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# Clinical Decision Making: A Case Study of the Effects of Evidence Based Medicine and Past Empirical Experience in the Emergency Department

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Clinical Decision Making:

A Case Study of the Effects of Evidence Based Medicine and Past Empirical Experience in the

Emergency Department

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### **Abstract**

With a growing number of medical malpractice suits and the passage of policy that focuses on patient advocacy, an emphasis has been placed on research regarding the decision-making processes of physicians in everyday practices. Over the past decades, scholars have looked to specific clinical decision-making philosophies, how they can be implemented into practice, and the effects of such implementation, but little research has been done into the culmination of decision-making philosophies on a day-to-day basis. By focusing on single-case study of a Midwestern Emergency Department and asking Attending physicians to self-report their decision-making philosophies, this study serves as a transition between past clinical decision-making research and studies not yet created. Results, although not statistically analyzable due to the small number of respondents, indicate that variation in clinical decision-making does exist, and cannot be attributed to one sole variable or factor. In addition, it is evident that multiple clinical decision-making philosophies are at play in daily clinical practice. Albeit a small study, this study can be repeated and modified in the future to determine true statistical significance between certain factors and clinical decision-making. Not only this, but a better understanding of the culmination of clinical decision-making philosophies can be understood.

### **Acknowledgements**

I dedicate this thesis to my grandfather, Stanley Zeman, who lost his battle with prostate cancer in September of 2017. Without the time I spent with him as a caregiver, this research would not have come to fruition.

Thank you to my mentor, Dr. Ramazan Kilinc, who aided my efforts tirelessly, even if I presented him with a slew of questions. His guidance and great breadth of knowledge regarding research were invaluable to this effort.

Thank you to Dr. Lucy Morrison, University Honor's Program Director, for her support of my academic endeavors of the past four years. Thank you for always encouraging me to pursue my goals, no matter how crazy they seemed.

While traditional medical research has focused on scientific methodologies and treatment-based studies, research in the past decades has started focusing on the way in which physicians make clinical decisions. In light of this new research, it is important to look at the unique case of the Emergency Department (ED). A place where building relationships occurs in a minute-by-minute setting and histories are given between strangers, the didactics of how doctors make decisions are different in comparison to other specialties. While research has focused on the clinical-decision making philosophies independently, studying how these philosophies underlie decision-making specific to the ED is an opportunity yet to be explored. Two philosophies that exist in the Emergency Department, in the context of this research, are evidence-based medicine and past empirical experience (opinion-based medicine). Evidence-based medicine includes clinical practice guidelines and “evidence-based” research that supports the use of certain medication, imaging, or techniques in a specific context (Napoli and Jagoda, 2007). On the opposite hand, past empirical experience involves knowledge imparted on a physician by mentors, events a physician has experienced in their own practice. External influences that may affect decision-making philosophy utilization include, but are not limited to, history of malpractice litigation, physician demographics, and patient involvement in care. Through a single case-study of Emergency Department attending physicians at a large, Midwestern hospital, the culmination and interaction of varying philosophies and decision-making influences are analyzed. My results indicate that practice variation exists due to a number of decision-making philosophies at play. In order to bolster current practices, it is important that emergency physicians are encouraged to immerse themselves in health law and continuing education. This way they are informing themselves with the best possible methods for treating and communicating with their patients. This study is crucial to furthering medical

education of both current and future clinicians alike and its implications could have a profound effect on the future of such research.

### **Literature Review**

With technological advances and the advent of new research, the medical field is constantly evolving. As more people require medical care, research in this field has been focused to not only the treatment of diseases, but also the decision-making processes of clinicians and patients alike. Research in the medical field is largely associated with more efficient ways to diagnose diseases, advances in treatment and medications, and the discovery of cures for the formerly incurable. In the last two decades, a form of decision-making called evidence-based medicine has become a focus of scholars in this discipline and those similar alike. Soon the question of how practitioners apply these novel research methods into the everyday course of medical practice came to fruition. It is evident that medical practices vary from physician to physician, but the exact cause of this variation is largely unexplored. Scholars have questioned whether this is due to legal influences on physicians, patient involvement, or other factors. A field in which this variation is extremely apparent is that of Emergency Medicine. If two patients present to the Emergency Department (ED) with certain symptoms, their experience—medicines administered, laboratory and imaging studies ordered, and level of involvement they take in their care—may lack consistency due to the underlying decision-making philosophies of the provider that cares for them.

