can reduce variation and inconsistency in clinical decision-making (French, 2006). This would need to be studied further with scenarios based on real patient cases with real outcomes.

Confidence Assessments.

In this project, the MEOWS tool appeared to boost RN confidence. As one nurse wrote in the comments section, "I felt more confident knowing that it wasn't just my opinion that the patient was at risk. The MEOWS tool validated it." This appreciation of a tool to validate a nurse's assessment has been described by RNs in other research, as well. Experienced RNs might be alerted to a deteriorating condition by use of intuition, but they confirm their concerns with the tool (O'dell, Victor, & Oliver, 2009).

However, one nurse indicated a small drop in her confidence level from "Absolutely confident" to "Somewhat confident" with use of the tool. She added a comment that she would have called the provider for one of the case studies, but the tool indicated that was not necessary. She did not follow the tool's guidance and indicated she would notify the provider.

It was not surprising that the confidence level of nurses with the least amount of experience on the unit increased with use of the tool since their average years of experience in total was less than that of their colleagues' (see Figure 7). This finding correlates with those of Gao, et al., (2007) whose qualitative study showed that EWS is helpful for less experienced staff because of standardized criteria. If a nurse lacks a high level of intuition, she may rely on an

objective early warning score to identify a deteriorating patient condition (O'dell, Victor, & Oliver, 2009).

The associated finding that use of the tool also increased the confidence of the most experienced nurses might seem incongruous since they are expected to be already confident as a result of their pattern recognition and resulting intuition. However, experience does not eliminate a nurse's uncertainty with clinical intervention decisions (Cioffi, 2000; Hedberg & Larsson, 2003), and it is also not necessarily correlated with expertise (Benner, Hughes, & Sutphen, 2008). As recognized experts, the most experienced nurses are frequently called upon to consult with their less experienced colleagues. Future investigation into the benefits of the MEOWS tool to reduce the stress on experienced nurses and potentially increase nursing retention, could be warranted.

Escalation of Care.

Without use of the tool, more nurses chose to continue to assess the patient first before escalating care. The decision to notify the provider sooner is consistent with other studies showing that by providing a framework for identifying deteriorating patients, early warning systems equalize RNs' knowledge base and decision-making (Robb & Seddon, 2010). Use of a warning tool can make it difficult for a nurse to procrastinate in escalating care, according to Gao, et al., (2007).

Context

The nurses at the project-site hospital are dedicated to evidence-based nursing and research to improve their practice. As a result, a higher number of participants was anticipated. Some of the possible reasons for the small sample size included concurrent training for implementation of a new house-wide computer charting system, which resulted in mandatory

overtime for the staff. As a result, potential participants may not have wanted to spend any more time at the hospital than necessary. The voluntary, unpaid requirement for participation may also have been a dis-incentive for some nurses.

Financial Considerations

The hospital was concurrently researching use of an early warning system for medical-surgical patients with a grant from the national Centers for Medicare and Medicaid Services (CMS). A recent serious patient outcome where use of the MEOWS tool could possibly have resulted in a more positive outcome had spurred interest in this clinical inquiry project by hospital and perinatal leadership at the highest levels. If the decision was made to expand future research to include the perinatal patient population, future financial implications could include costs related to writing another grant. If the decision was made to program the new computer documentation system to automatically calculate a MEOWS score for each nurse's assessments, further costs could include computer analysts' time. However, the potential costs related to legal financial settlements as a result of unrecognized patient deterioration could be much higher than temporary salaries to improve the documentation system.

Situation analysis

Because of the timing of this clinical inquiry project in tandem with the stresses and tight scheduling necessitated by training for the new computer documentation system, I was very uneasy when I asked for volunteers at a staff meeting. I did not want to add an additional stressor to the nurses, and I wasn't sure if any of them would volunteer. I feared that I might only get three participants and spend time on a project that would be worthless. Even though I was happy to recruit 10 participants, thanks to the efforts of one very energetic and dedicated participant, I was disappointed that I could not demonstrate statistical significance for the results of this project because of the low number of participants. However, the results have been of

interest to the regional perinatal leadership team and to the physician leading the house wide EWS implementation. The researcher has since been invited to serve on a committee led by a hospitalist physician who would like to include the MEOWS tool in her next project funded by the Centers for Medicare and Medicaid Services (CMS). A personal, desired outcome of this project has been an increase in the researcher's confidence to lead the staff in future unit-based research projects.

