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Qualitative study to understand the use of CT angiography in the diagnosis of pulmonary embolism in the Emergency room setting

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Abstract

Purpose—To better understand the decision-making behind the ordering of CT pulmonary angiography (CTPA) for the diagnosis of pulmonary embolism (PE) in the Emergency Department (ED).

Methods—We conducted semi-structured interviews with our institution’s emergency medicine (EM) providers and radiologists who read CTPAs performed in the ED. We employed the Theoretical Domains Framework (TDF) – a formal, structured approach used to better understand the motivations and beliefs of physicians surrounding a complex medical decision-making – to categorize the themes that arose from our interviews.

Results—EM providers were identified as the main drivers of CTPA ordering. Both EM and radiologist groups perceived the radiologist’s role as more limited. Experience- and gestalt-based heuristics were the most important factors driving this decision; more important, in many cases, than established algorithms for CTPA ordering. There were contrasting views on the value of D-dimer in the suspected PE work up, with EM providers finding this test less useful than radiologists. EM provider and radiologist suggestions for improving the appropriateness of CTPA ordering consisted of making this process more arduous, and incorporating D-dimer tests and prediction rules into a decision support tool.

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Conclusion—EM providers were the main drivers of CTPA ordering, while there was a marginalized role for the radiologist. Experience- and gestalt-based heuristics were the main influencers of CTPA ordering. Our findings suggest that a more nuanced intervention than simply including a D-dimer and a prediction score in each pre-imaging workup may be necessary to curb over-ordering of CTPA in patients suspected of PE.

Keywords

Pulmonary embolism; appropriate imaging; qualitative analysis; Theoretical domains framework

Introduction

CT pulmonary angiography (CTPA) is the gold standard for the diagnosis of pulmonary embolism (PE), a potentially lethal condition in which a blood clot lodges itself in the vasculature of the lungs.¹ While the diagnostic value of CTPA for patients at high risk of PE is significant, there are still harms associated with the procedure which make it less suitable for patients at low risk of PE. Excessive diagnostic imaging utilization can adversely affect patients through injury from intravenous contrast administration, exposure to ionizing radiation, or engender further investigations to resolve incidental imaging findings or false positives.^{2–4} CT may increase patient length of stay when discharged from high turnover areas such as the emergency department (ED).⁵ In spite of these potential harms, up to 72% of CTPAs to rule out PE in the ED may be avoidable.⁶

Several key stakeholders have attempted to enact policies to address overuse of CTPA. The Choosing Wisely campaign, an initiative of the American Board of Internal Medicine Foundation and Consumer Reports, seeks to foster stewardship of medical tests and procedures whose reduction would both improve care and decrease costs. The American Thoracic Society, American College of Chest Physicians, American College of Emergency Physicians, and American College of Radiology have partnered with this campaign and selected reduction of avoidable CTPA as a priority in order to decrease imaging related harms to patients considered low-risk by established criteria.⁷ In spite of this consensus, CTPA remains overutilized in the emergency department setting. Numerous authors have reported high rates of avoidable CTPA use in the ED, ranging between 15–72%.^{6,8–10} Theories to explain such overuse include fear of litigation, distrust of clinical decision rules, and the widespread use of gestalt-based heuristics in place of objective medical decision making.^{10–12} However, no study has engaged providers to explore why they order CTPA in the emergency setting and how these reasons relate to overuse. Before overuse can be addressed using behavioral interventions or other strategies, the barriers and facilitators to appropriate imaging must be understood. There is a knowledge gap regarding the perceptions, attitudes, and norms of physicians ordering and interpreting CTPA in the emergency setting.

The objective of this study was to better understand the complex decision process behind CTPA ordering in the ED using a qualitative research approach. Qualitative methods span many disciplines and fields of inquiry and are especially valuable in obtaining depth and detail on phenomena from the perspective of study participants. Importantly, qualitative

methods are indicated to identify and explore beliefs, values and motivations behind decisions and behavior.^{13,14} Prior studies examining the ordering of advanced imaging found that patients are rarely a significant driver of imaging utilization.^{15,16} We therefore sought to explore the perceptions, attitudes and norms of emergency medicine (EM) physicians and radiologists in the CTPA ordering process. Our findings will be of special interest to patients, physicians, and those seeking to improve the ordering and value of imaging.

Methods

This study was considered by our institutional review board to be a quality improvement endeavor and, thus, exempt from review. Subjects were informed that participation was voluntary, interview transcripts would be anonymized, and no identifying data would be shared with institutional or departmental leadership.

