4

Decision-Making in Emergency Medicine
Thinking Differently

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Thinking Differently

Physicians who practice emergency medicine think differently than physicians in many other specialties. We have **different (1) goals, (2) clinical reasoning, and (3) expertise**. These differences do not make us better or worse than other physicians; rather, they are distinctive and revealing features of our specialty that define us. In this chapter, I will explain why and how emergency physicians *think differently* and how those differences make our specialty unique.

Goals

Decision-making in emergency medicine ultimately reflects the primary goal of the specialty: to **identify and address emergent**

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conditions in acutely ill or injured adults and children.[1] Our job is to recognize emergencies and intervene accordingly.

Sometimes emergencies are quite evident (e.g., gunshot wounds, cardiac arrest, hemorrhage), and our decision-making is centered on treatment options; we must consider whether to follow common algorithms, deviate from them based on unique patient characteristics, or act at all.

Sometimes emergent conditions are difficult to diagnose (e.g., poisonings, pulmonary hypertension), and our decision-making instead drives a rigorous search for pathology, finding and interpreting critical data to construct our hypotheses.

Importantly, there are uncommon emergencies that rarely present to outpatient clinics, conditions seen almost exclusively in emergency departments (EDs) or critical care units. It is incumbent upon emergency physicians to recognize the **acute presentations of these rare life threats**. This defining goal – to determine if there is an emergency – is a different way of thinking.

At times, emergency physicians may appear to be chasing "zebra" conditions that are rarely seen.[2] The tests we use to diagnose such uncommon yet high-risk emergencies may seem excessive or unnecessary. However, zebras do exist, and how else might they be found? And by whom in our health-care system? And at what time and access point? Emergency physicians **bear a responsibility to identify and treat rare and dangerous conditions, and this mandate affects our decision-making**.

I am an emergentologist, I deal in emergencies, and that drives my clinical reasoning. I am not a generalist. I am not a jack of all trades; rather, I **specialize in resuscitation**. I am comfortable managing emergencies seen in a wide variety of fields, and the scope of my work has been characterized as "the most interesting 15 minutes of every other specialty."[3] Emergencies – broadly – are my purview.

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Most physicians aim to make a diagnosis. I do not, because I think differently. **My job is not to make a definitive diagnosis; it is to identify and treat emergencies**. If I can convince myself that there is no emergency, I've addressed the primary goal of my specialty. I am very comfortable discharging a patient who presents with a high-risk chief complaint if my diagnostic approach is complete and thorough, and I consider all possible life threats in my decision-making. I reassure such patients that there is no evidence of an emergent condition and no significant interventions are required.

The "rule out emergency" way of thinking **runs contrary to the goals of patients who seek definitive diagnoses**. Patients are accustomed to physicians explaining the cause of their symptoms, not explaining what isn't causing their symptoms. Such goals are very reasonable but can be the source of great frustration for patients when their expectations of a diagnosis go unmet.

I do, in fact, diagnose many conditions during every ED shift. However, when there is no identifiable emergency, I find that many patients are grateful to simply know that they are safe to return home. That said, some patients may still want a diagnosis and will be unsatisfied with my approach. But if my efforts and decision-making are rigorous, I know these patients will live to see another day.

I am often struck by the confusion that many emergency medicine trainees have about the goals of our specialty. They likely chose emergency medicine because of the adrenaline it can conjure, furnished by exciting procedures and heroic interventions. However, **resuscitations comprise less than 2% of the work we do in emergency medicine**.[4] And very quickly, trainees become frustrated by the lack of adrenaline they previously sought. With time, though, most emergency physicians come to realize that **diagnostic challenges keep our minds as engaged as our heroics,**

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and that the identification or exclusion of emergencies is truly our primary goal.

Admittedly, **social ills and a broken health-care system require emergency physicians to manage many nonemergencies**. This frustrates my adrenaline-seeking colleagues. However, I've found peace with this reality. My solace stems from my professional duty to society. I believe that there is a fair arrangement at play between society and me, unspoken, but nonetheless a covenant I agreed to as an emergency physician that comes with expectations. Society has given me an incredibly special honor that is reserved for few doctors: **the opportunity to care for the exciting 2% of patients who require my resuscitative skills – in exchange for my due attention to all the rest**. My decision-making and goals are different for these patients, determined by the social contexts in which their diseases manifest. It's a privilege.

> *Key Point*: The goal of emergency medicine is to identify and manage emergencies, and that goal drives our decision-making. We *think differently*.

Clinical Reasoning

I've talked a lot about recognizing life-threatening conditions and making important diagnoses. But how is that done? How do emergency physicians diagnose emergencies? The answer lies in our methods of cognitive decision-making.

