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OB/GYN Rates and Risk of Malpractice:

Considerations for the University of Connecticut Health Center Credentialing Committee

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OB/GYN Rates and Risk of Malpractice:

Considerations for the University of Connecticut Health Center Credentialing Committee

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I. Overview

According to many physicians, there is currently a medical malpractice crisis in the United States that is especially impacting obstetricians (OBs). The rates at which claims are filed against OBs are thought to be extremely high and worsening over time. Additionally, the OB rate of claims is seen as grossly disproportionate relative to other specialties. The corollary of this increased rate of claims for the OBs, in turn, suggests that OBs are at higher risk for malpractice claims. The main goal of this paper is to understand how the local data on OBs compare to national data. Moreover, the local data will be utilized to understand what claim rates should be expected for local OBs. Before the main goal is addressed, however, the paper will review the history of malpractice, the causes and effects of claims among OBs and, finally, the types of reform that have been put into place to address this problem.

II. Literature Review

A. Malpractice History

Medical malpractice litigation has played a significant role in the U.S. court system for almost 200 hundred years. It is thought that malpractice litigation originated in the 1840's as a result of several cultural changes (1). The religious revivals of the 1820's and 1830's led to decreased acceptance of religious fatalism, the idea that physical illness was a result of divine retribution. This coupled with scientific advances led to increased expectations by patients for

more definitive diagnoses and treatments. Secondly, the increased availability of food with the invention of refrigeration, canning, and the steam train improved health consciousness. Moreover, it was evident in approaches such as the Thomsonian system of medicine, where people were able to treat themselves with homeopathic remedies, that a proactive culture of patients was emerging (2).

Societal changes also played an important role in the origination of malpractice litigation. Most influential of the societal shifts was the trend towards marketplace professionalism. Because the U.S. was a young nation with a newly developing society, the professions were open to the general public, both trained and untrained, instead being of controlled by social elites. This created a more open environment in which professionals could compete. However, it also resulted in the virtual absence of professional standards. Parallel to the competitive environment among health practitioners to gain patients was the competitive environment among lawyers to gain clients. It was at this point in American history that malpractice litigation emerged. It was also during the late 1800s that the advent of malpractice insurance was seen.

The "professional standard" adopted by the U.S. courts stemmed from 18th century English common law as set forth in the case of Slater vs. Baker and Stapleton. The now famous book, *Commentaries on the Laws of England* by Sir William Blackstone, was published in 1768 and was first distributed in the U.S. in the early 1800's. These commentaries applied theories of professional misconduct to physicians. Such misconduct was termed as *mala praxis*. The

American word *malpractice* is derived from this term. The interaction of such legal commentaries with the cultural and societal changes mentioned above provided fertile ground in which to grow the doctor, lawyer and patient interconnection.

This case established that the standard of care against which physicians activities would be assessed would be “the usage and law of surgeons” in addition to the rule of the profession as testified to by surgeons themselves (3). The enforcement of this decision resulted in a situation where any physician, whether qualified or not, could testify on behalf of either party. A provision of this decision was that the standard of care would be judged depending on location. This “locality rule” stated that if one doctor did not give you a crutch for a broken leg and no suit was filed against him, then another doctor in the same region could do the same without penalty. Moreover, it also held that physicians working for hospitals could not be held liable because they argued they were merely a cog in the wheel. Further restricting the potential for malpractice litigation was the fact that hospitals were granted immunity from liability because they were deemed “charitable corporations” and thus could not be penalized.

Accountability in the face of a profession that did not operate in a systematic manner was difficult to prove. In the 1800s, the most common forms of medical education involved in the U.S. involved apprenticeship or education through a university or proprietary school system. Although the American Medical Association was pushing for the systemization of medical education, the public consensus, according to Beck’s review, was that people in a free country

had the right to pursue and practice medical care by whatever means were acceptable to them (4). However, by the early 1900's, research had shown the uselessness of things such as bleeding and purging and the efficacy of things such as vaccinations and public sanitation. These points of progress encouraged the public as well as many of medical professionals to follow the systematic and scientific philosophy of medicine.

The reform of medical education would eventually lead to standards of care and accountability. In the United States these reforms were based on the seminal work of Abraham Flexner (5). The Council on Medical Education and the Carnegie Foundation granted Flexner, an educational theorist and schoolmaster, the task of surveying and assessing medical education in hopes of reforming and systematizing it. Flexner surveyed 155 medical schools across the US and Canada to verify whether they were adhering to progressive and scientific principles. In 1910, Flexner reported that very few of these institutions had the financial and human resources necessary to serve such progress. He also concluded that proprietary medical schools were an exploitation of the medical profession that were not geared toward social needs or public health and should thus be shut down. Subsequent to this report, licensing boards forced heightened admission standards and improved curriculums. Shortly thereafter, proprietary schools began shutting down. Additionally, highly regarded medical universities began to see a large influx of philanthropic donations for education and research.

The evolution of medicine via improved medical education and new technology as well as the increased dissemination of knowledge finally forced the issue of accountability. Health practitioners were now expected to receive training continuously. Additionally, national accreditation standards for physicians and institutions were set in concert with the nationally recognized licensing system in the early 20th century. The "locality rule" was slowly adopted as a national standard and applied using national expert testimony. Not only did physicians become more liable, but hospitals became potentially liable as well. As the risk for liability increased, so did the potential recovery of economic and non-economic damages.

The initial surge of malpractice cases in the United States occurred in the mid-to late-1970's. Not only did this directly affect the parties involved, but it also indirectly it affected providers' access to malpractice insurance. The nuances of the malpractice crisis have changed over time. The crisis of 1970's was deemed one of malpractice insurance availability. The increasing number of claims, coupled with skyrocketing settlement amounts, prompted some insurers to move to lower liability risks, astronomically increase their premiums or discontinue providing malpractice insurance all together (6, 7). This volatile environment prompted tort reform.

According to Kinney's review, tort reform of medical malpractice has come through in two generations. The first was in response to the crisis of 1970's. This set of reforms focused on reducing the frequency of litigation by advocating for the providers and insurance companies (8).

The most well known of these tort reforms was MICRA - the Medical Injury Compensation Reform Act. It was enacted in California in 1975 and subsequently passed in many other states. It imposed caps on both economic and non-economic damages. The act also shortened the statute of limitations and regulated the contingency fees of attorneys, making it more difficult and less appealing to file a claim. Interestingly, a study reference by Loh revealed that the number of claims after 1976 was more than double the number of claims filed prior to 1976 (9). However, due to the constant evolution of this act over time, it is difficult to truly understand its effects.

The next medical malpractice crisis in the United States occurred in the mid-1980's. It was estimated that there were claims against 16 out of every 100 physicians with settlement amounts at a median of $400,000 (9). Other data revealed that average malpractice claims payments were $139,900 in 1988 (10). Total national payouts for malpractice claims were reported to be $2.12 billion by 1991. The tort reform that occurred in answer to this crisis, i.e. second generation of tort reform according to Kinney, appeared to advocate more for patients. Such reform included use of medical practice guidelines to set standard of care references in the litigation setting.

The third and current national malpractice crisis started in the mid-1990's. By 2001, average malpractice claim payments had risen to $328,100 and by 2003 total national payouts had risen to $ 4.45 billion (i.e., both had more than doubled). Since 1985, 45 states have passed reforms to limit recoveries in such suits. Furthermore, California continued to take action that initiated a national

trend of amending MICRA in order to control premiums for malpractice insurance (11). Tort reforms developed in response to this wave of crisis will be addressed later in this text in the “Reform” section.

B. Malpractice Patterns in OB/GYN and Other Specialties

Medical specialty is one of the strongest and most well documented determinants of the frequency of malpractice action (12). As referenced in “Medical Professional Liability and the Delivery of Obstetrical Care: Volume II, An Interdisciplinary Review” published in 1989, more than 73% of OB/GYNs had experienced a claim (13). In the 2006 version of a survey of the American College of Obstetricians and Gynecologists (ACOG) fellows, 89% of the respondents reported a history of a suit in their careers (14, 15). Furthermore, these fellows had an average of 2.6 claims each. Interestingly, a 2005 survey of 658 members of the Central Association for Obstetricians and Gynecologists found that they could expect one claim per every 11 years.

Data from the 1970s revealed that one of the specialties at highest risk for a suit was obstetrics/gynecology (OB/GYN). Between 1976 and 1981, 15.5 of every 100 OB/GYN providers incurred a claim, as compared to 6.7 per 100 for all physicians (16). A more recent study conducted by Studdert et al., utilizing data from five insurance companies in four regions of the U.S., showed that OB/GYNs were the most frequently sued specialty and made up 19% of those with claims (17). Among OB/GYNs, costs related to medical malpractice increased four-fold above that of other medical costs from 1975 to 2000 (18).

A study by Taragin et al. focused on potential demographic risk factors for all physicians in the state of New Jersey between 1977 and 1987, with results showing that OB/GYNs had almost eight times the number of claims as the psychiatry reference group (19). Overall, the literature clearly supports the notion that OB/GYNs are generally more prone to litigation in comparison to other specialists.

Surgeons are also thought to be a high-risk specialty not only with regard to the type of patient population treated, but also with regard to risk of claims. A study of orthopedic surgeons surveyed in 2006 revealed that they were sued at twice the rate of physicians as a whole (20). The authors went on to state that there appeared to be a positive linear relationship between the probability of at least one malpractice claim and years in practice. Moreover, the cumulative rate of being sued at least once was 90% for those in practice for more than 30 years. The authors commented that the risk of a claim seemed excessively high in orthopedic surgery compared to other medical specialties.

The ramifications of different levels of malpractice risk in different specialties can further be understood by looking at variation in the levels of malpractice insurance premiums between specialties. Posner calculated that the probability of an error that leads to damages of more than $1 million is approximately 1 per 100,000 hospital patients being treated by physicians in “low risk” specialties such as internal medicine. In contrast in high risk specialties such as obstetrics, the probability of serious claims is approximately 1 per 10,000 pregnancies (7). To compensate for these overtly different levels of risk,

insurance companies charge higher premiums to physicians in the high-risk specialties. For example, in Connecticut, in February of 2003, the Office of Legislative Research reported that the average medical malpractice premium rate was $10,612 for internists, $40,146 for general surgeons and $82,238 for OB/GYNs. Although Connecticut seemed to show the largest discrepancies, the differences between OB/GYNs and the other groups held true throughout eight other states.

Professional liability is, without a doubt, a major concern for practicing OB/GYNs. Other medical specialists and the public may not appreciate the magnitude of the problem for this specialty. It is widely assumed that the longer one is in practice, the greater the cumulative risk of litigation, although there is limited documentation that supports this assumption. Charles et al. studied predictors of risk of malpractice claims and found increasing age to be the strongest predictor of risk for malpractice claims (21). Increasing age correlated with years in practice. In their study on malpractice claims experience among young OB/GYNs providing fertility-control services, Weissman et al. stated that number of years in practice was a significant predictor of risk of lawsuits (22). It is imperative to understand how specialty and time in practice affects the litigation experience for physicians. Such an understanding may allow us to create risk assessment models and thus, in turn, potentially allow us to adopt preventive measures that will reduce risk.

C. Obstetrician Specific Suits: Reasons

Approximately 60% of negligence claims against OB/GYNs relate to events occurring during labor and delivery (23). Although adverse pregnancy outcomes have declined over time, claims filed against OB/GYN providers have increased. The premise of medical malpractice litigation focuses on mistakes of commission or omission. More than a quarter of OB/GYN malpractice cases are due to missed diagnosis of fetal anomalies (24). It is for this reason that lack of antenatal screening and diagnosis often provides a basis for suits alleging wrongful birth or death. Diseases and disorders such as cerebral palsy, Tay Sachs, and cystic fibrosis frequently lead to allegations of wrongful birth on the premise that the patient would have avoided conception or would have chosen to terminate the pregnancy if the appropriate diagnosis had been made.