### **Clinical Decision Making**

According to Kovacs and Croskerry (1999), “Clinical reasoning, medical problem solving, diagnostic reasoning, and decision analysis are all terms used in the growing body of literature that examines how physicians make clinical decisions” (p. 947). It “...describes a form

of qualitative inquiry that examines the thought processes involved in making medical decisions” (Kovacs and Croskerry, 1999, p. 947). There exists a gap in research regarding clinical decision making in the context of the Emergency Department. Because of this, the only work noted of the pedagogies surrounding specifically Emergency Physicians (EP) is the aforementioned article by Kovacs and Croskerry.

Due to the unique nature of decision making in the ED, in comparison to other outpatient fields, it is important to recognize: “The EP’s role is not to achieve diagnostic closure for all patients, but to identify those with acute illnesses who require immediate diagnostic and/or therapeutic intervention” (Kovacs and Croskerry, 1999, p. 950). Of note, they apply the hypothetico-deductive model of decision making to Emergency Medicine (EM) as one of the models of decision making, which will be accepted as the model typically used by EPs. This model involves the process of making hypotheses, ordering various testing, gaining new information, evaluating the hypothesis, and repeating. Their hypotheses are constantly evolving, until they reach a final diagnosis (Kovacs and Croskerry, 1999). It is important to note that Kovacs and Croskerry (1999) also elucidate on the possible errors that can be made the decision-making process (p. 950).

### **Past Empirical Experience and Opinion-Based Medicine**

While Kovacs and Croskerry (1999) focus on the process of decision-making it is also evident that varying decision-making philosophies can be enacted in the ED that layer into the hypothetico-deductive model. While this is the underlying model, each physician is able to enact various decision-making philosophies that can influence the way in which they utilize this cyclical model. Thus, this layering of a model and philosophies could account for the variation in decision-making in the ED.

A clinical decision-making philosophy utilized in the ED focuses on a physician's past experience has been given many names in the literature. Sometimes, a direct name was never given, rather, scholars have described this type of philosophy as Rodwin (2001) does when he refers to it as "...medicine based on authority, tradition, and the physician's personal experience" (p. 439) He continues:

"...physicians practiced medicine based primarily on their medical training, individual experience, and local custom...Doctors knew about their colleague's work by direct observation or reputation, but there was little in the way of external assessment or control over medical practice outside of informal professional self-regulation. These conditions promoted physician autonomy and sovereignty" (Rodwin, 2001, p. 440).

This type of decision-making philosophy will be referred to as "Past Empirical Experience or Opinion-Based Medicine". In contrast to what some scholars would call Opinion-Based Medicine, this term denotes a type of medicine that is practiced as the result of the past experiences of a physician. Even though "empirical" is a part of the name, these practices are not always "empirical". While it can be argued that past successes with a treatment can be considered empirical, some practices are not always backed by sound research or methodologies. They can be enacted for a number of reasons, and these reasons may be legitimate, although not empirical.

#### **Malpractice and past empirical experience.**

Some scholars have noted that one potential source of practice variation could be fear of malpractice suits. A study that surveyed malpractice options of physicians from multiple specialties done by Lawthers et.al (1992) noted:



“Physicians tend to overestimate the risk of being sued, but estimates do correlate with specialty...The perceive risk of suit from an adverse outcome or medical injury caused by negligence is quite high. Physicians believed they had a 45 percent chance of being sued for cases in which a patient suffered from an unintended adverse outcome that caused a disability because of nonnegligent medical management” (p. 468).

Furthermore, a study performed by Glassman et.al (1996) indicates “...20 to 55 percent of physicians, depending on scenario and specialty, reported that their decisions were extremely or very influenced by the desire to minimize possibility of malpractice litigation...[but]...was cited less than one-half as often as clinical information” (p. 228). While it is unclear whether these findings can be specifically translated into the case of the Emergency Department setting, if it can be applied, this would be yet another factor accounting for clinical decision-making variation.

### **Evidence Based-Medicine (EBM)**

Yet another philosophy that has become increasingly accepted in the recent decades is that of evidence based-medicine, or EBM. Rosenberg and Donald (1995) explain: “Evidence based medicine is the process of systematically finding, appraising, and using contemporaneous research findings as the basis for clinical decisions” (p. 1122). Rodwin (2001) continues this, by theorizing that EBM is “...the movement to evaluate the safety, effectiveness, and cost of medical practices using tools from science and social science and to base clinical practice on such knowledge” (p. 439).

Consequentially, there are many benefits of using EBM, according to Rosenberg and Donald (1995), for both providers and patients. They include that EBM:

- Enables clinicians to upgrade their knowledge base routinely;

- Improves clinicians' understanding of research methods and makes them more critical in using data...;
- Gives [clinical] team a framework for group problem solving;
- Enables juniors to contribute usefully to the team...;
- Better[s] communication with patients about the rationale behind management decisions (Rosenberg and Donald, 1995, p. 1124).