Outcomes

Some of the participants have stated that the MEOWS tool has given them confidence in relying on their intuition more than they could before. They also have said they are more discerning of vital sign parameters that fall into the danger zone because they now see the red rows with those numbers in their minds.

Limitations

A primary limitation of the study is the small number of participants at one site. The sample size may not make the project unworthy of notice, however. Early phase research generates hypotheses, it does not test them, and early phase research is a very valid and important step in many research projects. By testing research tools with a small number of participants, a researcher can avoid mistakes in future studies on the same topic that may involve more expense and a larger data base (Aickin, 2007).

Another limitation is that it only tested the "what" of RN escalation of care and not the "why." The project showed that use of the MEOWS tool equalized the RNs' recognition of a deteriorating patient condition, increased their confidence, and resulted in more prompt notification of the provider. However, research does not address whether the best way to escalate care is to go through the charge nurse first or directly to the provider. Adding the

support of the charge nurse's assessment in a call to the provider could strengthen the nurse's request for a bedside consult or a request for a transfer of the patient out of the postpartum unit and into the intensive care unit. A qualitative study combined with actual patient case studies could be useful to determine that piece.

No novice nurses volunteered for the study. As a result, the results were measured by how many years a nurse had worked on the project-site postpartum unit.

The results of this study could result in hesitancy by some providers about implementing the MEOWS tool. Two things, in particular might be of concern to providers: 1) the frequency with which the nurses might call the provider first, which some might consider a nuisance; 2) the unit culture of individual providers giving their own guidelines for notification of deteriorating patient conditions. This practice of individual notification guidelines could complicate or reduce the use and validity of the MEOWS tool and could possibly lead to a situation where nurses are less confident because a patient's vital signs are within the red zone that should trigger a phone call to the provider if the MEOWS tool were used, but the provider has ordered otherwise.

Other limitations include case examples that were created for the project but not tested for validity or accuracy, the limited time frame of the project, which probably resulted in a smaller number of participants, and lack of project promotion by the hospital. The participants were asked to respond to an untested and unfamiliar protocol, which sometimes was different than their current unit culture. In addition, limiting the Likert scale to four options might not have allowed for a discrete enough range of responses to discern the differences in decision-making.

Conclusions

With the hospital's current interest in early warning systems, this study can serve as an early phase study to support implementation of an early warning system in the perinatal unit. By demonstrating the current state of perinatal nursing on the unit without the MEOWS tool, including the wide range in risk assessments by nurses and the number of nurses who might delay notifying the provider as the patient condition deteriorates, the case can be made for further evaluating the incorporation of the MEOWS tool to standardize care.

The MEOWS tool has suggested that its use equalizes the recognition of a deteriorating patient condition, increases the confidence of nurses in that assessment, and leads to more prompt provider notification. However, more research and discussions with providers and RN staff may be necessary before the tool is accepted and implemented by the project-site hospital for the reasons noted above.

Dissemination of Information

Results will be disseminated to participants upon request and to the leadership within the researcher's institution. A public presentation of this project will be given at the OHSU School of Nursing on May 23, 2012. Nationally, the results will be submitted for potential publication in peer-reviewed journals such as the *Journal of Obstetric, Gynecologic and Neonatal Nursing (JOGNN)*, *Nursing for Women's Health*, and the *Journal for Perinatal and Neonatal Nursing.* An abstract for a poster presentation will be submitted to the local and national conferences of the Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN).

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allowed for a more discrete evaluation of the effect of the MEOWS tool on RN decision-making. And finally, I want to thank my husband, Gary Irland, for his support of my continuing education and his tireless attention to laundry, dishes, and vacuuming while I spent time at the computer. Also, the support of my other family and friends kept me going when I wondered why I was doing this at such a late time in my career.

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Appendices

Appendix A

Postpartum Nurses:

Have you ever been uncertain . . .

- About whether or not your patient's condition is deteriorating?
- About when to notify the provider?
- About whether you should call the provider to the bedside?

A tool that answers these questions—the **Modified Early Obstetric Warning System (MEOWS)**—is currently being used in the United Kingdom.

As a part-time or full-time postpartum RN at Providence St. Vincent Medical Center, you are being offered a chance to participate in a research study to answer the question:

"Does use of a Modified Early Obstetric Warning System (MEOWS) equalize the decision-making of nurses along the novice-to-expert continuum?"

Time commitment: approximately 1 hour

Risks: There are no known risks to participating in the project. Participation will not affect your employment or your annual review. Only a tracking number will identify your answers. All responses will be kept confidential.