According to a survey on professional liability conducted by The American College of Obstetricians and Gynecologists in 2006, the most common claim against OB/GYNs was for cases of neurological impairment. These accounted for 30.8% of all claims against OB/GYNs and had an average settlement amount of $1,150,687 (15). Neurological impairment claims commonly include a diagnosis of cerebral palsy. More than half of premiums paid by OB/GYNs cover suits for "birth related" cerebral palsy which implies that oxygen was restricted during the labor and delivery process (25). Cerebral palsy is a serious brain injury that can result from several factors including, but not limited to, lack of oxygen during delivery, exposure to infection, exposure to maternal fever and congenital malformations (26). Even though many factors can cause cerebral

palsy and a large proportion of premiums are dedicated to payouts for “birth related” cerebral palsy cases, studies have found that deprivation of oxygen during labor and delivery only cause a small percent of this neurological disorder (26). Thus, the assumption that providers can always prevent cerebral palsy and other neurological disorders appears to be misinformed.

Electronic fetal monitoring, EFM, is used to monitor the fetal heart rate in utero late in pregnancy and during labor and delivery. Changes in the fetal heart rate have been noted as indications of fetal distress. Historically, these signs of distress have been largely associated with lack of oxygen. This method of monitoring has long been considered standard of care to prevent brain injuries and is commonly referred to in claims of alleged negligence. These claims allege that EFM prevents brain injuries such as those that are evident in cerebral palsy (27). Because EFM is the standard of care, it is commonly thought that utilizing this procedure will protect OB/GYNs from litigation. However, EFM is fraught with controversy with regard to its ability to prevent neurological impairments such as cerebral palsy (28, 29). The incidence of cerebral palsy, 1 per 500 births, has remained relatively unaffected by the use of EFM over time (30). Additionally, the literature states that EFM has been shown to have high false positive rates leading to an increased rate of Cesarean sections (C-sections), which may compound matters. C-sections will be addressed later in this text.

According to the 2006 ACOG survey (15), stillbirth/neonatal deaths were the second leading cause of claims (15.8%). Overall, the rate of stillbirths has dramatically declined by 52% in the U.S. between 1978 and 2000 (31, 32).

However, early stillbirths, fetal deaths occurring between 20 and 27 weeks of gestation, have remained virtually unchanged in the U.S. (33). As of 2003, the rate in the U.S. was 6.2 stillbirths per every 1,000 live births (34). There are several causes of this devastating outcome, making it even more of a challenge to prevent.

Shoulder dystocia (entrapment) with brachial plexus nerve injury was the third leading basis for claims (15.7%) against the physicians surveyed by ACOG in 2006. Other data supports its importance as well (35). The incidence of shoulder dystocia at birth is thought to be between 0.6% and 9.0%, with variations related to birth weights (36). Between 4% and15% of these cases result in brachial plexus palsies of which approximately 90% resolve within 12 months. Baxely et al also stated that maternal hemorrhaging and uterine rupture are adverse events associated with shoulder dystocia. According to the 2003 ACOG practice bulletin, the main cause of shoulder dystocia is thought to be birth assisted by forceps or vacuum mechanisms (37). The committee charged with creating this bulletin also notes that that there are several risk factors and that it is a difficult event to predict, even for experienced OB/GYNs.

D. Obstetric Specific Effects of Malpractice

Increasing litigation against obstetricians has adversely affected the specialty and its patients. A 2004 ACOG news release identified 23 “Red Alert” states which were in danger of losing physicians who perform deliveries due to medical liability insurance (38). Among them was Connecticut, which was

considered as being on the verge of a crisis. The concern was an imminent departure of malpractice insurance carriers from the state and a resulting departure of OB/GYN providers. The high expense of liability insurance or its unavailability has forced 70% of OB/GYNs to alter their practice patterns (22). More specifically, 28.5% have increased the number of Cesarean sections they performed, 25.6% decreased their care of high-risk patients and 7.2% stopped delivering babies altogether. Many of these (65%) have also made other changes to control their risk of litigation. More than 7% have stopped practicing obstetrics altogether because of either insurance affordability, availability issues or the risk of being sued (15).

In the United States, approximately 500,000 women are without obstetric care in rural areas (39). It should be further noted that those still providing obstetrical care are family practitioners, not obstetricians, and therefore typically do not treat high-risk pregnancies. Infant mortality is significantly higher in rural areas of the western and southern regions of the U.S. (40). Moreover, a literature review by Peck and Alexander showed that babies born in these areas had lower birth weights, shorter gestational periods, lower APGAR scores and longer hospital stays associated with higher costs (41). A reduction of OB/GYN providers and their services more severely affects already struggling rural areas (39).

An additional adverse effect of the increase in litigation has been the practice of “defensive medicine” which means that providers practice in such a

way as to avoid malpractice claims. It has been estimated that defensive medicine costs society approximately $80 billion per year in the U.S. (18). A survey of Pennsylvania physicians in high-risk specialties showed that 93% of them practiced defensively (42). These high-risk specialties included OB/GYN, general surgery, neurosurgery, and radiology. Thirty-two percent of obstetricians were more likely to practice "assurance" defensive behavior such as referring for additional consults and ordering more tests than deemed necessary. Twenty percent of obstetricians were more likely to practice "avoidant" defensive behavior in which a provider reduces or discontinues treatment or procedures. Forty-six percent of obstetricians in this study said they had or would stop practicing obstetrics within the next two years.

Another trend that demonstrates the wide prevalence of defensive practice among obstetricians is the increase in birth by Cesarean section (C-section). In 1965 the rate of C-sections was approximately 4%. By 1988, it had increased to 25% (43). The current Cesarean section rate in the U.S. is predicted to reach 33% (44). There is an abundance of data supporting the common belief that the dramatic increase in the number of Cesarean deliveries is merely another form of defensive medicine at work (45-48). Furthermore, although the C-section procedure has become much safer over the years, the true cost and risk of morbidity and mortality associated with it are appreciably higher in comparison to vaginal deliveries (49).

Many studies have observed an increase in adverse outcomes concomitant with the increase in Cesarean delivery. Thus, defensive practice may actually increase the risk of litigation. In a prospective survey of over 18,000 deliveries in Norway, Kolas et al. found that planned Cesarean deliveries doubled both the rate of transfer to the neonatal intensive care unit and the risk for pulmonary disorders, compared with a planned vaginal delivery (50). A Canadian, retrospective, population-based cohort study revealed that those in the planned Cesarean delivery group had an increased risk of cardiac arrest, wound hematoma, hysterectomy, major puerperal infection, venous thromboembolism, and hemorrhage requiring hysterectomy, and longer hospital stays than those in the planned vaginal delivery group (51).

A prospective cohort study, utilizing the 2005 WHO global survey on maternal and perinatal health, concluded that C-sections were associated with increased risk of severe maternal and neonatal morbidity and mortality in cephalic presentations (52). In a review of the literature, Miesnik et al. discussed a study in which Macdorman et al. (2006) analyzed nationally linked birth and infant death data for the 1998 to 2001 birth cohorts to examine infant mortality based on mode of delivery in low-risk mothers (53). The data revealed significantly higher rates of neonatal mortality for medically elective Cesarean delivery than for vaginal birth.

E. Malpractice Reform

1. Overview of the Need and Potential for Reform

The malpractice crisis waves of the 70s and 80s were each answered with approaches to reforms that ranged from the hospital room to the courtroom (6, 7, 54, 55). In the current crisis of increasing malpractice insurance premiums, many physicians are once again calling for reform (54). The Associated Press reported on March 17, 2009 that the president of the American Medical Association, Nancy H. Nielsen, has spoken directly to the Obama Administration health advisor Ezekiel Emanuel to emphasize the urgency of this issue (56). It is clear, according to the article, that the Obama administration will be scrutinizing the nation's medical malpractice system.

2. Reform at the Societal Level

The Health Care Quality Improvement Act of 1986, as amended in 1998, was an act in which Congress acknowledged the increase in medical malpractice litigation and the need for quality control (57). This legislation led to the creation of the National Practitioner Data Bank (NPDB). The goal of this database is to improve the quality of health care utilizing a system that identifies practitioners who have been served with malpractice suits and leads to comprehensive review of their professional credentials. Additionally, the NPDB restricts those who have been disciplined in one state from practicing in another state without full disclosure of their claims history.

The Help Efficient, Accessible, Low-cost, Timely Healthcare Act of 2007 (H.R. 2580) was proposed to improve patient access to health care services and to provide improved medical care by reducing the excessive burden that the liability system places on health care delivery system. It never became law. More recently, on February 13, 2009, a similar act was introduced in Congress. The Help Efficient, Accessible, Low-cost, Timely Healthcare Act of 2009 (H.R. 1086) proposes a statute of limitations of three years after the manifestation of the injury or one year after the injury is discovered. The act also limits non-economic damages, such as those for pain and suffering, to $250,000. If passed, the act would limit attorney contingency fees, similar to Connecticut's current laws (58). Finally, the act proposes to limit punitive damages which are awarded to punish a defendant and which deter defendants and others from committing similar punishable behaviors.

As noted above, C-sections have been associated with poor outcomes and thus potentially with increased litigation. In response, recent programs have aimed towards reducing unnecessary interventions (59). As Demott and Sandmire state in their letter to the editor in *The New England Journal of Medicine*, "the ultimate intervention is Cesarean delivery" thus, learning to improve obstetrical care leads to lower rates of Cesarean delivery as a secondary effect.

The creation of public health policy may also assist in reducing litigation. It is no surprise that one of the main objectives of Healthy People 2010 is to

reduce the rates of C-section among low risk women (43). In addition to setting the goal to reduce C-sections among primary pregnancies, Healthy People 2010 is proposing a reduction in the rate of repeat C-sections.

3. Reform at the Professional Level

The publication of *To Err is Human* by the Institute of Medicine in 1999 brought to the forefront the need to discuss and confront error-related injuries in healthcare (60). One of the major accomplishments stemming from such discussions was agreement on the recommendation to improve medical education. More specifically, the Institute of Medicine suggested creating interdisciplinary training teams that utilize methods such as simulation. Although simulation exercises have been used in professions such as aviation for many decades, it has only been utilized by the medical profession in the past 10 years.

Grevnik et al. describe two full-scale simulators that offer practice in critical events in obstetrics: METI, which is provided by Medical Education Technologies, Sarasota, Florida, and SimMan, manufactured by Laerdal Medical in Stavanger, Norway (61). The authors state that simulation has several advantages over traditional medical training. These potential advantages include the creation of rare teaching opportunities, provision of safe environments where procedures could be repeated while feedback is provided, and the potential to lower costs inclusive of those associated with malpractice. A new simulation based team training approach recently tailored for obstetrical care has been created by the Controlled Risk Insurance Company (CRICO) and the Risk Management Foundation (RMF) of the Harvard Medical Institutions (62). This

novel training approach had much success in the field of anesthesiology, showing a significant decrease of malpractice litigation (63). This decrease was so pronounced that the insurance provider, who originally discounted malpractice premiums for those participating by 6%, increased the discount to 19%. A study by Goffman et al. in 2008 showed that simulation exercises in shoulder dystocia, a major cause of litigation, helped in significantly improving documentation (64). It should be noted that documentation is a main source of evidence in malpractice litigation and is paramount in directing the course of litigation (65).