While the benefits are high for the parties, EBM as a decision-making philosophy also has pitfalls. Rosenberg and Donald (1995) elucidate that essential pitfalls of EBM include: "...time...money...gaps in evidence...[and] electronic data bases used for finding relevant evidence [that] are not comprehensive and...not always well indexed" (p. 1125). In contrast to past empirical experiences, "...evidence-based medicine reduces the discretion and autonomy of physicians" (Rodwin, 2001, p. 440). Perhaps this is why some physicians are hesitant to adopt it as a decision-making strategy.

With the impetus towards EBM in the medical community as a whole, EBM is practiced in the Emergency Department. This can be seen in a number of different ways, including the use of Up to Date (an electronic medical research database), medical literature, and clinical practice guidelines in making decisions.

#### **Clinical practice guidelines: EBM in action.**

Clinical practice guidelines (CPGs) are becoming more recognized as a form of EBM and may be utilized by ED providers. Napoli and Jagoda (2007) note that clinical practice guidelines are "...increasingly accessed for reasons that include: Simplifying the body of literature to clarify best evidence practice when such evidence exists, attempting to provide cost-effective care, reducing practice variability, and medial legal protection when standards are lacking" (p.

425). They continue by describing these models as evidenced based, elucidating on a study that shows Internal Medicine Physicians have been using CPGs in their everyday practice (Napoli and Jagoda, 2007, p. 426-27). These CPGs appear similar to a roadmap of that guides physician's decisions on how to proceed forward based on a patient's presenting symptoms. Napoli and Jagoda (2007) continue: "As practice guidelines become a more prominent resource for standard-driven care, their impact on Emergency Department practice will increase. Due to the wide variety of patient conditions Emergency Physicians treat, many guidelines written by specialties other than Emergency Medicine are applicable to the Emergency Department" (p. 429). Venkatesh et al. (2017) agree with this previous work, as they write "Over 25 years, emergency medicine in the United States has amassed a large evidence base that has been systematically assessed and interpreted through ACEP Clinical Policies" (p. 1). The American College of Emergency Physicians (ACEP) sets forth a general code of ethics and practice guidelines for Emergency Physicians (Clinical Guidelines Affecting Emergency Medicine Practice, 2014). As many roadmaps that are given to physicians, the ultimate decision is given to the provider which path they choose to take.

In some sense, CPGs provide an evidence-based way of defining the standard of care, or the so-called *expected* level of treatment given to a patient by a physician and hospital staff. Mello (2001) notes that "...because they derive from the consensus of experts, CPGs are thought to represent the prevailing standard of care in the medical profession" (p. 647). However, Napoli and Jagoda (2007) contend "The 'standard of care' is often still defined by how care is provided in the community around the practitioner, and not by how the best available scientific evidence defines it" (p. 429). To some form, CPGs serve as one method of potential legal implications in medical practice that could account for variation in decision-making. However, Mello (2001),

notes that despite the fact that CPGs are gaining more prevalence in physician malpractice (negligence) suits, "...CPG's can only tell the court what is required in a typical case where the patient presents a certain medical condition or set of symptoms" (p. 710). Because not every case is what Mello (2001) would note as "typical", this could be the cause of one area of deviation from uniform methods of clinical decision making.

### **Shared-Decision Making (SDM)**

Yet another decision-making method that has been largely accepted by the medical community as a whole is the shared decision-making (SDM) model. Stigglebout et.al (2015) notes that the steps of shared decision making are as follows: "1) The professional informs the patient that a decision is to be made and that the patient's decision is important; 2) The professional explains the options and the pros and cons of each relevant option; 3) The professional and patient discuss the patient's preferences; the professional supports the patient in deliberation, [and] 4) The professional and patient discuss the patient's decisional role in preference, make or defer the decision, and discuss possible follow-up" (p. 1173).

Because of the many different paths, a clinician can take in forming and evolving hypotheses, the shared decision-making model can be applied to the ED. In this sense, physicians and patients make decisions together rather than one more so than the other.