Design

We conducted semi-structured in-depth interviews with EM physicians and radiologists reading ED CTPAs. We felt that these groups were the primary stakeholders and fiduciary decision-makers for patients needing emergent imaging. We used the Theoretical Domains Framework (TDF) to help design an interview guide and to categorize emergent themes.^{17,18} TDF is a theoretical framework that can be used to understand the motivations and beliefs of physicians or patients surrounding a complex medical decision like the ordering of advanced imaging. TDF consists of 12 discrete domains which integrate constructs from a wide spectrum of individual and organizational behavior theories. These domains help identify barriers and facilitators that can affect a medical decision, thus providing a foundation to optimize future interventions and to facilitate implementation.^{19,20,21} Two separate interview guides were created, one for EM providers and one for radiologists. These guides were based on relevant published literature, the investigators' experiences as well as the TDF.

Participants

We used stratified purposeful sampling, defined as intentionally selecting a sample according to a study's needs, to select EM and radiology providers to interview.²² EM providers included physician assistants, residents, and attending physicians who evaluate patients at risk of pulmonary embolism presenting to the ED. There are approximately 170 attending physicians, 60 residents, and 85 physician assistants practicing in our institution's EM department. Radiology providers included residents and fellows, and attending physicians from the emergency and thoracic imaging radiology sections. These radiologists have regularly protocolled and interpreted CTPA examinations for ED patients. There are a total of 121 attending radiologists, 30 fellows, and 37 residents practicing in our institution's Radiology department. The study team contacted potential study subjects and scheduled interviews via email. No monetary compensation was provided. The length of the interviews ranged between 13 minutes and 70 minutes with a mean of 31 minutes. Enrollment was completed after achieving thematic saturation for each group. Thematic saturation is the point at which the range of ideas has been elicited and subsequent interviews do not uncover new information.²³

Data Analysis

All interviews were conducted in person, audio recorded, and transcribed verbatim. Initially, 5 researchers independently coded the first 5 transcripts from each group. This coding team then met to create an initial TDF-based codebook for each provider group. Consensus for how to code the remaining transcripts was then reached. The next 5 transcripts from each group were independently coded by 2 coding team members (MK, ES). The coding for these transcripts was reviewed by the remaining three investigators (SG, DM, SS) to ensure a robust and logical organization and classification of emergent themes into the proper domains. Discrepancies were resolved by consensus. The remaining transcripts were then coded by MK and ES independently, followed by discussion and reconciliation of any discrepancies. If reconciliation could not be achieved initially, the discrepant codes were discussed within the entire coding team until resolved.

The codebook for each physician group was modified and expanded as themes emerged and/or changed in scope. All coded transcripts were entered into MAXQDA [12.1.0; VERBI GmbH, Berlin], a qualitative analysis software package, which was used to organize the interview data and assist with analysis. When thematic saturation was reached for each group, each codebook was reviewed for consistency of use between the themes and domains and was finalized. Thematic consistency was maintained between the groups, where appropriate. Finally, the study team met to review and agree upon the most salient themes and domains arising from the interviews.

Results

EM Physicians

Characteristics of EM providers—We interviewed 20 EM providers: 6 residents, 11 attendings, and 3 physician assistants. [Table 1] The mean post graduate year (PGY) experience for the residents was 3.5 years; attendings had a mean of 7.5 years of practice following training, and physician assistants averaged 11.7 years of practice after training.

EM findings: Key themes identified within relevant domains—Key themes expressed by EM providers identified 5 relevant TDF domains: Social/Professional Role and Identity; Beliefs about Consequences; Memory, Attention and Decision Processes; Environmental Context and Resources; and Goals. [Table 2]

Domain: Social/Professional Role and Identity: The majority of the EM providers felt that they were in a better position than radiologists to assess the appropriateness of a CTPA. EM providers believed it was their duty to order CTPA for any patient in whom the diagnosis of PE could not be otherwise excluded.

“I don’t think the radiologist knows better than we do when to pull the trigger on a different scan. It’s not their skillset; it’s the emergency physician’s skillset.”-EM attending

“That’s sort of what I was talking about in the beginning. If it’s on your radar, it’s a can’t-miss diagnosis, so if you’re thinking about it and you’re thinking about

working somebody up and you can't rule it out by any other means, you're almost honor-bound to do the study of choice."- EM resident

Domain: Beliefs about Consequences: EM physicians reported that fear of malpractice was an important decision factor for other EM physicians ordering unnecessary CTPAs but did not feel this fear was a major driver of their personal behavior. Resident physicians and physician assistants expressed less concern about medico-legal issues than did attendings.

"I think the whole medical legal thing also makes people more inclined to CT someone even if they have a pretty low suspicion just 'cause no one wants to be sued."- EM resident

EM providers expressed a wide variation of opinion on the use and role of the D-dimer test. They were generally dissatisfied with its lack of specificity. In spite of the known false positive rate, an elevated D-dimer left EM providers feeling forced to order a CTPA even in situations where they believed CTPA was not necessary. As a result, some EM providers surveyed actually considered indiscriminate use of D-dimer to be a cause of CTPA overuse.