Other forms of medical education may also serve to reduce risk of litigation. The increase in medical education and its association with litigation was studied by Nesbitt et al. (66). A 10-year risk management study was conducted among 194 family physicians providing obstetric care in 32,831 births. The study consisted of increased continuing medical education through seminars and monitored adherence to practice guidelines. Results of the study reported only five closed claims and one with a settlement. Adherence to clinical guidelines is also a likely effective approach to reduce risk of poor outcomes for mother and baby as well as to reduce risk for litigation for OB/GYN providers. In a retrospective case-control study of 290 delivery-related malpractice cases and 262 control deliveries, non-compliance with a guideline was associated with an almost six-fold increase in the odds of a malpractice claim (67). Among those who did not adhere to guidelines, 80% of the suits were directly related to lack of adherence. It was noted, however, that the appropriateness of departure from

said guidelines was not assessed. Nevertheless, the study, which spanned a decade, gave credibility to the argument for adherence.

A departure from the ACOG guidelines in practicing C-sections can be seen in the fact that this procedure is more commonly performed as a practice of defensive medicine as opposed to being done due to indication. Indeed, it appears that C-section rates have increased in response to the increased risk of litigation. However, as noted above, several studies have also found C-sections to be associated with increased adverse birth outcomes, thus likely further increasing the risk for litigation.

Another ACOG guideline where non-compliance has been documented is the recommendation for intrauterine resuscitation prior to C-section in the case of fetal distress seen through fetal heart rate abnormalities (68). A review of the literature done by Chauhan et al. attempted to assess compliance with this guideline (69). The study revealed that compliance with the guideline, although difficult to assess, was not commonplace. The study went on to suggest potential reasons for lack of adherence. The first was the ACOG statement, "This …does not define a standard of care, nor is it intended to dictate an exclusive course of management", which may be seen as a deterrent to adherence. Other potential reasons for lack of adherence stated were lack of randomized clinical trials to support the guideline and poor readability of the practice bulletin outlining the guideline.

4. Reform at the Healthcare Organization Level

A milestone of healthcare organization reform was seen in the suggestions of the executive summary of *To Err is Human*. This summary discussed the need to improve communication in order to improve patient safety and to reduce error-related injuries (70). In a commentary published in ACOG in 2006, Pearlman suggested four areas of safety in which OB/GYNs would benefit from specified strategies. The first suggestion is to develop reliable and reproducible quality control measures and a system to track them. Efforts on this front within other high risk specialties, specifically anesthesiologists and surgeons, have led to improved outcomes and reduced liability costs (71). To date, it is not known that a national implementation of such a system exists for obstetricians, although many institutions have implemented their own systems.

Secondly, Pearlman cited the need for a better understanding of the important safety and liability areas utilizing closed claim reviews. Another approach suggested by Pearlman is to work prospectively with pharmaceutical and surgical device manufacturers to develop innovative new products that would increase the likelihood of safe outcomes. It is not well understood to what degree this is already occurring and what, if any, affects such relationships have had on patient safety and reduced litigation. The final approach suggested by Pearlman is to create a culture of safety in obstetrics and gynecology by incorporating safety education into all levels of training. Recently, systems-based practices and practiced-based learning have become part of the

evaluation process of all approved training programs by the Accreditation Council for Graduate Medical Education.

5. Reform in the Relationships between Providers and Patients

Provider- patient communication and its role in frequency of claims has been gaining recent attention. Informing the patient of risks up front and of potential adverse events is critical. Open communication between provider and patient can deter misperceptions by the patient and thus lead to different expectations. Such a change could potentially improve patient-provider relationships, especially in the obstetric setting. In a retrospective longitudinal cohort study, lawsuits were positively correlated with patient complaints (12). Another study by Hickson et al. found that, out of 127 obstetric patients where the result was death or permanent injuries leading to a claim, 70% reported the reason for filing was that the physician did not warn about long-term neurodevelopmental problems (71).

Evidence of the impact of physician-patient communication on the frequency of litigation has prompted studies on how to improve it. Research has shown that specific and teachable communication behaviors are associated with fewer malpractice claims for primary care physicians (72). Communication behaviors associated with lower claims included educating patients about what to expect, soliciting patient's opinions, checking patient understanding, and encouraging patients to talk. In a paper on physician practice behavior and litigation risk, Hickson refers to two specific methods that may reduce litigation for

physicians (73). The first approach is the “ask/tell/ask” method in which the physician asks the patient if he or she has any questions, answers the question, and then asks the patient if there are any more questions. This type approach to communication has been seen as effective in the ambulatory setting (74). It is recommended that the “ask/tell/ask” approach be followed until all the patient’s questions have been answered. If the physician does not know the answer, the article recommends that he/she be honest with the patient, ensure the patient he/she will get an answer and commit to a time when he/she will provide that answer.

The second approach referred to in Hickson was the “teach back” process. This process of interactive communication was found to improve health literacy among low health literacy patients with diabetes (75). The method entails having the physician provide information or explain a concept to the patient and then, in turn, ask the patient to recall and reiterate the information or concept. The author states that it is imperative that the physician be patient and respectful during this process as potential obstacles may arise when introducing medical terminology.

III. Introduction to Research Study

We are currently experiencing a third wave of a malpractice crisis characterized by an increase in litigation as well as by the lack of affordability and availability of malpractice insurance. Strong evidence exists showing that, ultimately, this crisis adversely affects patients' access to care. Although many OB/GYNs practice defensively by over-utilizing interventions such as C-sections, the frequency of malpractice claims continues to increase. Tort reforms, to date, have not greatly alleviated the negative impact of the crisis. These negative impacts are of notable concern to public health professionals.

The remainder of this paper will focus on the malpractice situation for local OB/GYNs, specifically those who practice at the University of Connecticut Health Center. To begin, it is imperative to know how the frequency of malpractice claims against OBs at the UConn Health Center compares to the frequency of claims against OBs nationally. Furthermore, it is important to know how OBs compare to other specialties on the local level. Finally, knowing the frequency of claims as relative to time in practice for those who currently have affiliations with the UConn Health Center could potentially allow us to set expectations for future OBs.

Hospital credentialing committees are typically the gatekeepers of affiliation. At the University of Connecticut Health Center, medical staff credentialing is done by the Board of Directors with assistance from the Clinical Affairs Subcommittee. These groups are comprised of physicians from a variety of specialties. The University of Connecticut Health Center's credentialing

committee ensures quality care, treatment, and services by reviewing pertinent information related to several factors of the applicant's career.

The factors reviewed in this process are licensure, history of disciplinary action and registration of controlled substance with federal and state agencies. Education, training, experience, board certification, and clinical competence are all considered as well. Other factors taken into account for credentialing include hospital affiliations, work history and government sanctions against the applicants. Finally, in addition to the above-mentioned, malpractice coverage and malpractice claims history is reviewed. Applicants with a history of a claim are considered to have a "gray mark" and are then discussed at length among committee members prior to being granted credentials and privileges.

As stated in the John Dempsey Hospital Medical Staff Services Policy and Procedure Manual, the credentialing committee is firmly committed to a non-discriminatory process of granting credentials and privileges. However, it is not well understood if the processes by which malpractice claims are reviewed consider that different specialties experience different malpractice rates. Furthermore, it is not clear if the historical artifact of time and the changing malpractice environment is taken into account when reviewing an applicant's malpractice claims history. Of specific interest here, is the experience of obstetricians due to the common assumption that they experience a very high rate of claims.

The aim of this research is to describe the pattern of malpractice claims experience among obstetricians who are granted credentials at the University of

Connecticut Health Center. Secondly, this work attempts to determine how the pattern may have changed over time and how the pattern differs from those of other specialties. The final aim of this study is to provide the credentialing committee a mechanism by which it can estimate the expected number of claims for any applicant who is an obstetrician. The two former aims will assist the committee in understanding temporal patterns for obstetricians and how they differ from other specialties. The latter aim will provide the committee with a standard by which it can judge whether the claims experience of any individual obstetrician is in line with the usual pattern. This standard will allow committee members to see whether an obstetrician has a relatively excessive number of claims relative to the length of his/her practice.

We plan to accomplish these aims by answering the following questions:

1. What is the mean number of claims per year of practice among OBs?

1a. Does the mean number of claims among OBs vary by year of graduation?

1b. Does the mean number of claims vary from other specialties?

1c. Is variation in the mean number of claims by year of graduation among OBs different from what occurred in other specialties?

Knowing the mean number of claims per year of practice among obstetricians will allow us to develop an overall rate of claims per year, thus providing us with a better understanding of the general experience of obstetricians. By further looking at the claim rates among obstetricians and how they vary by year of

graduation category, we will better understand the potential impact of the changing malpractice milieu throughout time. This will also allow us to develop estimates and probabilities of claims for future applicants. Comparing the rates of obstetricians to other specialties will give us a broad sense of whether or not the experience of obstetricians is unique. Finally, evaluating any variation of rates by year of graduation categories among obstetricians, and comparing these to potential variations among other specialties, will provide a more comprehensive look at how the experience of obstetricians may differ.

2. What is the mean number of claims among OBs in the first 10 years of practice?

2a. Does the mean number among OBs vary by year of graduation?

2b. Does the mean number among OBs differ from what occurs in other specialties?

2c. Is variation in the mean number of claims by year of graduation among OBs different from what occurred in other specialties?

These questions limit the analyses addressed in Question 1 to the first 10 years of practice. However, this will make exposure (i.e., time in practice) constant for all physicians. It furthers the aims of this project by providing us with results that are unlikely to be affected by the correlation between year of graduation and time in practice, therefore enabling us to discern what differences exist for obstetricians regarding the number of suits in the first 10 years of practice.

3. What is the distribution of time to first malpractice claim among OBs?

3a. Does the distribution of time to first claim among OBs vary by year of graduation?

3b. Does the distribution of time to first claim among OBs differ from that found in other specialties?

3c. Is variation in the distribution of time to first claim by year of graduation among OBs different from what occurred in other specialties?

Again, these questions are similar to those of Question 1. However, by analyzing the distribution of time to first malpractice, we can gain additional insight into what the true experience for obstetricians is.

4. Is it possible to estimate the expected number of malpractice claims for an OB applying for credentials at UCHC based on year of graduation and years in practice?

We believe that providing answers to these questions may help the credentialing committee at UCHC to (1) put into proper context the malpractice experiences of OBs who apply for credentials and (2) determine more objectively whether the malpractice experience of an individual OB is consistent with what would normally be expected based on year of graduation as well as time in practice.

IV. Study Design and Methods

A. Available Data:

A historical cohort study of physicians applying for credentialing between December 21, 2005 and January 22, 2007 at the University of Connecticut Health Center was conducted. Data on applicants collected by the Medical Staff Services department were analyzed to investigate the rates and risks of malpractice claims within and between specialties by year of graduation category, as defined below. Information on malpractice claims history, closed or settled cases, was obtained by the credentialing committee via queries of the national practitioner databank at www.npdb-hipd.com. Additionally, all companies that had afforded malpractice coverage to the physician within the past five years were contacted for claims history. If the committee was unable to obtain a response from the insurance company after three attempts, the physician was informed that the application could not be completed until this information was obtained. Furthermore, if a query response showed information other than that indicated by the physician, the physician was contacted for written clarification. Those with pending suits, as obtained via applicant report, were also included in the database.

A malpractice claim was defined as any litigation brought forth regardless of outcome status. The dependent variable was defined as the number of claims. Exposure was defined as the time between date of graduation and date of application for credentialing. The second dependent variable was defined as the number of claims in the first ten years of practice for those who were exposed

for at least 10 years. The third dependent variable was defined as years from the date of graduation to the date of their first claim. For those who did not have a claim, this variable represented years from graduation to date of application for credentials.