Cognitive decision-making refers to a series of many observations, interpretations, and reasoned decisions.[5] In medicine, cognitive decision-making is the choice of a particular course of action based on physician interpretation of patient data and the stimuli in their clinical workplace. And although some physicians in other

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specialties may use similar methods of clinical reasoning to me, the vast majority do not. Emergency physicians think differently.

Let's consider the practice environment of the ED and its effects on my decision-making. Emergency physicians are bombarded with constant inputs of information about their patients and the circumstances of their diseases. These data must be observed, defined, and determined to be relevant or not in an efficient manner. Much of the information that is readily available is noise and ultimately doesn't impact my decision-making, but that **noise needs to be recognized as such**, requiring some cognitive load. The **absence of important data must also be realized, prompting the need for appropriate diagnostic tests that will yield the missing information**. As data emerge, several courses of action become apparent. I must decide on a preferred option, among a number of other alternatives considered.

Cognitive decision-making is extremely complex. The ways that physicians develop and refine their decision-making processes are theorized, yet their veracity remains a longstanding quandary for medical education researchers. Many conceptual frameworks exist, although supporting data are often lacking.

Two factors must be considered when analyzing the cognitive decision-making of emergency physicians: (a) the type of clinical reasoning process used and (b) the speed with which decisions are made.

Processes of Clinical Reasoning. Psychologists describe two types of cognitive reasoning that drive critical thinking: inductive and deductive reasoning.[6] Physicians predominantly use one reasoning process or the other to make clinical decisions. Both reasoning processes can be time-intensive as clinical data are amassed and considered or can be swift if patient data are readily available and the decision-maker is knowledgeable and experienced.

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Inductive reasoning requires the decision-maker to reach a conclusion based on all of the available evidence. Inductive reasoning processes are **data-driven, and therefore subject to error if critical data are missing**. However, an inductive approach can result in **highly effective pattern recognition over time**, as the individual is exposed to more and more data and cases.

Deductive reasoning takes the opposite approach. The decision-maker first makes a hypothesis and then tries to confirm or refute that hypothesis by gathering and analyzing evidence. Deductive processes are goal-driven and serve as the basis for logic and the scientific method. Deductive reasoning results in diagnoses or classifications.

Emergency physicians **generally employ inductive reasoning**. We receive and consider abundant information until we have enough data by which we reach a conclusion, such as whether an emergent clinical condition is present or absent. We rely on pattern recognition when we manage time-sensitive, high-risk emergencies and have the situational awareness to identify critical data needed for our decision-making process.

Most other physicians use deductive reasoning as they consider the likelihood of possible diagnoses and confirm or refute these by seeking relevant data. A classic example of deductive reasoning is the "morning report" common to internal medicine teaching services.[7] A case is presented and then an exhaustive differential diagnosis is created; methodically, each diagnostic possibility is considered and data are sought to make decisions about those individual hypotheses.

Key Point: Emergency physicians use inductive reasoning to make clinical decisions, whereas most other physicians use deductive reasoning. We *think differently*.

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Speed. Physicians must effectively and efficiently make clinical decisions, and time is a significant driver. One widely accepted theory of critical thinking, the dual processing theory, states that decisions are made at different speeds, some fast and some slow.[8]

"System 1" decision-making refers to fast thinking that is **almost reflexive and automatic, often the result of highly effective pattern recognition that is developed over time and with experience**. Alternatively, "System 2" decision-making is **slow and deliberate, time-intensive, and dependent on the correct interpretation of available information**.

For years, researchers believed that clinical errors could be overcome if physicians used cognitive forcing strategies and more System 2 thinking. However, **many now believe that System 1 decision-making is more accurate, and the way to avoid errors is simply to build the foundational knowledge necessary for correct pattern recognition**.[9]

Emergency physicians rely on System 1 decision-making when they encounter true emergencies, situations in which critical diagnoses must be identified quickly and life-saving interventions performed immediately. In such situations, there is little time for System 2 deliberation.

Emergency physicians must encounter a large number of patients during training to experience the meaningful case variation required for accurate pattern recognition and the development of System 1 decision-making skills. Case variation can be constructed in the absence of high patient volume through the use of simulation or simple "what if" hypothetical questioning with faculty experts.[10]

All physicians develop pattern recognition and exhibit some System 1 decision-making. But most other physicians rely on System 2 decision-making to make specific diagnoses, rather than just recognize patterns. However, emergency physicians

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have time pressures that frequently limit System 2 thinking. Often, the accuracy of their decisions improves with experience, as their clinical decision-making becomes more automated and instinctive.