"I see the D-dimer as becoming an increasingly difficult test to use properly. It has a high false positive rate and in multiple situations which could affect the level of the D-dimer, such as potentially the age, whether or not if somebody is pregnant, how the blood test was obtained. So those all make it very tricky to interpret that blood test."- EM attending

"Yeah, so, I hate the D-dimer. I understand its utility. I think that too many D-dimers are sent when people [have] low clinical suspicion for PE and then they feel boxed in to getting a CTPA, which I also think is wrong. Again, I think the decision to get a CTPA should be based on a clinician's clinical reasoning plus or minus the criteria, plus or minus a D-dimer, but clinical reasoning still should be a big part of that." -EM attending

Domain: Memory, Attention and Decision Processes: ED providers' past experiences with patients, both positive and negative, appeared to be the most important factor guiding their ordering of CTPA. Gestalt was also identified to be important for ordering CTPA. Gestalt-based heuristics were described as complementary to and in certain cases more important than other decision tools.²⁴ Less experienced providers (e.g. residents and junior attendings) reported ordering more CTPAs and relying more on algorithms before ordering those CTPAs than their more experienced colleagues.

"I would say that my clinical experience highly influences my ordering. Because I think there's more, as much as we've developed these decision rules, I think there's a lot to be said about just experience. And having been out for ten years, I think sometimes I feel a certain way about a patient even though they don't fit a certain profile and I'll end up doing something additional for them."- EM attending

"Occasionally, again, if I am concerned, if I cannot explain a patient's symptoms, if there is something in the history that makes me think that they have a high probability of getting PE, I'll just get a CAT scan."- EM attending

EM providers reported using online clinical decision support tools to help inform their CTPA decisions. EM providers demonstrated familiarity with and reported regular use of non-imaging risk stratification tools like the PERC criteria, Geneva score, and Wells' score when ordering CTPA.

“Again, I think my experience is that I trust the decision making tools and I trust the well-established up-to-date PE algorithms. I think that’s made me a safe practitioner around this area. To my knowledge I haven’t had any disasters and I also don’t think that I over-order. I certainly don’t over-order. If anything, I probably under-order. I’m certain that I’ve missed a PE or two that I don’t know about but I haven’t missed a clinically significant one.”-EM attending

Domain: Environmental context and resources: EM providers described CTPA ordering as an important topic frequently discussed among peers. Most EM providers acknowledged there to be a low threshold for ordering CTPA when there was any potential for a diagnosis of PE based on chief complaint or clinical evaluation. EM providers perceived ordering practices to be highly variable across their peers. They also reported an absence of significant barriers to the ordering process, aside from patient specific factors such as IV contrast allergy. EM providers felt this ease of ordering along with rapid reporting of results was a facilitator of CTPA utilization. EM providers indicated that establishing a diagnosis simplified patient disposition regardless of whether it was discharge or admission to an inpatient unit. Some providers felt that the definitive nature of CTPA encouraged its early utilization and discouraged the use of D-dimer, which was felt to delay disposition.

“I think for any test if it’s very, very available and it’s fast and it’s easy to do and it doesn’t take a lot of time and there’s more turnaround on the report; then we’re just more likely to use it more.”- EM attending

“Well I mean, diagnosis. Diagnosis is big. And unfortunately a lot of times it makes disposition easier – so getting an image will make it easier for you to get a patient out of the department – either home or upstairs. So that’s why a lot of times I think even when I started transitioning to a more liberal practice, I would err on the side of imaging as soon as possible because even that delay and waiting for the dimer could keep the patient in the department longer. – EM resident

Overall, there did not appear to be consensus regarding a best practice for CTPA ordering. Competing factors including acting in the patient’s best interest, appeasing outside referring physicians, and avoiding litigation drive overuse of CTPA.

“So if you order a CT that turns out negative, no one is ever gonna say, “Why did you order the CT? It was negative.”... All incentives are for you to over-order. If you miss a PE and there’s a bad outcome you’re hung out on a branch to dry basically. – EM attending

Domain: Goals: EM providers had various ideas to improve guideline-concordant CTPA ordering, including a Wells' score-based decision support tool. Such a tool might help standardize and validate the selection of CTPA. Another EM provider suggested making the image ordering process “less convenient.”