The predictor variable of specialty, also referred to as group in this text, was broken down into obstetrician (OB), surgical (SURG), and medical (MED). The OB group, which was used as a reference group in the regression analyses, was comprised of obstetricians as well as gynecologists. The SURG group consisted of general surgery, orthopedic surgery, urology, ophthalmology, otolaryngology, neurological surgery, plastic surgery, thoracic surgery, oral and maxillofacial surgery and colorectal surgery. The MED group was comprised of internal medicine, family practice, psychiatry, emergency medicine, dermatology, neurology, pathology, anatomy, nuclear medicine, physical medicine / rehabilitation and occupational medicine.

The second predictor variable was year of graduation category, which was divided into three cohorts: 1945-79, 1980-89, and 1990-2006. These categories were created in such a manner as to attempt to reflect the three “waves” of malpractice, as referenced in the literature review portion of this paper. Due to small cell numbers, those that graduated between 1945 and 1969 were collapsed with the 1970 to 1979 category. Both the 1945-79 and the 1980-89 groups were used as reference groups to understand changes in risk over time. In this text these categories are also often referred to as first (the reference group), middle and last.

B. Statistical Methods:

All statistical analyses were performed using SPSS 16.0 for Windows.

Question 1. Poisson regression using years since graduation as a length of exposure variable.

Poisson regression was done to address Question 1 and its subparts. Exposure time was considered as the time from graduation to time a physician applied for credentials. The natural log of exposure was used as an offset variable in the regression analysis to account for the fact the physicians in practice for longer periods of time have had a greater opportunity to experience a malpractice claim than physicians in practice for shorter periods. An interaction variable was created and introduced into the regression to assess how specialty modified the temporal changes in claims relative to year of graduation. Using the OB group as a reference, relative risks, and 95% confidence intervals were calculated for all subparts of Question 1.

Question 2. Poisson regression without an exposure variable.

The exposure time variable was not included in this regression analysis. Rather, in order to eliminate the likely correlation between exposure time and year of graduation, analysis of the mean number of claims among the OB group in the first ten years of practice was limited to those who had at least ten years of exposure. All of the above-mentioned analyses for Aim 1 were repeated for Aim 2.

Question 3. Survival analysis using Kaplan-Meier plots and the log-rank test.

Distribution of time to first malpractice claim among the OB group was assessed using Kaplan-Meier plots. A test of equality of survival distributions (time to first claim) was done for the different year of graduation categories using log-rank tests. This approach was also utilized to determine whether any evidence of dissimilarities existed between the distribution in the OB group as compared to the SURG and MED groups. Kaplan-Meier plots and Cox proportional hazards regression were used further to investigate whether the trend of malpractice claims, for all year of graduation categories, differed for the OB group as compared to the other specialties.

Question 4: Matrix of rates developed utilizing Poisson regression results from Question 1.

A matrix of rates by year of graduation category for the OB group was created to assist the credentialing committee in estimating the expected number of malpractice claims for future applicants. The rates are based on the one-year rates that resulted from the Poisson regression in Questions 1 and 2.

V. Results

Table 1 provides descriptive information on the population represented by this database. The database included information on 1,064 physicians among whom 12% were OB/GYN; 28%, surgical; 43%, medical; 5%, anesthesiologists; 5%, radiologists and 7%, pediatricians/other. Because counts were small for the

anesthesiologists, radiologists, pediatricians/ other groups, these data were not used for comparison purposes. From this point forward, the three comparison groups will be referred to as OB, SURG, and MED.

Among the 875 OB, SURG and MED physicians applying for credentialing between December 2005 and January 2007, 185 (21.1%) had had a malpractice claim filed against them (Table 2). Of the 185, the OB group accounted for 23.2% of the claims, the SURG group for 45.4%, and the MED group for 31.4%. Within the OB group, 34.7% had experienced at least one claim. Among the SURG group, 28.6% experienced one or more claims. Finally, among the MED group, 12.7% had experienced a claim. Chi-square analyses comparing the proportions who experienced a claim between all three groups revealed significant differences between them with a p-value less than 0.001. Further analyses showed a significant difference between the OB and MED groups but not the OB and SURG groups ($p<0.001$ and $p=0.22$, respectively). Of the OB group, 16.1% had multiple claims filed against them, compared to 13% of the SURG group and 2.9% of the MED group with multiple claims (Table 3). Chi-square analyses comparing these proportions between all three groups with multiple claims revealed significant differences ($p<0.001$). Further analyses showed a significant difference between the OB and MED groups but not the OB and SURG groups ($p<0.001$ and $p=0.39$).

However, these chi-square comparisons between specialties did not account for differences in length of practice. Due to the fact that more time in practice implies greater time at risk and a higher expected number of claims,

analyses that consider length of practice will likely prove to be of more utility. It should also be noted that year of graduation was not considered in the chi-square analyses. Further investigation with consideration of this variable may reflect the historical effect of varying trends in malpractice claims.

A. Question 1:

The OB group experienced a total of 71 malpractice claims over 2596.43 person-years of practice. This equated to a rate of claims of 0.028 per year with a 95% confidence interval (CI) of 0.022 - 0.035 (Table 4). Another way to interpret, this is that for any given year of exposure, 2.8% of OBs in this population had a claim filed against them. The CI allows us to assert with 95% assurance that the percentage of OBs who had experienced a claim ranges between 2.2 and 3.5% for any given year of practice. Similarly, for any given 10 years of practice, approximately 28% of the OBs, ranging from 22 to 35%, had a claim filed against them. By 20 years of exposure, we can expect that 56% of this population would have had a claim filed against them with a range of 44 to 70%. By using the “number needed to treat” method, dividing the rate by its reciprocal, one can also interpret this data as the expected number of years between each claim. The expected number of years to the first claim and between each subsequent claim for OBs was 35.71, meaning that one claim was experienced approximately every 36 years of practice.

Analysis by year of graduation category showed that the 1-year rate for the OBs who graduated between 1945 and 1979 was 0.014 with a 95% CI of 0.009 to 0.023 (Table 5). In other words, for any one year of practice, it could be

expected that 1.4% had a claim filed against them, with a range between 0.90 and 2.3%. For any given 10 years of practice in this graduating category of OBs, one could expect 14% of them to have had a claim. The expected number of years to the first claim, and between subsequent claims, was approximately 71 years.

In comparison, for any given 10 years of practice among the OBs in the 1980-1989 graduation category, 39% (95% CI: 28 - 54%) had a history of at least one claim. The relative risk (RR) for this category as compared to the 1945-1979 category was 2.78 (p=0.00, 95% CI: 1.54 - 5.02). Thus, OBs in the 1980-1989 graduation category had a 178% higher risk for a claim than those in the 1945-1979 category. It should be noted that the range of the increased risk varied from 54% to 402%. This category had approximately 26 years between each claim.

For any given 10 years, 42% (95% CI: 27 – 66%) of the 1990-2006 graduating category of OBs were likely to have a claim filed against them. This category was over 200% (RR=3.04, p=0.00, 95% CI: 1.57 – 5.92) more likely to have had a claim filed than the 1945-1979 cohort of OBs. It is worth noting that the range of this relative risk could potentially have varied from a 57% to 492%. A comparison of the 1990-2006 category to the 1980-1989 category revealed a relative risk of 1.09 (p=0.75, 95% CI: 0.63 – 1.91). However, the range varied so much so as to potentially reduce the risk of a claim by 37% or to increase the risk by 91% and therefore was not statistically significant. In this category, the expected time between claims was 24 years.

In comparison to the overall proportion of OBs having a claim filed in any given 10 years of practice, 28% as noted above and again in Table 6, the Poisson regression revealed that during any given 10 years, 21% of the SURG group was likely to have had a claim (95% CI: 18 – 25%). However, when the SURG group was compared to the OB group the relative risk was 0.76 (p=0.06, 95% CI: 0.58 – 1.01) and therefore was not statistically significantly different. The expected number of years to first claim and between all subsequent claims for the SURG group was roughly 47 years. The MED group had a rate of 0.007 claims per year, meaning that 0.7% of them have had a claim in any given 10 years, with a 95% CI of 6 to 9% compared to the OBs. The relative risk was 0.26 (p<0.001, 95% CI: 0.19 – 0.36). This means that physicians in the MED group were 64% less likely to have had a claim than the OBs. The MED group experienced one claim about every 139 years of practice.

Analysis by year of graduation category for the SURG group showed that the one year rate for those who graduated between 1945 and 1979 was 0.017 (Table 7). The 10-year rate was therefore 0.170 with a 95% CI of 0.130 to 0.210. The 10-year rate for the 1980-1989 category was 0.286 (95% CI: 0.225 - 0.364). For the 1990-2006 category the 10-year rate was 0.259 (95% CI: 0.165 - 0.405). The corresponding relative risks for the middle and last categories were 1.72 and 1.56 respectively (p=0.00, 95% CI: 1.23 – 2.41 and p=0.09, 95% CI: 0.94 – 2.58, respectively). Although the middle category was significantly different from the reference category of 1945-1979, the last category was not. Comparing the last group to the middle category also did not yield a significant difference (p=0.70).

For the MED group among the 1945-79 graduating category, the 10-year rate was 0.059 with a 95% CI of 0.042 to 0.083. The 1980-1989 graduation category experienced a 10-year rate of 0.104 (95% CI: 0.076 - 0.145). Finally, the 1990-2006 category had a 10-year rate of 0.047 with a 95% CI of 0.021 to 0.104 The relative risks, using the 1945-1979 category as a reference, were 1.76 and 0.80 respectively (p=0.02, 95% CI 1.10 – 2.84 and p=0.60, 95% CI: 0.33 – 1.89, respectively). While the risk for the middle category significantly increased by approximately 76% above the first category, no statistical significance was found between the last and first categories. Analyzing the difference between the 1990-2006 and 1980-1989 categories resulted in no significant differences (p=0.07).

The rate of claims for the OB group appears to be increasing over time while the rates for the SURG and MED groups appear to be decreasing. Using an interaction variable in the Poisson regression to assess if specialty changed the temporal variations in claims relative to year of graduation, there was a non-significant global p-value of 0.18.

B. Question 2:

The general aim of this question was to describe the mean number of claims among OBs in the first 10 years of practice. These data were limited to those with at least 10 years of exposure. It should be noted that, although in answering Question 1 we often referred to 10-year rates, Question 2 differs in that it focuses on the malpractice experience in the *first* 10 years of practice

versus *any given* 10 years. Additionally, in contrast to rates noted in Question 1, the rates referred to in Question 2 do not rely on exposure time due to the fact that it is constant for everyone and thus should not be affected by any correlation between year of graduation and time in practice.

Overall, the OBs experienced a malpractice claim rate of 0.250 (95% CI: 0.172 - 0.365) for their first 10 years in practice. Thus, roughly 25% of OBs had a claimed filed against them in their first 10 years of practice. Further analyses by year of graduation category revealed that no OBs had a claim filed during their first 10 years in the 1945-1979 graduating category (Table 8). Roughly 23% of the 1980-1989 graduating category had a claim filed in their first 10 years while approximately 61% of the 1990-2006 graduating category had experienced a claim in their first 10 years of practice (95% CI: 16 - 33%, 95% CI: 38 - 98%). Due to the fact no claims were filed in the first 10 years for the reference group, relative risks were not able to be calculated. However, a comparison of the latter and middle categories revealed a significant increase in risk of about 167% (RR=2.67, p=0.00, 95% CI 1.22 – 5.84).

Compared to the overall rate among the OBs of 0.250, the SURG and MED groups experienced an overall rate of 0.086 and 0.030 of claims within their first 10 years of practice (95% CI: 0.058 - 0.129, 95% CI: 0.017 - 0.129) (Table 9). Both the SURG and MED group showed significant reduction of risk of having a claim filed within the first 10 years relative to the OBs (RR=0.34, p<0.001, 95% CI: 0.20 - 0.60 and RR=0.12, p<0.001, 95% CI: 0.06 - 0.24).