> *Key Point*: Emergency physicians rely on System 1 decision-making that is efficient and effective when managing emergent conditions. Other physicians more commonly use System 2 decision-making to make specific diagnoses. Emergency physicians *think differently*.

Expertise

The Dreyfus model of skill acquisition theorizes a common trajectory for learners as they develop expertise.[11] Novices are considered *advanced beginners* once they enter a program of study, may progress to *competence* through training, and may become *experts* after longitudinal practice and experience. As learners pass from stage to stage, their problem-solving skills improve.

Advanced beginners have limited experience and superficial knowledge of expected tasks, thus requiring more effortful decision-making and extra time for critical thinking.[11]

Competent individuals are capable of performing tasks to expected standards, even if those standards are high, with few errors or inconsistencies. The time required for competent individuals to think and act is minimal compared to advanced beginners but less efficient than experts. Importantly, not all competent individuals become experts. In the United States, emergency physicians are considered competent for autonomous clinical practice when they successfully complete an accredited residency training program.[12]

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Experts have special or advanced knowledge and skills in a particular field of work that are derived from training and longitudinal experience. Because of their deep foundational knowledge, experts are more likely to act efficiently and effectively when they manage tasks or solve problems common to their field. Expertise in medicine is believed to develop over many years of clinical practice. There are two types of experts: routine experts and adaptive experts.[13]

Routine experts apply their foundational knowledge to efficiently and effectively solve problems that they commonly encounter. Consider the emergency physician who manages common cardiac arrhythmias on a daily basis, such as atrial fibrillation. They have deep foundational knowledge about the anatomy and physiology of the heart, electrocardiogram interpretation, cardiac pharmacologic agents, and cardioversion techniques. Some days they will see atrial fibrillation that is fast, some days the heart rate will be slow. Sometimes the patient will have very high blood pressure, sometimes they will be hypotensive. But each of these case variations are still atrial fibrillation, which is a routine, commonly encountered problem in emergency medicine; over time, the physician becomes an expert at managing this arrhythmia. But what happens when a patient presents with Brugada syndrome, a rare arrhythmia that the emergency physician has never seen before?

Adaptive experts integrate their foundational knowledge to efficiently and effectively solve new or never-before-seen problems. Continuing the previous example, if the emergency physician appropriately managed their first case of Brugada syndrome by drawing on their knowledge of arrhythmias and using effective problem-solving skills, we would regard them as an adaptive expert. **Most (if not all) emergency physicians routinely encounter unusual cases that they have never seen before, regardless of years in practice**. New diseases, diagnostics,

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therapeutics, and social challenges contribute to ever-evolving patient presentations. Social and behavioral determinants of health can create unique circumstances that yield novel clinical problems to solve. And with each passing year, the probability that a physician will encounter a patient with a rare condition increases.

Although the average emergency physician will periodically face uncommon conditions, not all emergency physicians reliably manage such patients efficiently and effectively. Not all emergency physicians are naturally adaptive experts. That said, **the natural frequency with which emergency physicians must manage unusual problems demands a constant refinement of clinical skills, problem-solving, and adaptation of practice**.

Can adaptive expertise be taught? Yes. This is another hot topic that has the attention of medical education researchers. Are all trainees capable of developing adaptive expertise? Maybe.[14] If so, what instructional methods can facilitate adaptable clinical practices? Or, are some trainees simply better problem-solvers than others?

One theory suggests that certain trainees – so-called *master adaptive learners* – exhibit skills, traits, and behaviors that improve the efficiency and effectiveness of their learning and contribute to their development of adaptive skills.[15] These attributes distinguish master adaptive learners from their peers, suggesting that some trainees will never be adaptive experts. However, certain educational techniques have been shown to effectively teach adaptive skills across trainee cohorts.[16]

I consider adaptive expertise to be the primary goal of medical education. It certainly should be considered the ultimate objective of all emergency medicine training programs. Other specialists may never encounter patients with conditions outside of their routine scope of practice. However, emergency physicians are guaranteed to encounter unique or rare problems throughout

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their careers; therefore, it is imperative that they learn adaptive problem-solving skills.

> *Key Point*: Emergency physicians demonstrate adaptive expertise when they efficiently and effectively solve uncommon or unique clinical problems. These adaptive experts *think differently*.

Conclusion

The practice demands of emergency medicine – expectations to accurately identify and treat emergencies, to reason efficiently and effectively, and to expertly adapt practices to any clinical encounter – determine decision-making processes that uniquely distinguish the specialty. Emergency physicians *think differently*.

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