Benefits: Professional satisfaction of participating in a preliminary investigation that may lead to improved safety of post partum patients. You will also receive a free Regal Cinema movie ticket in appreciation for your time.

Date: **Saturday, February 25, 2012** Location: **Conference Room #4** Time: 0900

- For further questions, and to participate, please contact the researcher, Nancy Irland, RN, by email at nancy.irland@providence.org, no later than **2400** on **February 14, 2012**.
- If you cannot participate in the group survey, individual appointments may be scheduled with Nancy Irland.

OHSU IRB #00008155
PH&S IRB #12-023B

Appendix B

Information Sheet

TITLE: A Physiologically-Based Early Warning Score for Postpartum Patients: Will it Equalize the Decision-Making of RNs Along the Novice-to-Expert Continuum? (PH&S IRB #12-023B, OHSU IRB #00008155)

PRINCIPAL INVESTIGATOR:
Nancy Irland, MSN, CNM, RN
Student, Doctor of Nursing Practice
OHSU – School of Nursing
6375 NW 268th Pl
Hillsboro, OR 97124
503-809-1745

CO-INVESTIGATOR:
Gary Laustsen, PhD, FNP, RN
Associate Professor
OHSU-School of Nursing
One University Blvd.
La Grande, OR 97850
541-962-3132

PURPOSE:
You have been invited to be in this research study because you are a postpartum RN at Providence St. Vincent Medical Center (PSVMC). The two primary purposes of this study are to investigate (a) whether use of the Modified Early Obstetric Warning Score (MEOWS) tool for tracking the vital signs of postpartum patients improves the confidence of postpartum RNs; and (b) if use of the MEOWS tool equalizes the patient care decision-making of RNs on the novice-to-expert continuum.

This information sheet will explain this study to you, and what you need to do if you take part. Make sure you understand what is written; ask as many questions as needed before you decide whether to take part. We plan to enroll about 15-20 participants at PSVMC.

PROCEDURES:
If you take part in this study, you will participate in a survey session led by the investigator. You may participate in this session with other postpartum RNs, or you may participate in a private session with the investigator. The estimated time for the session is 1 hour during unpaid time. The survey session will take place at Providence St. Vincent Medical Center in conference room #4 on Saturday, February 25, beginning at 0900.

In the survey session, you will be asked to read three case studies and answer questions after each written case. The investigator will then present the MEOWs tool. After discussion of the MEOWs tool, you will re-visit the same case studies, plot the patient's vital signs on the MEOWs tool and respond to the questions again.

You will also complete a survey (RN Personal and Professional Information) with questions about your RN experience. On this survey, you will be asked to record your age and years of experience.

At any time during this study, you may refuse to answer any question. You may also stop the session at any time.

RISKS AND DISCOMFORTS:
Although we have made every effort to protect your identity, there is a minimal risk of loss of confidentiality. Your name will not appear on any records, and your responses will not be shared with

anyone at PSVMC. The case studies and questions that you receive at the survey session will include a tracking number, but there is no link between this number and your identity.

BENEFITS:
There will be no direct benefit to you for participating in this study. However, by participating, you may help us to learn if use of the MEOWS tool benefits postpartum nurses by improving their confidence in assessing unstable postpartum patients and communicating their concerns with providers.

ALTERNATIVES:
You may choose not to be part of this study.

COSTS:
There is no cost to you for being in this study.

You will receive a Regal Cinema movie ticket in appreciation for your participation after the survey session.

PRIVACY:
To protect your privacy, there will be no signed consent form for this study. By completing the RN Personal and Professional Information survey, you are agreeing to take part in this study. Your name will not appear on the surveys completed in this study; there will be no link between your answers and your identity.

Research records may be reviewed and copied by the Providence Health & Services Institutional Review Board , the OHSU Institutional Review Board and the Office for Human Research Protections.

GENERAL INFORMATION:
Your taking part in this study is voluntary; you do not have to join this or any research study. If you do join, and later change your mind, you may quit at any time. If you refuse to join or withdraw early from the study, you may do so without affecting your relationship with Providence Health & Services, OHSU, the investigator, the investigator's department, or your employment at PSVMC.

QUESTIONS:
Any questions you have about this research study can be answered by:
Nancy Irland, MSN, CNM, RN at nancy.irland@providence.org or 503-809-1745.