Within group analyses for the SURG group by year of graduation category showed a rate of 0.008 for the 1945-1979 category with a 95% CI of 0.001 to 0.058 (Table 10). The subsequent year of graduation categories revealed rates within the first 10 years of practice of approximately 0.065 and 0.334 respectively (95% CI: 0.031 - 0.136, 95% CI: 0.204 - 0.544). The relative risks were 7.91 and 40.72 ($p=0.05$, 95% CI: 0.97 - 64.26 and $p<0.001$, 95% CI: 5.39 - 306.73, respectively), thus showing no statistical significance between the middle and first graduating categories but a significant increase for the last category when compared to the first. A comparison of the latter two graduating categories did show a relative increased risk for the 1990-2006 group (RR=5.15, $p<0.001$, 95% CI: 2.12 - 12.50).

The 1945-1979 category of the MED group experienced a rate of 0.012 (95% CI: 0.003 - 0.050), meaning only about 1% of them had a claim in the first ten years, while the 1980-1989 category had a rate of 0.037 (95% CI: 0.016 - 0.081). The 1990-2006 category had a rate of 0.057 with a 95% CI of 0.022 - 0.152). The relative risks using the 1945-1979 category as a reference were about 2.93 and 4.58 respectively ($p=0.19$, 95% CI: 0.59 - 14.40, $p=0.08$, 95% CI: 0.08 - 24.96); thus, no significant differences were found between these categories. A comparison between the 1990-2006 category and the 1980-1989 category also did not show significant differences in risk of a claim for the first 10 years (RR 1.56, $p=0.49$, 95% CI: 0.44 – 5.53).

Analysis utilizing the interaction variable of specialty and year of graduation category was conducted to determine whether the trends in the rate

of claims within the first 10 years of malpractice differed among specialties. The results showed a global p-value of 0.39 for the interaction variable, indicating that changes over time among the MED and SURG groups do not differ significantly from the temporal changes in the OB group. However, it should be noted that these results are questionable due to the fact that no claims were filed against the OBs in the 1945-1979 year of graduation category. Additionally, it is possible that no difference was detected due to lack of power.

C. Question 3:

This question looks at time to first claim. Unlike Question 2, Question 3 was *not* limited to those with at least 10 years of exposure. This approach allows us to determine percentages of those who experienced their first claims with lesser or greater amounts of exposure. Therefore, it gives a broader sense of what the experience was for all applicants.

Using the Kaplan-Meier method, overall, the analysis showed that 15% of the OBs experienced their first malpractice claim within their first 10 years and approximately 32% had experienced their first claim by 20 years, as noted in Figure 1. More specifically, no OBs in the 1945-1979 category had a claim by their first 10 years and only 8% had a claim filed within their first 20 years (Figure 2). Among the 1980-1989 category, 16% and 42% had a claim filed within the first 10 and 20 years of practice, respectively. For the 1990-2006 category, 29% saw their first claim within 10 years of graduation and 47% saw their first claim within 15 years after graduation. Twenty-year rates were not reported for the

1990-2006 category as no one in this category had reached the 20 year mark at the time this data was analyzed. With the use of the log ranks test, statistical significance was found when comparing the first graduating category with the middle category ($p=0.001$). Comparing the first category to last category was also found to be significant ($p<0.001$). The comparison between the middle and last category did not yield significant results ($p=0.12$). It is plausible however, that significance was not seen due to lack of power.

While the Kaplan-Meier plots demonstrated that, overall, 15% of the OBs had a claim within their first 10 years, they also showed that only 7% of SURG and 3% of the MED groups had their first claim within this time frame (Figure 3). Twenty-year percentages for the latter two groups were 22% and 10%. A global comparison showed significance ($p<0.001$) and pairwise comparison revealed significant differences between both SURG and MED relative to the OB group ($p=0.01$ and $p<0.001$ respectively).

Within group analyses by year of graduation category for the SURG group showed that 2%, 7% and 21% of the first, middle, and last categories experienced a claim within their first 10 years (Figure 4). The global comparison of these categories was significant ($p<0.001$). The global comparisons showed significant differences between the first and middle graduation category as well as between the first and last graduation category ($p<0.001$ for both). There was no significant difference found between the middle and last category ($p=0.11$).

For the MED group, the within group analyses revealed that 1%, 4% and 4% had a claim in the first 10 years for the first, middle and last year of

graduation categories (Figure 5). The pooled comparison showed significance with a log rank p-value of 0.001. Pairwise analyses showed significant differences between the first year of graduation category and the middle category (p=0.001). A difference was also seen between the first and last year of graduation category (p=0.04). No significant difference was seen between the latter two graduation categories.

Using Cox regression, an interaction variable was created to determine whether variations in the distributions of time to first claim by year of graduation category were different between specialties. Results showed that the variation in distribution among OBs was not significantly different from what occurred in other specialties (p=0.35).

D. Question 4:

Based on rates derived in Questions 1 and 2, a matrix of expected number of claims was calculated for each graduation category within the OB group (Table 11). With 5, 10, 20 and 25 years of practice, the expected number of claims was for the 1945-1979 category were 0.07, 0.14, 0.28 and 0.35 respectively. This means, for example, that among those applying for credentialing with 25 years of practice, one would expect an average of 0.35 malpractice claims.

The expected number of claims for 5, 10, 20, and 25 years of practice for the 1980-1989 category was 0.19, 0.38, 0.77, and 0.97 respectively. This means one would expect, on average, essentially 1 claim for those applying for credentialing with 25 years of experience.

The last graduating class had expected number of claims equal to 0.21, 0.42, 0.84 and 1.05 for 5, 10, 20, and 25-year practice periods. Therefore, one expects an average of 1.05 claims in this group for an OB with 25 years of practice. One also expects 0.61 claims.

VI. Discussion

Interestingly, the OB group accounted for 27% of all claims filed against the physicians applying for credentials. This is almost 10% more than the above-referenced proportion from the Studdert et al. study. In contrast, the proportion of OBs with a malpractice claim was significantly lower in this group than that reported in the 2006 Physician's Liability Survey: 35% versus 89%. The current population of OBs being studied also had what appears to be a significantly different mean number of claims than those in the survey: 0.57 versus 2.6. The aforementioned differences between what is known about the population as compared as to what was seen in this sample may limit the external validity of these data. Additionally, these differences lead to the speculation that the OB/GYNs who apply to the credentialing committee at the University of Connecticut Health Center are somehow qualitatively and different from other populations. That being said, suggested guidelines for credentialing application reviews should take into account both the broader population as well as what has been previously been seen in their own pool of applicants.

These data do support the general belief that the rate of malpractice among OBs is statistically significantly higher than among those in other

specialties, even those specialties considered to be high-risk. However, the actual rates of malpractice among OBs are low. Even for the1990-2006 year of graduation category that is most at risk, the experience of a claim among OBs is approximately one per every 24 years of practice. Over time, however, the rates of malpractice claims for OBs have increased almost three-fold. Interestingly, this marked shift occurred in the 1980's. This era was the start of the second wave of the malpractice crisis. Although, statistically speaking, all three specialty groups have experienced increases in malpractice rates over time, the suggestion of a continuing upward trend exists only for the OBs. Moreover, the SURG and MED groups appear to be trending downward. This contrast between the upward trend of the OBs and the downward trend of the other specialties makes the OB's rate of malpractice appear even higher over time. As a side note, the specialties with downward trends are worthy of further investigation as this may lead to a better understanding of how to reduce risk of litigation. These are likely to be important considerations for the credentialing committee when reviewing applicants.

It is also interesting to note that the most recent OB graduates with 10 or more years of exposure have a very high likelihood of having a claim in the first 10 years. The upward trend of having a claim in the first 10 years is reinforced statistically for both the OB and SURG groups. However, the degree of risk for recent OB grads is 80% higher than that for the recent SURG graduates.

The experience for all OBs for time to first malpractice has significantly changed over time. Recent graduates now have approximately a 30% chance of

having a claim in their first 10 years. Again, although the SURG group's experiences were similar to those of the OB group, the degree to which the OBs' rate has increased is much more pronounced. These are also likely to be important considerations for the credentialing committee.

VII. Conclusion

Credentialing committees are often faced with a substantial responsibility in deciding when to award privileges to physicians and in attempting to do so in a systematic manner based on the characteristics of individual applicants. Risk of litigation is known to vary between and within specialties. The current assumption is that there is a positive linear relationship between time in practice and number of claims; however, there is little understanding of how the era of malpractice crisis in which physicians began practice may have affected their risk of litigation. The following considerations are outlined with the goal of assisting the University of Connecticut Health Center Credentialing Committee in making decisions when granting physicians privileges:

1. The proportion of those OBs with a claim against them is significantly lower in this sample when compared to the 2006 ACOG OB population surveyed.

2. The OB rates here are likely to be considerably lower than those of the general population of OBs.

3. The current rate of malpractice for OBs is about 1 claim per every 23 years.

4. Rates for OBs appear to be going up over time while rates for other specialties are going down.

5. OBs are more likely than other specialties to have a malpractice claim filed within the first 10 years and this likelihood continues to rise.

6. The time to first claim is significantly shorter for OBs as compared to other specialties.

7. The matrix of expected number of claims provided for each graduation category within the OB group may aid the credentialing committee in evaluating the experiences for future applicants.

VIII. Appendices

A. Table 1: Descriptive Table of Cohort (N=1064)

Foreign Graduate	130
Mean Age (SD)	50.22 (10)
Mean Years in Practice (SD)	23.51 (10.4)
Gender	
Male	802
Female	262
Year of Graduation	
1990-2006	283
1980-1989	400
1945-1979	377
Specialty	
OB/GYN	124
Surgical	294
Medical	457
Anesthesiologist	54
Radiologist	57
Pediatrics	71
Other	7

B. Table 2: Proportion of History of Malpractice Claim by Specialty Crosstabulation

History of Malpractice Claim		Specialty			
		OB	SURG	MED	Total
	No	81	210	399	690
		65.3%	71.4%	87.3%	78.9%
	Yes	43	84	58	185
		34.7%	28.6%	12.7%	21.1%
	Total	124	294	457	875
		100.0%	100.0%	100.0%	100.0%

C. Table 3: Number of Claims by Specialty

Number of Claims	Specialty			
	OB	SURG	MED	Total
At Most One Claim	104	256	444	804
	83.9%	87.0%	97.1%	91.9%
Multiple Claims	20	38	13	71
	16.1%	13.0%	2.9%	8.1%
Total	124	294	457	875
	100.0%	100.0%	100.0%	100.0%

D. Table 4: OB Rates (includes all years of graduation)

Years of Exposure	Rate	95 % CI	Expected Number of Years between Claims
1yr	0.028	0.022- 0.035	35.71
5yr	0.140	0.111 - 0.177	
10yr	0.280	0.222 - 0.354	
20yr	0.560	0.444 - 0.708	

E. Table 5: OB Rates and Risk by Year of Graduation Categories

	1945-1979	1980-1989	1990-2006
Rate	0.014	0.039	0.042
95% CI for rate	0.009-0.023	0.028 -0.054	0.027 -0.066
RR (ref 1945-79)		2.78	3.04
95% CI for RR		1.54 - 5.02	1.57 - 5.92
p		0.00	0.00
RR (ref 1980-89)			1.09
95% CI for RR			0.63 - 1.91
p			0.75

F. Table 6: OB Rates and RISK compared to SURG and MED for All Year of Graduation Categories

	OB	SURG	MED
Rate	0.028	0.021	0.007
95% CI for rate	0.022-0.035	0.018-0.025	0.006-0.009
Expected years between claims	35.71	46.95	138.89
RR		0.76	0.26
95% CI for RR		0.58-1.01	0.19-0.36
p		0.06	< 0.001