### **Patient involvement.**

Patient involvement is also a key factor in determining variation in clinical decision making, particularly in the context of the ED. Because each patient is different, this means that not every patient will present with the same symptoms, nor the same worldview. Because of this, scholars have attempted to look at the possibility that variation in patient involvement correlates to the models of decision-making that clinicians apply. Arora and McHorney (2000), in a study

involving "...a 4 year observational study of patients with chronic disease..." found that "a majority of patients (69% preferred to leave their medical decisions to their physicians... [and] preferences vary significantly by patient characteristics" (p. 335). McGuire et al. (2005) later build upon this, stating "the physicians in this [their] study favor patient participation in medical decisions, with the nature and extent of that participation varying according to the patient, the physician, and the decision. Some of our subjects deliberately promote a collaborative relationship with patients but most prefer the role of an expert who educates the patient and directs the decision-making process" (p. 468). Thus, this is yet another way that scholars have attempted to explain the variation in clinical decision making. The level of comfort that a physician feels in including the patient in the decision-making process could also account for this variation. Yet again, there is a gap in research, particularly pointed out by Dy (2007), who describes "Assessing patients' preferences for decision-making roles, information, and risk communication would be valuable in evaluating decision making or interventions, or even in tailoring them to patient characteristics; more research is needed on how and whether these tools could be a part of clinical practice" (p. 646).

### **Physician's Number of Years in Practice**

Hajjaj et al. (2010) indicate certain "non-clinical influences" on decision-making (p.178). In the specific context of the ED, which, like many other specialties has physicians with varying years of clinical practice experience. "Physician's gender, age, and ethnicity may play a role in decision-making...younger physicians order more tests than older physicians" (Hajjaj, et.al., 2010, p. 183). Albeit not Emergency Medicine, a Psychiatry-based study in Germany found: "Not only did psychiatrists' age predict the early adoption of the drug, but their working environment and their personality characteristics also affected whether they adopted the drug

within three months after launch” (Hamann, et.al, 2006, p. 703). This suggests that physician age, or perhaps number of years in practice, may also influence clinical decision-making.

However, a gap in the literature exists regarding physician “age” and specific decision-making philosophies.

### **Model and Hypotheses**

Because there is overlap in the two philosophies, it is likely that that they are both used in the Emergency Department, but past empirical experience is arguably more-so utilized than evidence-based medicine, particularly due to the fast-paced nature of decision-making in the ED. Based on a careful review of the literature, it is evident that two of the main decision-making philosophies that are utilized frequently in the Emergency Department are evidence-based medicine and past empirical experience (or opinion-based medicine). While decision-making as a whole is influenced by numerous factors, number of years a physician has been practicing may influence which strategy they are more likely to employ in daily practice. Therefore, based upon both the literature and it is hypothesized that a physician with longer practice experience will employ past empirical experience more frequently than EBM. Due to the sheer number of cases and experiences these physicians have on their repertoire, the bulk of their decision-making is an active culmination of these. Likewise, due to the push towards EBM in medicine in general, physicians with fewer numbers of years in practice likely employ EBM over past experiences. Much like the unique nature of Emergency Medicine encounters, this argument brings together a unique perspective stating that variation may be due to more evident factors than we initially hypothesized.

Figurative model:

Number of years in practice (IV) → Clinical Decision-Making Philosophy (DV)

More specifically,

Number of years in practice (IV) → Evidence Based Medicine

Past Empirical Experience

### **Research Design**

By combining the work of past researchers, this study serves as a mosaic, uniting the future and past medical communities toward a unified forward goal. Many times, literature of this nature notes that further research is necessary for the implementation of sound and justified practices. By serving as a piece that combines this multitude of philosophies, further identification of these specific practices can be made. It's not that the research is not there, it is simply that the connections are not being made. Therefore, this research is a continuation of the last two decades of research that has been performed.

A single-case study of an Emergency Department that is a part of an urban, Midwestern teaching hospital was performed. Due to the innovative nature of this hospital, it was anticipated to be more progressive and diverse in its decision-making strategies, as opposed to a very traditional ED. For the sake of evaluating differences in number of years in practice, only attending physicians were contacted as possible participants for this survey. These attendings were variable in background, age, and number of years in practice, thus allowing for better pattern recognition in the resulting. Using physicians from this cohort limited some extenuating variables due to the fact that they practice together on a regular basis. Factors, such as differences in region or hospital policies could be controlled. In addition, starting small-scale with this research is imperative to see if generalizability is even possible on a larger-scale study. Because much research focuses on a single philosophy rather than the intermingling of multiple

philosophies—which is more realistic in daily practice—this method will allow for the best control of variables.

Data collection occurred through qualitative, IRB-exempt survey sent via email to the hospital's attending physicians. Physicians at this hospital were sent an email seeking volunteers for a survey, which did not include a "name" question (specifically denoting anonymous data usage) and were allowed to opt in or out of the survey. Basic questions about the physician's background were asked including: a) sex; b) primary and secondary specialties; c) number of years of practice in said specialties; and d) U.S. medical school attendance. This is done in-line with literature that variation may be affected by demographics. Next, physicians discuss their education, which includes both undergraduate and graduate coursework related to medical ethics (law) and clinical decision-making.