Any questions you have about your rights as a research subject will be answered by the Providence Health & Services Institutional Review Board at 503 215-2046 or the OHSU Research Integrity Office at (503) 494-7887.

You are free to ask questions about this study at any time.

This Information Sheet is yours to keep.

Appendix C
PH&S IRB #12-023B
OHSU IRB #00008155

Initial Welcome and Explanation

Thank you for volunteering to participate in this research project. As you may know, I am currently enrolled in the Doctor of Nursing Practice (DNP) program at OHSU. A requirement of the program is to conduct a clinical inquiry project. I have chosen to explore the benefits of an early warning system related to care of post partum patients. I am reading this information so that every participant will hear the same thing. You may follow along with the copy attached to your packet.

As you may know, St. Vincent Hospital recently started using an Early Warning System or EWS for adult medical-surgical patients, and a Pediatric Early Warning System called PEWS for pediatric patients. Early warning systems are visual aids for documentation, with pre-determined set points that trigger a nurse to escalate the assessment frequencies and to notify the charge nurse and/or provider as a patient's condition deteriorates. They have been used successfully in the United Kingdom for nearly 20 years to help identify and treat patients whose medical condition is rapidly deteriorating.

This is a study to determine, on a small scale, the benefits of a perinatal early warning system to equalize nurse decision-making. At this point there are no plans for implementing a perinatal early warning system at this hospital. However, results from this study may help influence leadership across the region and nationally of its value.

This study will be done in two parts, total estimated time involved is 45 minutes to one hour. In your packet are a demographic data collection sheet, an information sheet, and two sets of 3 case studies. Some of you have a different set of case studies than others, but the case studies within each packet are the same. Once everyone has finished the first part, I will explain how to use an early warning system for post partum patients and the second half of the project will begin.

If you must leave the room during the survey, please leave one at a time and wait until the previous person has returned in order to protect the reliability of your answers. When the survey is completed, please do not discuss your answers with each other or with your co-workers, since some of them may choose to do the survey at another time.

At the end, I will exchange your completed case studies for a movie ticket as thanks for your time. I appreciate that you are here because of a professional and altruistic interest in improving patient care. Thanks so much.

Please remove the demographic data collection sheet and the first set of 3 case studies. You will begin with the demographic and professional data, then move on to the first set of case studies and work your way through the 3 cases. Once you begin, you will not be able to ask questions about the case studies. Are there any questions right now? Then you may begin.

Appendix C, cont.

After Testing has been completed:

History and Use of the Modified Early Obstetric Warning System

An Early Warning System packages patients' vital signs in a quantifiable, visual format that serves as a trigger for escalating patient care. Pre-determined set points trigger a nurse to escalate the assessment frequencies and to notify the rapid response team or provider as a patient's condition worsens. Early warning systems do not drive a nurse's clinical judgment; they support it. Experienced RNs have reported they are often alerted to a patient's deteriorating condition by using intuition; they confirm their concerns with the early warning system. Early warning systems have been shown to equalize the knowledge base of RN teams.

A specific version of EWS for obstetrical patients, the *Modified Early Obstetric Warning Score* (MEOWS), correlates with physiologic changes of pregnancy. It is currently in use by nearly 200 hospitals in the United Kingdom. In 2011, the Centre for Maternal and Child Enquiries (CMACE), which reports to the National Patient Safety Agency in the United Kingdom, recommended use of the MEOWS for all pregnant and newly-delivered patients as one of their top-10 safety recommendations.

The MEOWS is a color-coded chart on which a nurse records a patient's respiratory rate, oxygen saturation, temperature, heart rate, blood pressure, urine output, level of consciousness, pain score, and general appearance of looking well or unwell. The patient's diastolic and systolic pressures are recorded on separate lines so that each one is tracked and trended separately.

Rows on the chart, where the nurse enters these assessments, are one of three colors: white, yellow, or red. Instructions on the top of the chart notify the nurse to contact the charge nurse if the patient triggers one yellow score at any time; notify both the charge nurse and provider for early intervention if the patient triggers one red or two yellow scores at any one time; and call the provider for a bedside assessment if the patient triggers 2 red scores. Notice that the MEOWS includes the intuitive measurement "looks unwell" as part of a nurse's assessment. That is a yellow score.