G. Table 7: Rate of Total Claims and Relative Risk within Specialty by Year of Graduation Category

OB	1945-1979	1980-1989	1990-2006
Rate	0.014	0.039	0.042
95% CI for rate	0.009-0.023	0.028-0.054	0.027-0.066
RR (ref 1945-79)		2.78	3.04
95% CI for RR		1.54-5.02	1.57-5.92
p		0.00	0 .00
RR (ref 1980-89)			1.09
95% CI for RR			0.63-1.91
p			0.75
SURG	**1945-1979**	**1980-1989**	**1990-2006**
Rate	0.017	0.029	0.026
95% CI for rate	0.013-0.021	0.023-0.036	0.017-0.041
RR (ref 1945-79)		1.72	1.56
95% CI for RR		1.23-2.41	0.94-2.58
p		0.00	0.09
RR (ref 1980-89)			0.91
95% CI for RR			0.54-1.51
p			0.70
MED	**1945-1979**	**1980-1989**	**1990-2006**
Rate	0.006	0.010	0.005
95% CI for rate	0.004-0.008	0.008-0.015	0.002-0.010
RR (ref 1945-79)		1.76	0.80
95% CI for RR		1.10-2.84	0.33-1.89
p		0.02	0.60
RR (ref 1980-89)			0.45
95% CI for RR			0.02-1.06
p			0 .07

H. Table 8: OB Claim Rates for First Ten Years in Practice and Risk by Year of Graduation Categories*

	1945-1979 (n=36)	1980-1989 (n=44)	1990-2006 (n=44)
Rate	**no claims	0.227	0.607
95% CI for rate		0.156 - 0.327	0.378 - 0.976
RR (ref 1945-79)		**N/A	**N/A
95% CI for RR			
p			
RR (ref 1980-89)			2.67
95% CI for RR			1.22 - 5.84
p			0.00

*Note: these rates are for those with at least 10 years of exposure
**N/A: not available; could not be calculated

I. Table 9: OB Claim Rates for First Ten Years of Practice and Risk Compared to SURG and MED by Year of Graduation Category

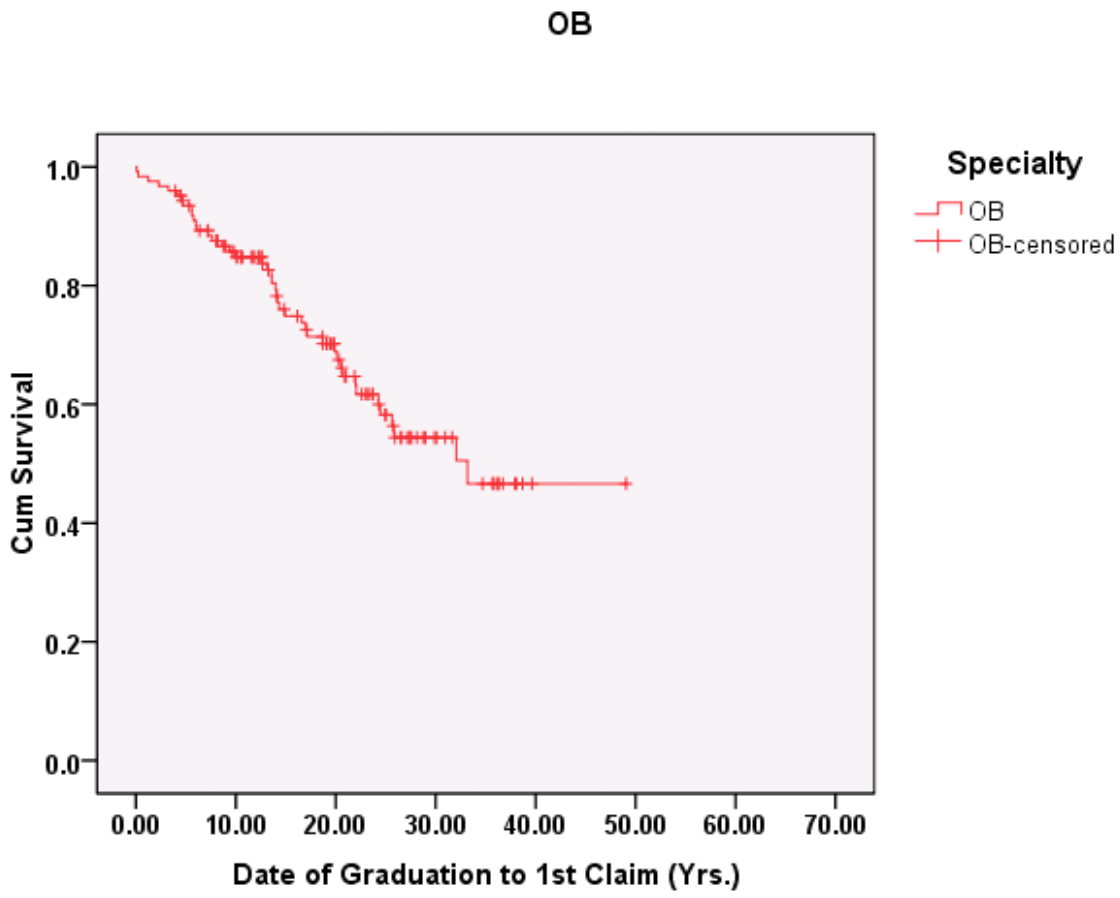
	OB	SURG	MED
Rate	0.250	0.086	0.030
95% CI for rate	0.172-0.365	0.058-0.129	0.017-0.129
RR		0.34	0.12
95% CI for RR		0.20-0.60	0.06-0.24
p		<0.001	<0.001

J. Table10: Rate of Total Claims and Relative Risk within Specialty by Year of Graduation Category for the First 10 Years of Practice

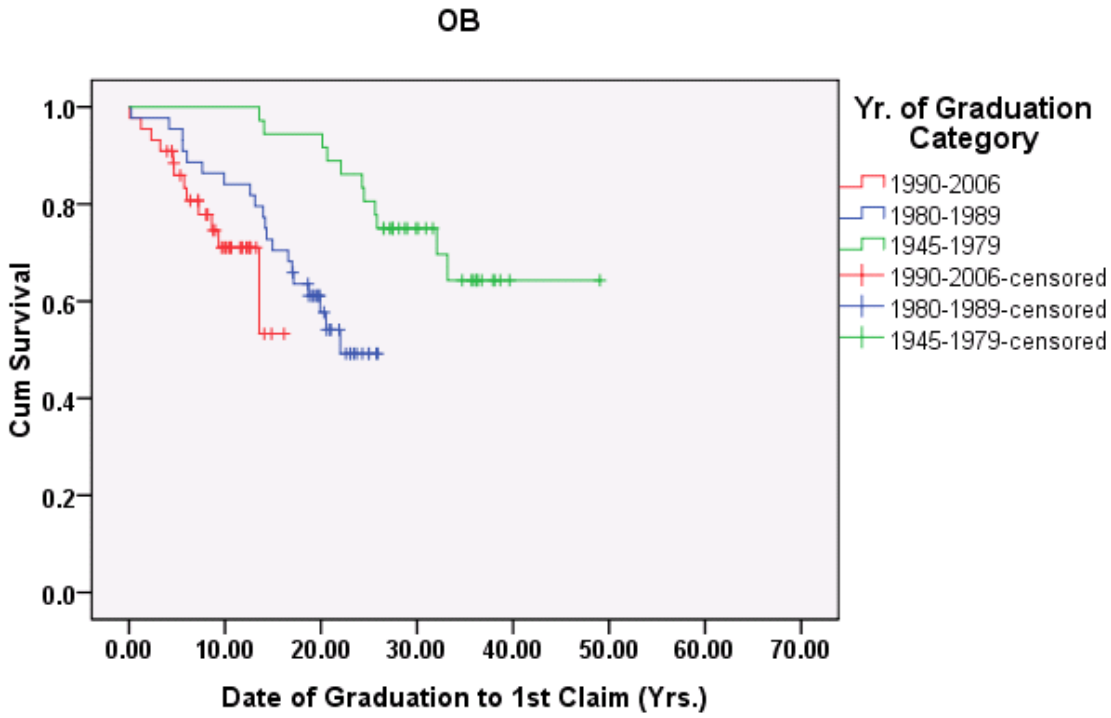
	YEAR OF GRADUATION CATEGORY		
	(Number of claims / N)		
OB	**1945-1979**	**1980-1989**	**1990-2006**
	(0/36)	**(10/44)**	**(17/28)**
Rate	**no claims	0.226	0.607
95% CI for rate		0.156-0.327	0.378-0.976
RR (ref 1945-79)		**N/A	**N/A
p			
95% CI for RR			
RR (ref 1980-89)			2.69
95% CI for RR			1.22-5.84
p			0.01
SURG	**1945-1979**	**1980-1989**	**1990-2006**
	(1/122)	**(7/108)**	**(16/48)**
Rate	0.008	0.065	0.334
95% CI for rate	0.001-0.058	0.031-0.136	0.204-0.544
RR (ref 1945-79)		7.91	40.72
95% CI for RR		0.97-64.26	5.39-306.73
p		0.05	<0.001
RR (ref 1980-89)			5.15
95% CI for RR			2.12-12.50
p			<0.001
MED	**1945-1979**	**1980-1989**	**1990-2006**
	(2/160)	**(6/164)**	**(4/70)**
Rate	0.012	0.037	0.057
95% CI for rate	0.003-0.050	0.016-0.081	0.022-0.152
RR (ref 1945-79)		2.93	4.58
95% CI for RR		0.59-14.40	0.08-24.96
p		0.19	0.08
RR (ref 1980-89)			1.56
95% CI for RR			0.44-5.53
p			0.49

**N/A: not available; could not be calculated

K. Figure 1: Kaplan-Meier Survival Analysis of Time to First Claim among OB Group for All Year of Graduation Categories



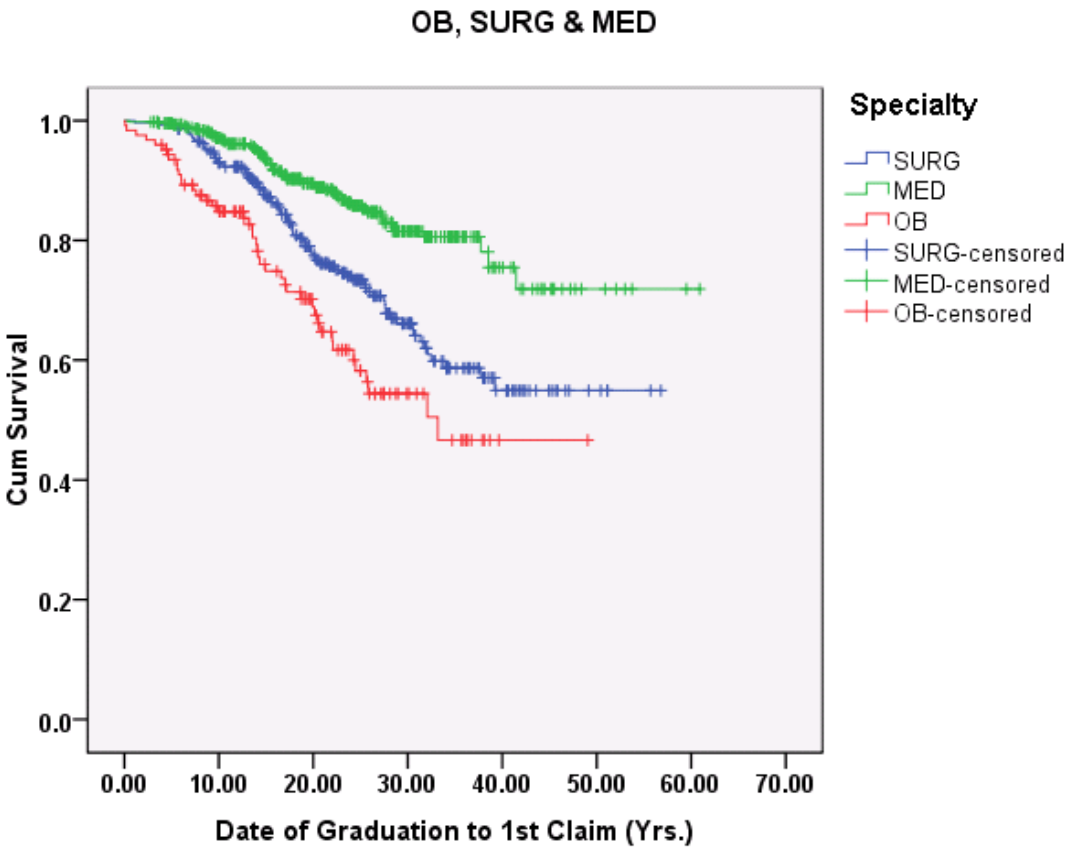
L. Figure 2: Kaplan-Meier Survival Analysis of Time to First Claim among OB group by Year of Graduation Category with Pairwise Comparisons