The bulk of my data comes from the next set of questions physicians are asked to self-report. First, physicians were given an open-ended question that asked how they learned clinical decision-making, how they would describe their own decision-making, and how their decision-making practices have evolved. Next, they were asked if and how their clinical decision-making had evolved since the start of their practice. These responses are analyzed qualitatively, to give layman a better idea of how physicians would describe the way in which they make decisions.

At this stage, physicians were given a statement about specific utilization of decision-making strategies and asked to respond on a Likert scale of strongly agree to strongly disagree. While this research focuses specifically on EBM and Past Empirical Experience, it would be incorrect to leave shared-decision making out the list of options for providers. Thus, these statements include:



- I employ evidence-based medicine as one of my decision-making philosophies in the ED;
- I employ past empirical experiences (or what some would call opinion-based medicine) as one of my decision-making philosophies in the ED; and
- I employ shared-decision making as one of my decision-making philosophies in the ED.

If physicians stated that they “Agree” or “Strongly Agree” with any of the above statements, they were prompted to answer the question “What percentage of your decision-making is performed secondary to \*insert philosophy\*?” These percentages were scaled in increments from 0-5%, 5-10%, and in increments of 10 up until 100%. This design allows for the determination of one strategy versus another. This data will be analyzed in a numerical, quantitative format, but no statistical regression will be run. Rather, this data will be utilized side-by-side to support or refute my hypothesis, as they will indicate a relationship between years in practice and which decision-making philosophy is greater utilized in the ED. There is overlap between the strategies, and it is doubtful that one is used completely versus the other. Thus, it is expected that physicians’ true decision-making philosophy percentages will not equal 100% individually.

The legal implications of clinical decision-making are not forgotten in this research design. Physicians are given the option to answer questions regarding their experience with either a) their own malpractices cases, or b) their own expert witness testimony. These qualitative inquiries may give more insight into why physicians utilize past empirical experience in everyday decision-making.

To assess the importance of external factors that may be a root cause of clinical variation in practice, physicians were asked to rate how likely or unlikely certain items were to influence

their decision-making. Examples of such items include: the physician's last "bad case," patient demographics, fear of malpractice suits, etc. These are largely to get a better picture of decision-making variation as a whole, but also could give more insight into why providers specifically utilize certain decision-making philosophies. Additionally, physicians are asked to self-identify their risk tolerance, to evaluate whether an increase or decrease in risk tolerance has an influence on decision-making practices.

## Results

Table 1

### *Respondent identification and demographics*

Physician ID	Credentials	Sex	Years in Emergency Medicine	Attended US Medical School?
1	MD	Male	10-15	Yes
2	MD	Male	20-25	Yes
3	MD	Female	10-15	Yes
4	MD	Female	25+	Yes
5	MD	Male	5-10	Yes
6	MD	Male	25+	Yes
7	MD	Male	25+	Yes
8	DO	Male	15-20	Yes
9	MD	Female	10-15	Yes

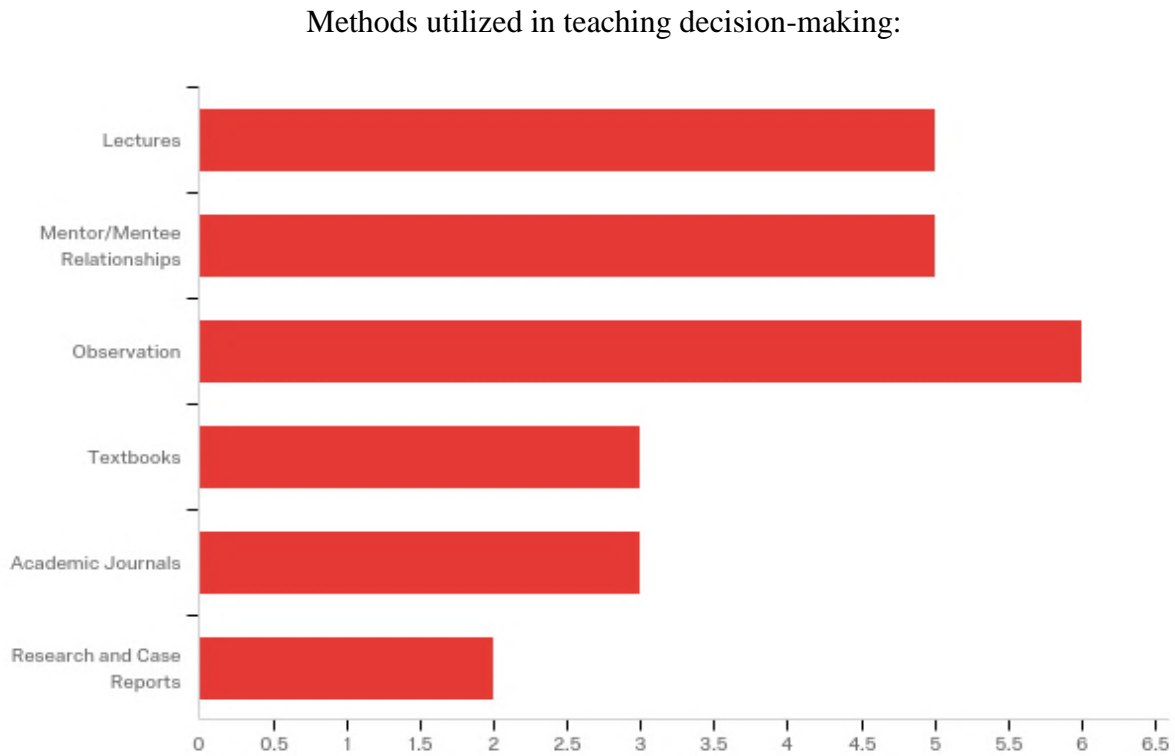
*Note:* This table indicates basic physician respondent demographics. Of the 26 Attending Physicians at the hospital studied, 9 responded to the survey, for a 34.6% response rate. 8 MDs (Medical Doctors) and 1 DO (Doctor of Osteopathic Medicine) were surveyed, comprised six males and three females. Regardless of credentials, physicians are given the same privileges and responsibilities at this hospital. All attended United States Medical Schools. Practice experience ranged from 5-10 years to 25+ years in this cohort.