Studies are continuing in the United Kingdom to validate the reliability of an early warning system for maternity patients. However, no studies to date have looked at how well the MEOWS tool equalizes the decision-making of RNs regardless of experience. With an expected shortage of experienced nurses in the next few years, a tool for standardizing RN decision-making could be important for patient safety. The purpose of this study is to do just that. It will also give you an idea of how similar your decision-making is to that of your colleagues. If you are interested, I will share the results with you next spring after I have analyzed them.

USING THE TOOL

Let's practice using the tool together before you return to the case studies, to see if your decision-making is the same or different when using the MEOWS tool.

Let's say you have a post partum patient who had ruptured membranes for 18 hours before arriving at the hospital. She received antibiotics in labor, and now her respiratory rate is 20, her temperature is 38.2, heart rate 92 beats per minute, blood pressure 120/88 and she looks unwell. According to the MEOWS tool, she has triggered three yellow scores, so the charge nurse and provider should be notified.

As I said earlier, the MEOWS tool isn't meant to drive your clinical judgment, but if you weren't sure whether or not she was "sick enough" to call the provider, the MEOWS tool might give you the confidence you need to make that call.

Any questions? Okay, please take the remaining set of case studies from your packets and begin. They are the same cases you had before, but you will use the MEOWS tool to package the vital signs and other symptoms to help you in your decision-making. Please note there is a MEOWS tool for each case study so you can mark on the tool before making your decision.

When you are finished, please put everything back in the manila envelope and hand it to me in exchange for your movie ticket.

Thank you again for participating.

Appendix D
PH&S IRB #12-023B, OHSU IRB #00008155

RN Personal and Professional Information

Effect of *Modified Early Obstetric Warning System* (MEOWS) on Equalizing Post Partum RN Decision-Making

ID number _____

Field Name	Description
Age (enter whole number)	
Total *Completed* Years of hospital RN experience as of today (enter whole number)	
Total *Completed* Years of *obstetrical* RN experience as of today (enter whole number)	
Total *Completed* Years of *post partum* RN experience **at PSVMC as of today** (enter whole number)	
Please circle the number that correlates with your personal assessment of your skills along the novice-to-expert continuum	Novice 1 Advanced beginner 2 Competent 3 Proficient 4 Expert 5
Average number of full hours worked per week (indicate one number and do not include overtime)	
Primary shift currently working (Please circle one)	1 = Day shift 0700 to 1900 2 = Evening shift 1500 to 2300 3 = Night shift 1900 to 0700
General level of confidence in my ability to identify diminishing patient status	Not at all confident 1 Minimally confident 2 Somewhat confident 3 Always confident 4
Level of assertiveness in calling provider to report rising patient risk and make a request	Not at all assertive 1 Minimally assertive 2 Somewhat assertive 3 Always assertive 4

Appendix E
PH&S IRB #12-023B, OHSU IRB #00008155

GROUP A

Effect of *Modified Early Obstetric Warning System* (MEOWS) ID number _____
on Equalizing Post Partum RN Decision-Making