Pairwise Comparisons

Specialty	Yr. of Graduation Category	1990-2006 p-value	1980-1989 p-value	1945-1979 p-value
OB	**1990-2006**		0.12	<0.001
	1980-1989	0.12		0.00
	1945-1979	<0.001	0.00	

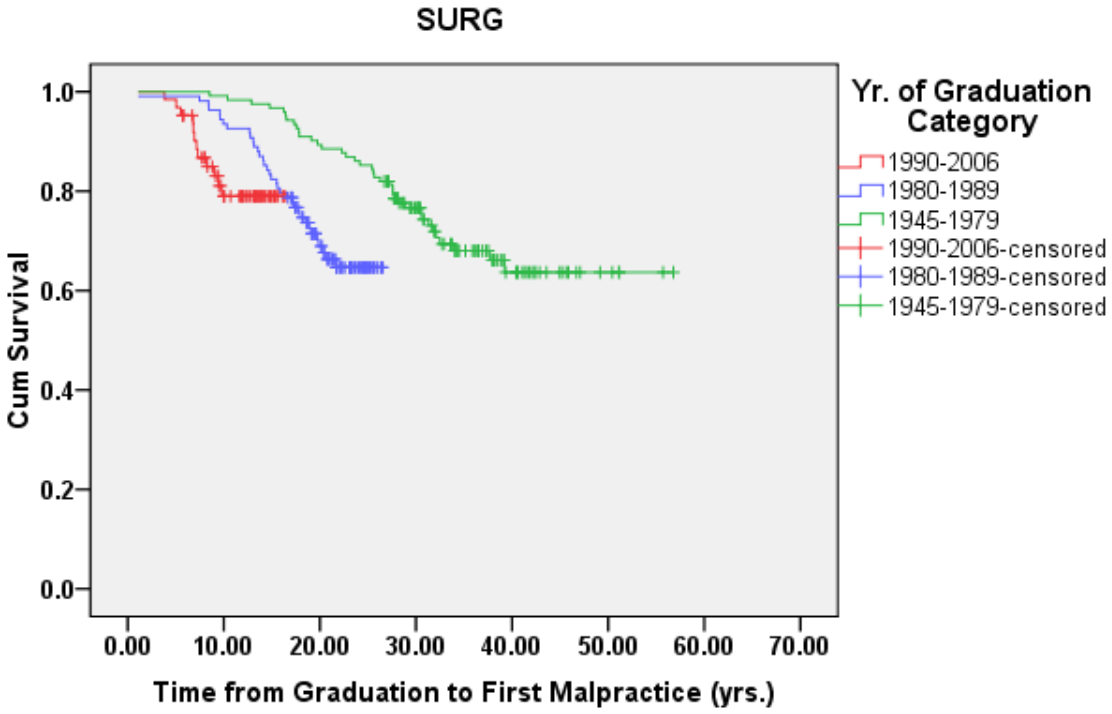
M. Figure 3: Kaplan-Meier Survival Analysis for OB, SURG and MED groups for all Year of Graduation Categories with Pairwise Comparisons



Pairwise Comparisons

Specialty	OB p-value	SURG p-value	MED p-value
OB		0.01	<0.001
SURG	0.01		<0.001
MED	<0.001	<0.001	

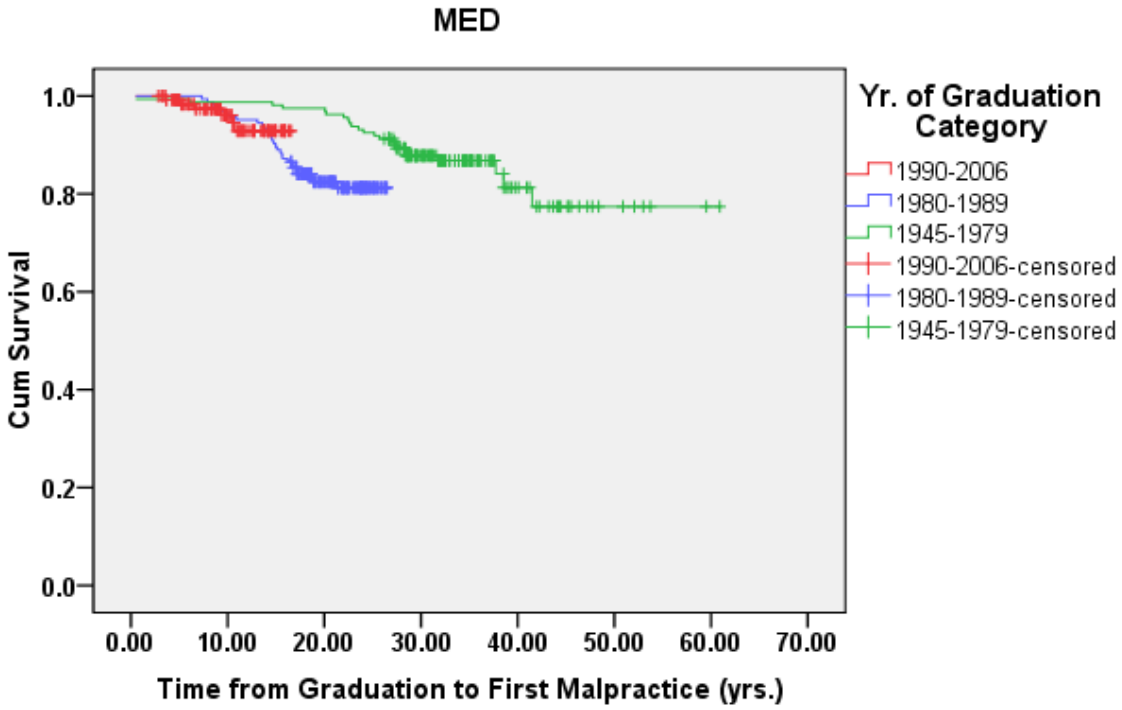
N. Figure 4: Kaplan-Meier Survival Analysis for SURG Group by Year of Graduation Categories with Pairwise Comparisons



Pairwise Comparison

Specialty	Yr. of Graduation Category	1990-2006 p-value	1980-1989 p-value	1945-1979 p-value
SURG	**1990-2006**		0.11	<0.001
	1980-1989	0.11		<0.001
	1945-1979	<0.001	<0.001	

O. Figure 5: Kaplan-Meier Survival Analysis for MED Group by Year of Graduation Categories with Pairwise Comparisons



Specialty	Yr. of Graduation Category	1990-2006 p-value	1980-1989 p-value	1945-1979 p-value
MED	**1990-2006**		0.87	0.04
	1980-1989	0.87		0.00
	1945-1979	0.04	0.00	

P. Table 11: Matrix for OB Group of Expected Number of Claims Relative to Years of Exposure and Year of Graduation Category

Year of Graduation Category	Years of Exposure								
	Expected Number of Claims								
	1	5	10	15	20	25	30	35	40
1990-2006	0.04	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68
1980-1989	0.04	0.19	0.39	0.58	0.77	0.97	1.16	1.35	1.55
1945-1979	0.01	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56

VIIII. References

1. Mohr, J. C. "American Medical Malpractice Litigation in Historical Perspective," *The Journal of the American Medical Association* 283 (2000): 1731-37.
2. Flannery, M. A. "The Early Botanical Medical Movement as a Reflection of Life, Liberty, and Literacy in Jacksonian America," *Journal of the Medical Library Association* 90 (2002): 442-454.
3. Stapelton, S. v. B. "Slater v. Baker & Stapelton," 1767.
4. Beck, A. H. "The Flexner Report and the Standardization of American Medical Education," *The Journal of the American Medical Association* 291 (2004): 2139-40.
5. Flexner, A. "Medical Education in the United States and Canada," *A Report to the Carnegie Foundation for the Advancement of Teaching*. New York, New York: Carnegie Foundation, 1910.
6. Mello, M. M., Studdert, D.M., and Brennan, T.A. "The New Medical Malpractice Crisis," *The New England Journal of Medicine* 348 (2003): 2281-84.
7. Posner, J. R. "Trends in Medical Malpractice Insurance, 1970-1985," *Law and Contemporary Problems* 49 (1986): 37-56.
8. Kinney, E. D. "Malpractice Reform in the 1990s: Past Disappointments, Future Success?," *Journal of Health Politics, Policy and Law* 20 (1995): 99-135.
9. Loh, C. " An Overview of Medical Malpractice and the Tort Reform Debate," in Enwonwu, C. N., Eva ed., *Public Health Management & Policy: An On-Line Textbook*. Cleveland, Ohio 44106: Case Western Reserve University, 2003.
10. Budetti, P., Bartlett, E., Bartlett, H., Waters, T. "Medical Malpractice Law in the United States," Kaiser Family Foundation, 2005.
11. Treaster, J. B. "Malpractice Insurance: No Clear or Easy Answers," *The New York Times*. New York, New York, 2003.
12. Hickson, G. B. "Patient Complaints and Malpractice Risk," *The Journal of the American Medical Association* 287 (2002): 2951-57.
13. *Medical Professional Liability and the Delivery of Obstetrical Care: Volume II, An Interdisciplinary Review* Washington D.C.: Institutes of Medicine, National Academy Press, 1989.
14. Chervenak, J. "Overview of Professional Liability," *Clinics in Perinatology* 34 (2007): 227-232.
15. Wilson, N., Strunk, A.L. "Overview of the 2006 ACOG Survey on Professional Liability," *The American College of Obstetricians and Gynecologists*, 2006.
16. Adams, K. E., Zuckemn, S. "Variation in the Growth and Incidence of Medical Malpractice Claims," *Journal of Health Politics, Policy and Law* 9 (1984): 475-88.
17. Studdert, D. M., Mello, M.M., Gawande, A.A., Gandhi, T.K., Kachalia, A., Yoon, C., Puopolo, A.L., Brennan, T.A. "Claims, Errors, and