Table 2

*Clinical Decision Making (CDM) in Practice*

Physician ID	CDM training?	CDM evolution?
1	Yes	Yes
2	Yes	Yes
3	Yes	Yes
4	No	Maybe [sic]
5	Yes	Yes
6	Yes	Yes
7	Yes	Yes
8	Yes	Yes
9	No	Yes

*Note:* Physicians were asked to self-report if their decision-making had changed throughout the course of their practice. If physicians answered a positive that was synonymous with “yes” their answered were codified as such, and vice versa. The most frequently reported causes of said-evolution was experience. If physicians responded that they had been taught, through various different methods, clinical decision-making philosophies in their training, this answer was also codified as “yes”. Many respondents noted that this clinical decision-making teaching came from clinical rotations or bedside experiences, in other words, more of a hands-on approach as opposed to just a lecture. Other materials these physicians noted as being implemented in their CDM training is noted in Figure 1.



*Figure 1.* Indication of what physicians reported to be the main approaches to their education in clinical decision making. The most utilized methods, reported from greatest to least, are: Observation, Lectures, and Mentor/Mentee Relationships.

Table 3

*Risk Tolerance*

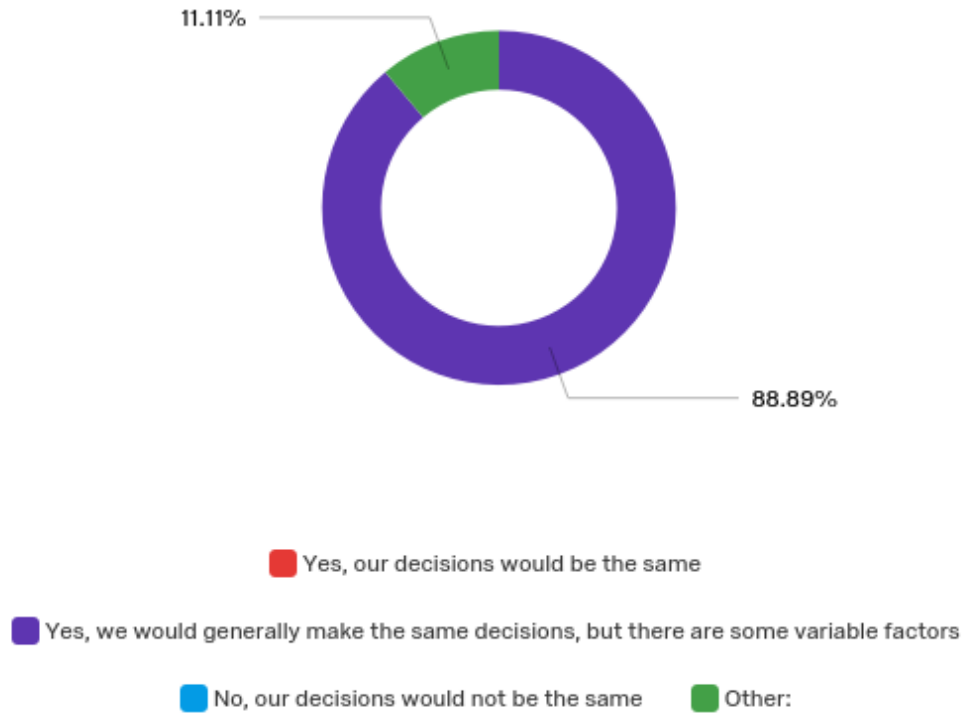
Physician ID	Risk Tolerance
1	N/A
2	Medium-3 on a scale from 1-5.
3	I feel that I tolerate a certain amount of risk but not a lot. I like to be safe in my practices at all times.
4	Medium
5	Low, no reason to ever take big risks
6	Moderate
7	My risk tolerance might be a little higher than average.
8	Low
9	Moderate