Case Study #1	
Part A. Ms. H is a 26-year-old G2 P2 who had a cesarean section at 2300 for prolonged second stage and arrest of descent after a 24-hour dysfunctional labor, pitocin augmentation, and a 3-hour second stage. Baby weighed 8# 13 oz. Ms. H. is now 4 hours post recovery, in post partum, at 0400. Pre-op hematocrit was 37%. During surgery, an extension of the transverse uterine incision was necessary. Blood loss was reported to be 1500 cc. She complains of abdominal pain in spite of having been medicated adequately for pain. BP 130/92, pulse 115, T 37. You have expressed a moderate amount of blood clots, measuring 350 mL by weight of 1 gm = 1 mL. Oxytocin infusion of 30 u/500 ml is running per IV pump at 125 mL/hr. You have just given misoprostol 800 mcg per rectum.	
1. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
2. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
3. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	_____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #1, cont	
Part B. At 0500 a.m., you have expressed more clots, weighing 100 gm, and the fundus becomes firm on palpation. BP is now 120/60, pulse 120, T 36.4, urine output less than 20 mL/hr since surgery. Hgb 7, HCT 27, platelets are 90,000.	
4. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
5. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
6. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	_____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #2	
Part A. Ms. N. is a 29-year old G1 P0 at 37 weeks. She was induced for Pre-eclampsia. BP 162/100 range in labor, 3+ protein on urine dip. Magnesium sulfate bolus of 6 Gm was given on admission, then 2 Gm/hr throughout labor. She delivered an 8# baby. An indwelling catheter was re-inserted after the delivery. She is now stable at 20 hours post delivery. Magnesium sulfate continues at 2Gm/hr per IV pump. Her urine output was 60 mL per hour at the start of your shift 4 hours ago. It has been 50 mL of urine *total* over the past 2 hours. BP now 150/ 92 (taken twice), P 90, T 37.2, RR 20, O2 saturation 94%. She states she is too dizzy to ambulate. DTRs are +1, lung sounds clear.	
7. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
8. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
9. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #2, cont.	
Part B. It is 1800. She is now 25 hours post delivery. The perinatologist saw her 1 hour ago. He was going to his daughter's birthday party and said not to call him unless there was an emergency. Magnesium sulfate was discontinued and an order was given for Hydralazine (Apresoline) 25 mg po tid. You gave the first dose 45 minutes ago and have now taken her vital signs again. BP 162/100, P 100, RR 21, T 37, O2 saturation 90%. Fundus is firm at 1 finger below the umbilicus, moderate flow. Urine output 50 mL/2 hours. Lung sounds are clear, Level of consciousness is awake and oriented, and responds appropriately to verbal commands.	
10. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
11. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
12. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #3	
Part A. **Ms. R.** is a 40-year-old G7 P7 female with an uneventful pregnancy at 39 weeks gestation. Admission vital signs were BP 120/70, P 90, RR 20, T 37. She had a rapid labor and delivered 4 hours ago at 1800. There was some question of her water being broken for 24 hours. Because of that, she had one dose of Penicillin in labor at 1700. She has a history of postpartum hemorrhage during her last delivery, requiring blood transfusions. Blood loss was 750 mL this time. An IV of 30 units oxytocin in 500 mL LR is running at 125/hr by pump. It is now 2200. Fundus is boggy but massages to firm at 1 above the umbilicus with clots expelled, measuring 200 mL by weight. You take her vital signs. They are BP 100/60, P 100, RR 20, T 38.2. Ms R. is resting quietly, blissfully holding the baby skin-to-skin.	
13. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
14. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
15. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #3, cont.	
Part B. It is now 0130. At 2400 her temperature and other vital signs changed. You called the midwife and received a new order for antibiotics every 4 hours. The first dose was given at 2430. Her temp now is 39.2, BP 74/50, P120, RR 20, and she looks unwell. Fundus is firm at 2 fingers below the umbilicus, normal flow.	
16. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 / Possibly at risk 2 / Probably at risk 3 / Definitely at risk 4
17. How Confident Are You About This Assessment?	Not at all confident 1 / Minimally confident 2 / Somewhat confident 3 / Absolutely confident 4
18. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	_____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse _____ = Provider notification ____ = Rapid response team notification _____ = Other (please describe)

Appendix F

PH&S IRB #12-023B, OHSU IRB #00008155

Group B

Effect of *Modified Early Obstetric Warning System* (MEOWS) on Equalizing Post Partum RN Decision-Making

ID number _____

Case Study #1	
Part A. Ms. W is a G2 P 2 @ 38 weeks with new onset of pre-eclampsia. She delivered by cesarean section at 1600 and a magnesium sulfate bolus was started in the PACU for a BP of 145/90, and then set to run at 2 gm/hr by IV pump. DTRs are +2, lungs are clear, oximeter is 95%, she is oriented, but tired. It is now 2100, five hours after surgery. She is on the post partum unit and you take routine vital signs. BP 151/93, P 65, RR 20, T 37.2, flow scant. She is resting quietly. A mag level has not been drawn.	
1. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
2. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
3. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	_____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #1, cont.	
Part B. At 2200 her BP is 155/88, P 70, RR 20, T 37.5. She has had 50 mL of urine output in the past 2 hours. Fundus is firm at 2 below, she is easily awakened, mod bleeding.	
4. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
5. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
6. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	_____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse _____ = Provider notification ____ = Rapid response team notification _____ = Other (please describe)