Compensation Payments in Medical Malpractice Litigation," *The New England Journal of Medicine* 354 (2006): 2024-33.
18. Pearlman, M. "Patient Safety in Obstetrics and Gynecology An Agenda for the Future," *The American College of Obstetricians and Gynecologists* 108 (2006): 1266-71.
19. Taragin, M. I., Wilczek, A.P., Karns, M.E., Trout, R., Carson, J.L. "Physician Demographics and the Risk of Medical Malpractice," *The American Journal of Medicine* 93 (1992): 537-42.
20. McGrory, B. J., Bal, B.S., York, S., Macaulay, W., McConnell, D.B. "Surgeon Demographics and Medical Malpractice in Adult Reconstruction," *Clinical Orthopaedics and Related Research* 467 (2008): 358-66.
21. Charles, S. C., Gibbons, R.D., Frisch, P.R., Pyskoty, C.E., Hedeker, D., Singha, N.K. "Predicting Risk for Medical Malpractice Claims using Quality-of-care Characteristics," *The Western Journal of Medicine* 157 (1992): 433-39.
22. Weisman, C. S., Teitelbaum, M.A., Morlock, L.L. "Malpractice Claims Experience Associated with Fertility-control Services among Young Obstetrician-gynecologists," *Medical Care* 26 (1988): 298-306.
23. "Professional liability and Risk Management: an Essential Guide for Obstetrician–Gynecologists." Washington, DC: The American College of Obstetricians and Gynecologists, 2005.
24. Shwayder, J. M. "Liability in High-Risk Obstetrics," *Obstetrics and Gynecology Clinics of North America* 34 (2007): 617-25.
25. Freeman, J. M., Freeman, A.D. "No-fault Neurological Compensation: Perhaps its Time Has Come, Again," *Harvard Medical Institution Forum* (2003): 5-6.
26. Nelson, K. B. "Causal Factors in Cerebral Palsy," *Clinical Obstetrics and Gynecology* 51 (2008): 749-62.
27. Graham, E. M., Petersen, S.M., Christo, D.K., Fox, H.E. "Intrapartum Electronic Fetal Heart Rate Monitoring and The Prevention of Perinatal Brain Injury," *The American College of Obstetricians and Gynecologists* 108 (2006): 656-66.
28. Shy, K. K., Luthy, D.A., Bennett, F.C., Whitfield, M., Larson, E.B., van Belle, G., Hughes, J.P., Wilson, J.A., Stenchever, M.A. "Effects of Electronic Fetal-Heart-Rate Monitoring, as Compared with Periodic Auscultation, on the Neurologic Development of Premature Infants," *The New England Journal of Medicine* 322 (1990): 588-93.
29. Banta, D. H., Thacker, S.B. "Historical Controversy in Health Technology Assessment: the Case of Electronic Fetal Monitoring," *Obstetetrical and Gynecological Survey* 56 (2001):707.
30. Perlman, J. "Intrapartum Hypoxic-ischemic Cerebral Injury and Subsequent Cerebral Palsy: Medicolegal Issues.," *Pediatrics* 99 (1997): 851-59.
31. Martin, J. A., Hoyert, D.L. "The National Fetal Death File," *Seminars in Perinatology* 26: (2002): 3-11.

32. Ananth, C. V., Liu, S., Kinzler, W.L., Kramer, M.S. "Stillbirths in the United States, 1981–2000: An Age, Period, and Cohort Analysis " *American Journal of Public Health* 95 (2005): 2213-17.
33. "Metropolitan Atlanta Congenital Defects Program: Birth Defects." Atlanta, GA: Department of Health and Human Services Center for Disease Control and Prevention, 2007.
34. Reddy, U. M. "Prediction and Prevention of Recurrent Stillbirth.," *Obstetrics and Gynecology* 110 (2007): 1151-64.
35. Gurewitsch, E. D., Allen, R.H. "Shoulder Dystocia " *Clinics in Perinatology* 34 (2007): 365-85.
36. Baxley, E. G., Gobbo, R.W. "Shoulder Dystocia," *American Family Physician* 69 (2004): 1707-14.
37. Sokol, R. J., Blackwell, S.C. . "ACOG Practice Bulletin Shoulder Dystocia," *International Journal of Gynecology and Obstetrics* 80 (2003): 87-92.
38. "Medical Liability Survey Reaffirms More Ob-Gyns Are Quitting Obstetrics " in Associates, P. S. R., ed., *The American College of Obstetricians and Gynecologists*: ACOG office of communications, 2004.
39. *Health Care in Rural America*. Washington DC: US Congress office of technology assessment, 1990.
40. Eberhardt, M., Ingram, D., Makue, D., et al. . "Urban and Rural Health Chartbook," *Health, United States, 2001*. Hyattsville, MD: National Center for Health Statistics, 2001.
41. Peck, J., Alexander, K. "Maternal, Infant, and Child Health in Rural Areas: a Literature Review.," in The Texas A&M University System Health Science Center, S. o. R. P. H., Southwest Rural Health Research Center, ed., *Rural Healthy People 2010: A Companion Document to Healthy People 2010*. College Station, TX, 2003.
42. Studdert , D. M., Mello, M.M., Sage, W.M., DesRoches, C.M., Peugh, J., Zapert, K., Brennan, T.A. "Defensive Medicine among High-Risk Specialist Physicians in a Volatile Malpractice Environment," *The Journal of the American Medical Association* 293 (2005): 2609-17.
43. *Healthy People 2010*. Washington, DC: U.S. Department of Health and Human Services, U.S. Government Printing Office, 2000.
44. "The New York Guide to a Healthy Birth," *New York: Choices in Childbirth* 2007.
45. Brown 3rd, H. S. "Lawsuit Activity, Defensive Medicine, and Small Area Variation: the Case of Cesarean Sections Revisited," *Health Economics, Policy and Law* 2 (2007): 285-96.
46. Dubay, L., Kaestner, R., Waidman, T. "The Impact of Malpractice Fears on Cesarean Section Rates," *The Journal of Health Economics* 18 (1999): 491-522.
47. Localio, A. R., Lawthers, A. G., Bengtson, J. M., Hebert, L. E., Weaver, S. L., Brennan, T. A., Landis, J. R. "Relationship between Malpractice Claims and Cesarean Delivery," *The Journal of the American Medical Association* 269 (1993): 366-73.

48. Tussing, A. D., Wojtowycz, M.A. "Malpractice, Defensive Medicine, and Obstetric Behavior," *Medical Care* 35 (1997): 172-91.
49. Menard, K. "Cesarean Delivery Rates in the United States: the 1990s," *Obstetrics and Gynecology Clinics* 26 (1999): 275-86.
50. Kolas, T., Saugstad, O.D., Daltveit, A.K., et al. . "Planned Cesarean versus Planned Vaginal Delivery at Term: Comparison of Newborn and Infant Outcomes," *The American Journal of Obstetrics and Gynecology* 195 (2006): 1538-43.
51. Liu, S., Liston, R.M, Joseph, K.M., Heaman, M., Sauve, R., Kramer, M.S. "Maternal Mortality and Severe Morbidity associated with Low-Risk Planned Cesarean Delivery versus Planned Vaginal Delivery at Term," *Canadian Medical Association Journal* 176 (2007): 455-60.
52. Villar, J., Carroli, G., Zavaleta, N., Donner, A., Wojdyla, D., Faundes, A., et al.,. "Maternal and Neonatal Individual Risks and Benefits associated with Cesarean Delivery: Multicentre Prospective Study," *British Medical Journal* 335 (2007): 1025.
53. Miesnik, S. R., Reale, B.J. "A Review of Issues Surrounding Medically Elective Cesarean Delivery," *Journal of Obstetric, Gynecologic, and Neonatal Nursing* 36 (2007): 605-15.
54. Bovbjerg, R. "Malpractice Crisis and Reform," *Clinics in Perinatology* 32 (2005): 203-233.
55. Sloan, F. A. "State Responses to the Malpractice Insurance “Crisis” of the 1970’s: an Empirical Assessment. ," *Journal of Health Politics, Policy and Law* 9 (1985): 629-46.
56. "Malpractice Essential Part of Health Debate - Reviving Issue May Provoke Fierce Fight from Trial Lawyers, Doctors," The Associated Press and MSNBC.COM, 2009.
57. "Health Care Quality Improvement Act of 1986 ": Congress, 1986.
58. Coppolo, G. "Medical Malpractice - Attorney's Fees," Office of Legislative Research, 2003.
59. Demott, R. K., Sandmire, H.F. "The Risks of Lowering the Cesarean-Delivery Rate," *The New England Journal of Medicine* 341 (1999): 53-55.
60. *To Err is Human: Building a Safer Health System*. Washington DC: The Institute of Medicine, 1999.
61. Grenvik, A., Schaefer 3rd, J.J., DeVita, M.A., Rogers, P. "New Apects on Critical Care Medicine Training," *Current Opinion in Critical Care* 10 (2004): 233-7.
62. Gardner, R., Walzer, T.B., Simon, R., Raemer, D.B. "Obstetric Simulation as a Risk Control Strategy: Course Design and Evaluation," *Simulation in Healthcare* 3 (2008): 119-27.
63. McCarthy, J., Cooper, J. "Malpractice Insurance Carrier Provides Premium Incentive for Simulation Based Training and Believes it’s Made a Difference," *Anesthesia Patient Safety Foundation Newsletter* 22 (2007).
64. Goffman, D., Heo, H., Chazotte, C., Merkatz, I.R., Bernstein, P.S. "Using Simulation Training to Improve Shoulder Dystocia Documentation," *Obstetrics and Gynecology* 112 (2008): 1284-7.

65. Brous, E. "Documentation and Litigation," *RN* 72 (2009): 40-3.
66. Nesbitt, T. S., Hixon, A., Tanji, J.L., Scherger, J.E., Abbott, D. "Risk Management in Obstetric Care for Family Physicians: Results of a 10-Year Project," *The Journal of the American Board of Family Practice* 16 (2003): 471-77.
67. Ransom, S. B., Studdert, D.M., Dombrowski, M.P., Mello, M.M., Brennan, T.A. "Reduced Medicolegal Risk by Compliance With Obstetric Clinical Pathways: A Case–Control Study," *Obstetrics and Gynecology* 101 (2003): 751 -55.
68. Hendrix, N. W., Chauhan, S.P. "Cesarean Delivery for Nonreassuring Fetal Heart Rate Tracing," *Obstetrics and Gynecology Clinics of North America* 32 (2005): 273-86.
69. Chauhan, S. P., Magann, E.F., Scott, J.R., Scardo, J.A., Hendrix, N.W., Martin Jr., J.N. "Emergency Cesarean Delivery for Nonreassuring Fetal Heart Rate Tracings: Compliance with ACOG Guidelines," *The Journal of Reproductive Medicine* 48 (2003): 975-81.
70. Rowell, K. S., Turrentine, F.E., Hutter, M.M., Khuri, S.F., Henderson, W.G. "Use of National Surgical Quality Improvement Program Data as a Catalyst for Quality Improvement," *Journal of the American College of Surgeons* 204 (2007): 1293-1300.
71. Hickson, G. B., Clayton, E.W., Githens, P.B., Sloan, F.A. "Factors that Prompted Families to File medical Malpractice Claims following Perinatal Injuries," *The Journal of the American Medical Association* 267 (1992): 1359-63.
72. Levinson, W., Roter, D.L., Mullooly, J.P., Dull, V.T., Frankel, R.M. "Physician-Patient Communication. The Relationship with Malpractice Claims among Primary Care Physicians and Surgeons," *The Journal of the American Medical Association* 277 (1997): 553-9.
73. Hickson, G. B., Entman, S.S. "Physician Practice Behavior and Litigation Risk: Evidence and Opportunity," *Clinical Obstetrics and Gynecology* 51 (2008): 688-99.
74. Hewson, M. G. "Clinical Teaching in the Ambulatory Setting," *Journal of General Internal Medicine* 7 (1992): 76-82.
75. Schillinger, D., Piette, J., Grumbach, K., Wang, F., Wilson, C., Daher, C., Leong-Grotz, K., Castro, C., Bindman, A.B. "Closing the Loop: Physician Communication with Diabetic Patients who have Low Health Literacy," *Archives of Internal Medicine* 163 (2003): 83-90.