*Note:* This includes data problem physician's self-reported, verbatim risk tolerance description.

If the physician was unsure of how to respond to the question, their answer is indicated as

“N/A”.

Clinical decision-making variation in practice



*Figure 2.* 88.89% of responding physicians stated that, in general, both they and their peers would make the same clinical decisions, but with some variable factors. This indicates that clinical decision-making variation does exist in everyday practice.

Table 4

*Clinical Decision-Making Philosophies*

Physician ID	I employ EBM.	Percentage of practice secondary to EBM.	I employ Past Empirical Experience or Opinion-Based Medicine.	Percent of practice secondary to Past Empirical Experience.	I employ Shared Decision-Making.	Percent of practice secondary to SDM.
1	Strongly Agree	80-90	Strongly Agree	80-90	Strongly Agree	Not answered
2	Strongly Agree	60-70	Strongly Agree	30-40	Strongly Agree	10-20
3	Strongly Agree	50-60	Strongly Agree	30-40	Agree	5-10
4	Neither Agree nor Disagree	Not answered	Agree	60-70	Agree	70-80
5	Strongly Agree	80-90	Strongly Agree	5-10	Strongly Agree	80-90
6	Strongly Agree	80-90	Agree	5-10	Agree	0-5
7	Strongly Agree	80-90	Strongly Agree	10-20	Strongly Agree	10-20
8	Strongly Agree	80-90	Strongly Agree	80-90	Strongly Agree	80-90
9	Neither Agree nor Disagree	50-60	Agree	60-70	Agree	20-30

*Note:* Physician responses to the utilization of three common decision-making strategies in the ED: Evidence-Based Medicine (EBM), Past Empirical Experience or Opinion-Based Medicine, and Shared Decision-Making (SDM). Physicians were then asked to describe, in predetermined



10 percentage ranges, how often their daily decision-making is secondary to the given philosophy.

Table 5

*Respondent legal exposure*

Physician ID	Law or Ethics Course prior to Medical School?	Law or ethics course during medical school?	Named as expert witness?	Named in malpractice suit?
1	No	Yes	No	Yes
2	Yes	Yes	Not answered	Not answered
3	No	No	No	No
4	No	No	No	Yes
5	Yes	Yes	Yes	No
6	Yes	Yes	Yes	Yes
7	No	Yes	Yes	Yes
8	Yes	Yes	Yes	No
9	No	No	No	Yes

*Note:* Indication of physician's legal exposure in the form of courses as well as litigation. Just under 50% took a law or ethics course prior to medical school, but approximately 67% had exposure with such a course during medical school. Of the physicians who responded, 62.5% had medical malpractice claims brought against them, and 50% had experienced being an expert witness in separate litigation.

Table 6

*Years in Emergency Medicine versus CDM Philosophy*

Physician ID	Years in Emergency Medicine	Percentage of practice secondary to EBM.	Percent of practice secondary to Past Empirical Experience.	Percent of practice secondary to SDM.
5	5-10	80-90	5-10	80-90
1	10-15	80-90	80-90	Not answered
3	10-15	50-60	30-40	5-10
2	20-25	60-70	30-40	10-20
4	25+	Not answered	60-70	70-80
6	25+	80-90	5-10	0-5
7	25+	80-90	10-20	10-20
8	Strongly Agree	80-90	80-90	80-90
9	Neither Agree nor Disagree	50-60	60-70	20-30

*Note:* An indication of number of years in Emergency Medicine versus clinical decision-making philosophies. This suggests that almost all physicians utilize EBM more so than Past Empirical Experience. No definitive correlation with age is found, as physicians in both the 5-10 and 25+ practice year range indicate 80-90% of their practice is secondary to this philosophy.