Case Study #2	
Part A. It is 0900. Ms. S. is a G 4 P 2 patient at 41 weeks with a history of pre-eclampsia. She delivered vaginally 16 hours ago (at 1700) and has magnesium sulfate running at 2 gm/hr per IV pump. BPs have been averaging 160/85, P 90, she states she can't keep her eyes open. DTRs are +1, lungs are clear, SpO2 is 95%. She has an indwelling catheter. Her urine output was 50 mL over 2 hours at 0700. The physician was informed and stated that was "close enough" to 30 mL per hour. Mag levels have not been drawn. When you do your assessments, you see that once again, she has had just 50 mL of urine output in 2 hours. Her vital signs are BP 164/80, P 90, RR 20.	
7. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
8. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
9. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #2, cont.	
Part B. It is now 1230. The physician has transferred care to a perinatologist. The patient's urine output remains at 50 mL every 2 hours. Her BP is now 170/94, P 100, RR 24, oxygen saturation 90%. Magnesium sulfate is still running at 2 gm/hr. DTRs are +1, she is drowsy but responds appropriately.	
10. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
11. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
12. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #3	
Part A. **Ms. R.** is a 40-year-old G7 P7 female with an uneventful pregnancy at 39 weeks gestation. Admission vital signs were BP 120/70, P 90, RR 20, T 37. She had a rapid labor and delivered 4 hours ago at 1800. There was some question of her water being broken for 24 hours. Because of that, she had one dose of Penicillin in labor at 1700. She has a history of postpartum hemorrhage during her last delivery, requiring blood transfusions. Blood loss was 750 mL. An IV of 30 units oxytocin in 500 mL LR is running at 125/hr by pump. It is now 2200. Fundus is boggy but massages to firm at 1 above the umbilicus with clots expelled, measuring 200 mL by weight. You take her vital signs. They are BP 100/60, P 100, RR 20, T 38.2. Ms R. is resting quietly, blissfully holding the baby skin-to-skin.	
13. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
14. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
15. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

Case Study #3, cont.	
Part B. It is now 0130. At 2400 her temperature and other vital signs changed. You called the midwife and received a new order for antibiotics every 4 hours. The first dose was given at 2430. Her temp now is 39.2, BP 74/50, P120, RR 20, and she looks unwell. Fundus is firm at 2 fingers below the umbilicus, normal flow.	
16. How likely is it that this patient is at risk of a critical event?	Not at all at risk 1 · Possibly at risk 2 · Probably at risk 3 · Definitely at risk 4
17. How Confident Are You About This Assessment?	Not at all confident 1 · Minimally confident 2 · Somewhat confident 3 · Absolutely confident 4
18. How will you respond to these findings? Please answer in rank order from 1-3, indicating: 1 = first thing you would do 2 = second thing you would do 3 = third thing you would do	_____ = Continue to assess the patient before calling anyone ____ = Consult with a colleague ____ = Consult/notify the charge nurse ____ = Provider notification ____ = Rapid response team notification ____ = Other (please describe)