### Discussion

The results from this hospital indicate a diverse group of respondents, varying in credentials and number of years in Emergency Medicine. All attended US medical schools, indicating their medical education would have been fairly standard, with some variable factors. One of the key indicators that this group was a strong cohort for this research, albeit small, was the fact that their number of years in practice varied from 0-5 years to 25+ years. Physicians also indicated their risk tolerance in the ED, and many indicated this as low or moderate. These variable demographics showed the diversity in so-called experience of these Attending physicians.

Clinical decision-making seemed to be a spectrum of knowledge. When asked about their experiences learning CDM, multiple indicated that bedside and clinical experiences are what truly allowed them to learn the craft. A physician, with 5-10 years of practice experience, on the end of the spectrum that indicated high levels of CDM teaching noted: "...I can't imagine a medical school that does not teach clinical decision making [sic], it is the backbone of medicine." On the contrary, three physicians indicated they received little to no training in CDM practices. The disparity in these responses is unclear. When prompted, 8/9 physicians noted that they and their peers would make similar decisions in clinical practice, with some variable factors. This is indicative that CDM is not a linear model and does in fact vary from provider to provider.

To understand if CDM is more of a process or if it is pre-determined early in a physician's career, physicians were asked to report if their decision-making had evolved over time. 8/9 noted that their decision-making had evolved throughout the course of their practice, with the most common cause of said evolution being experience. Specific philosophies were analyzed, and all physicians indicated that they utilized shared decision-making in the ED, but

the percentage of practice was much lower than that of the other two philosophies. While the cause of this finding is undetermined, it is hypothesized that it is secondary to the teaching nature of this hospital. All but two physicians indicated that they “Agree” or “Strongly Agree” that they utilize EBM in the ED, with multiple of these respondents indicating 80-90% of their clinical decisions secondary to this strategy. In regard to Past Empirical Experiences, all but one physician indicated they use this strategy in the ED, but percentages in practice were much more diverse. Two physicians indicated they utilized Past Empirical Experience only 5-10% of the time, while four indicated above 60% of their practice was secondary to this philosophy.

Due to the small number of respondents in this case study, the original hypothesis can be neither supported or refuted. The pattern suggests that the hypothesis should be rejected, however, in order to perform statistical analysis and prove significance, over 30 participants would be necessary. It is unclear if there is a correlation between number of years in practice and CDM philosophy. However, these results do indicate that the above three clinical decision-making philosophies—EBM, Past Empirical Experience, and SDM—are all utilized in conjunction with one another in the Emergency Department. This is a novel finding, particularly due to the fact that previous literature focused mainly on single philosophies.

Due to the sheer number of malpractice litigation currently, a high number of malpractice exposure was expected. However, it was surprising to see that just over half (5/9) of the respondents had been named in a malpractice suit. Very similar to the CDM education, physicians had varying opinions on how this legal exposure affected their CDM practices. While one physician noted that their malpractice case had no impact on their decision-making two other physicians noted that they either questioned their decisions or increased their normal practices as a result. Another legal exposure that approximately half of the respondent physicians had been

named as an expert witness in a malpractice case, meaning they either reviewed a case or testified to the practices in the case. The most interesting response to how this impacted decision-making was that it gave the physician more insight into how to treat future patients if they were to experience such a case themselves. These findings make it clear that legal influences are acting upon the clinical decision-making of physicians, apart from just the aforementioned practice guidelines.

With the intention of assessing other variables on CDM, physicians were asked to rank a number of items from a list into categories that would be likely or unlikely to influence their clinical decision-making. Such items included topics such as: patient demographics, medical policies, or EBM/Past Personal Experience artifacts. It was intended that this research could indicate all of the factors at play in decision-making, and could also be used for EBM and Past Personal Experience in action without physician's direct self-reported percentage. However, due to a technical error with the survey, this question was unable to be assessed.

### **Conclusions**

This research is innovative in the sense that it shows the inter-working of multiple clinical decision-making philosophies in the Emergency Department. CDM is not the result of one specific philosophy but rather a culmination of physician experience, evidence-based practices, and the ability to make shared decisions with patients. While the original hypothesis could not be supported or refuted due to a small number of responses, future research could include a larger case analysis with physicians from multiple geographic locations. In addition, responses were self-reported and may not reflect everyday practices. Thus, observation and interview-based studies are recommended.

These findings, albeit not confirmed, have implications for patients, physicians, policymakers, medical schools, and future physicians alike. More research into such a field could give these parties more insight into why each doctors practice differently, despite sometimes receiving the same education. Arguably, a push for implementation of standardized ethics, legal, and CDM lessons in medical schools could be advocated for. In addition, the notion that the everyday patient can better understand their own care due to research is large, particularly with recent emphasis of patients playing an active role in their own healthcare. It is without a doubt that this research should be continued so as to foster a strong collaboration between patient and provider.

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