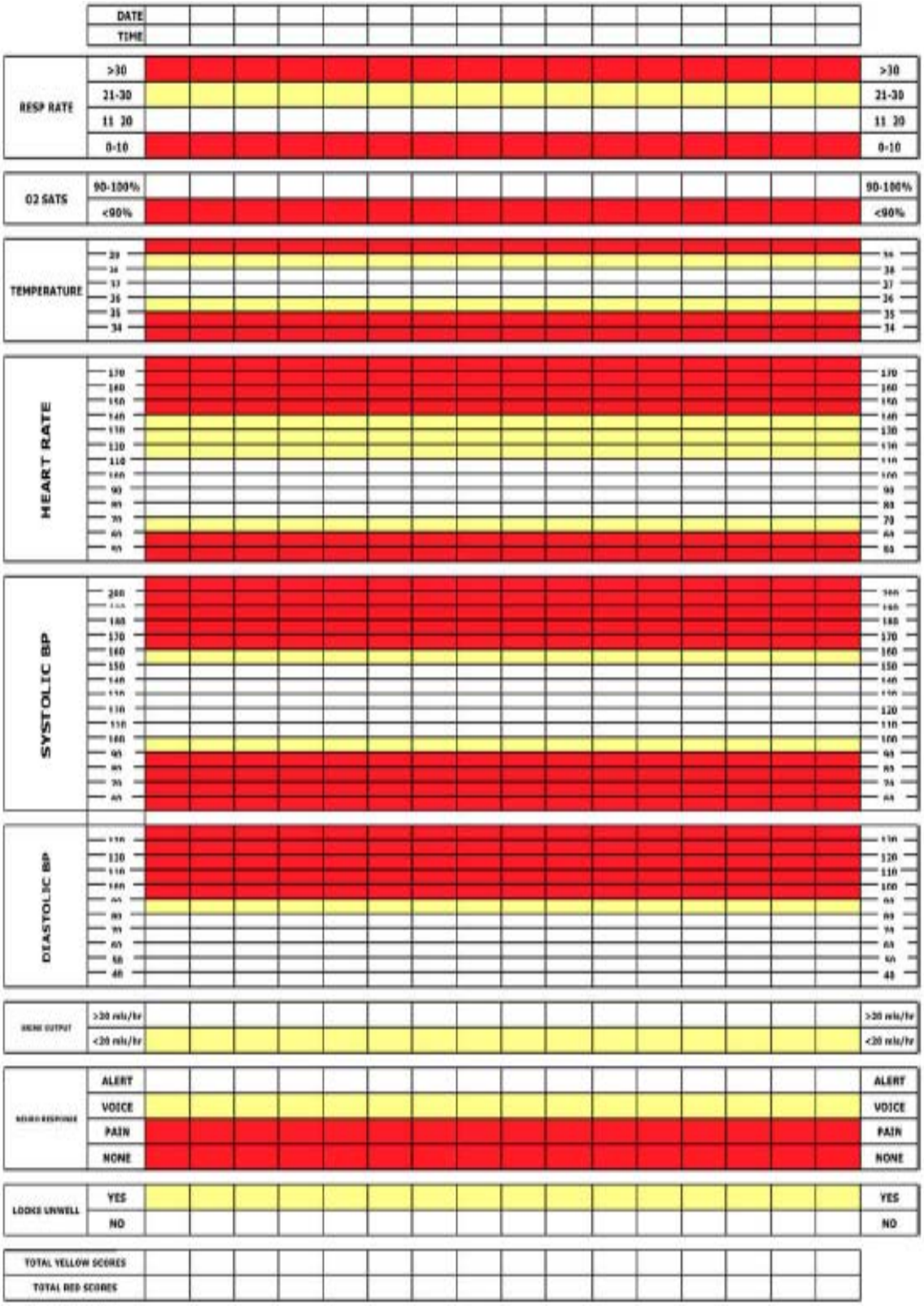
Appendix G

MODIFIED EARLY OBSTETRIC WARNING SYSTEM ME(O)WS

At a minimum, please use the following guidelines:

- Contact **CHARGE NURSE** for early intervention if patient triggers **ONE YELLOW SCORE** at any time.
- Contact **CHARGE NURSE** & **PROVIDER** for early intervention if patient triggers **ONE RED OR TWO YELLOW SCORES** at any time
- Notify **PROVIDER to come** for bedside consultation if patient triggers **TWO RED SCORES** at any time.

NOTE: This tool is not expected to replace RN clinical judgment. Consultation with the Rapid Response Team or any other skilled healthcare team member may occur at any time other than those indicated here, as needed.



Clinical Inquiry Project Executive Summary

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Description and Significance of the Clinical Problem

At the project-site hospital, the postpartum unit is an entry point into obstetrics for newly graduated Registered Nurses (RNs) and others without obstetrical experience. Less experienced nurses are more likely than experienced nurses to miss cues of pending patient deterioration.

Visual aids, known as *early warning systems* or *early warning scores* (EWS), have proven useful for standardizing criteria that identifies a deteriorating patient condition. A tool for obstetrical patients, known in the United Kingdom, as the Modified Early Obstetric Warning Score (MEOWS) was used in this study.

Clinical inquiry questions.

The clinical inquiry questions included, "Does use of the MEOWS tool equalize RN recognition of a deteriorating patient condition?", "Do the measures of RN confidence improve with the use of the MEOWS tool?", and "Does provider notification by the RN occur sooner with use of the MEOWS tool?"

Population and epidemiology.

The target population of this clinical inquiry project was postpartum RNs working in a tertiary care hospital in the Pacific Northwest.

Sample.

Ten postpartum nurses volunteered to participate. The range in age was 27-51 years (mean age 39 years). Years of experience on the project-site hospital unit ranged from 3-16 years, with a mean of eight years.

Survey Process.

Each RN responded to the same three case studies with and without using the MEOWS tool by indicating (a) whether or not the patient was at risk of a critical event, (b) how confident they were in that assessment, and (c) who they would notify first, second, and third, to escalate care.

Findings.

Use of the MEOWS tool equalized the risk assessments and increased the reported confidence levels of the RNs at the project-site hospital. There was also an increase in the frequency with which the RN would choose to notify the provider first.

Conclusion.

This small study suggests that use of the MEOWS tool equalizes the recognition of a deteriorating patient condition regardless of an RN's experience level, increases the RNs' confidence in their assessments, and leads to more prompt provider notification.