“I think it should actually be harder (to order CTPA). I think it’s too easy. I think maybe prompting when we order it to encourage people to order dimers because I feel like we often just order it.... Maybe there could be like an EHR sort of fix that when we order a CTPA, it will make us put the Wells score? And it won’t be a hard stop but would make us reconsider our decision. Or maybe encourage us to order a dimer. Stuff like that. Because I feel like it’s probably a little bit too easy, I think we probably order too much.”- EM resident

“it would probably be valuable to make the process less convenient because the threshold is so low to order CTs it would probably be valuable, although there would be resistance to it, it would probably be valuable to insert steps into the process that would make it a little bit more burdensome to order this test”- EM attending

Radiologists

Characteristics of radiologists—We interviewed 13 physicians: 3 residents, 2 fellows and 8 attending physician radiologists. [Table 3] The mean post graduate year (PGY) experience for the residents was 5 years, 6 years for the fellows, and 16.1 years of practice after training for the attendings.

Radiologist findings: Key themes identified within relevant domains—The most important themes for radiologists were evident in 4 domains: Social/Professional Role and Identity; Emotion; Memory, Attention and Decision Processes; and Goals. [Table 2]

Domain: Social/Professional Role and Identity: Radiologists believed that their main role in the ordering process for CTPA was to protocol the imaging order and address technical questions related to patient factors, such as contrast allergies, renal function, and pregnancy. The majority of radiologists did not feel it was their duty to determine which specific patients should or should not undergo a CTPA.

“We don’t really risk stratify as a radiologist: the ED risk stratifies and we just protocol the study and read it. So it’s not really within our realm.”-Radiology fellow

“I don’t think I should be in the position of determining if the patient should be ruled out for PE because that’s really the clinician’s job.”- Radiology attending

Domain: Emotion: Radiologists described their current role in CTPA ordering with varying degrees of frustration and resignation. They frequently discussed frustration when describing EM providers who may bypass standardized ordering guidelines (e.g. ACR appropriateness criteria) and preliminary non-imaging tests (e.g. D-dimer blood test), or who do not consider radiologists as partners in the ordering process.

We should be like any other medical specialty, when our service is requested, we should be consulted, and they shouldn’t be orders they should be requisitions. They are asking us to help them answer a clinical question. ”- Radiology attending

Radiologists often expressed sentiments of resignation along with frustration when they described a sense of futility over questioning a CTPA order. They felt 1) questioning the order was a waste of time, as the test would be done anyway, 2) questioning the order would provoke a negative interaction with the primary clinician, and 3) allowing the order to proceed may even produce an ancillary benefit by discovering a clinically relevant incidental finding. Radiologists felt they were not allowed to refuse this type of study no matter the study's indication or appropriateness.

Sometimes they really don't give you any history, to be honest. You see many exams ordered, "Rule out PE," and that's all that you have. ...we often just go ahead and do the exam, to be honest, because it ends up creating a lot of lost time and you don't really want to argue with anyone"- Radiology attending

Domain: Memory, Attention, and Decision Processes: Radiologists were familiar with common risk stratification guidelines and believed them to be important for appropriate CTPA ordering. However, radiologists did not feel confident that the risk stratification was routinely performed.

"Whether they're doing an official Wells' Score, PERC or whatever, or just doing their gestalt; I can tell from the history that they're actually answering negative to the risk factors. You know the common risk factors. So, those patients would therefore be really considered low risk."- Radiology attending

"Never, I don't think I've ever seen it [risk stratification in patient chart]."- Radiology attending

Radiologists also felt strongly about the necessity of ordering and correctly interpreting a D-dimer test for patients with low risk of PE. They believed that D-dimer should be used more frequently in the ED.

"I mean, if someone's getting a PE study that (D-dimer) should be positive... I don't think there's any reason why it shouldn't be. So, if the D-dimer's negative there should be no suspicion of PE, as far as I'm concerned."- Radiology attending

"So, I find it's, from our perspective, on the patients that I've talked about with the ER, [D-dimer is] not very much used only because they don't trust it either way. So it doesn't seem to be in decision pathway nor does it seem to be something we can be like, 'Oh well instead of radiating the patient can we send a D-dimer first?' Usually the answer is, 'No, 'cause we don't care what the result is anyway.'"- Radiology resident

Domain: Goals: While radiologists expressed acceptance of a role they themselves perceived as limited, the majority still wished to see interventions put in place to standardize the CTPA ordering process and improve documentation of the ordering providers' clinical reasoning. Several suggested the mandatory reporting of a Wells' score or PERC assessment in the patient record.²⁵⁻²⁷ Additionally, the majority of radiologists desired mandatory ordering of basic diagnostic modalities, such as D-dimer and chest x-ray, before considering CTPA.

“I think if we had evidence that they actually did a pre-test probability or if there was some, maybe in [the institutional CPOE (Computerized Physician Order Entry system)], having the Wells score or the other like PERC ...that would make us feel better about it and understand it instead of us feeling like it's just kind of like a shotgun thing that they do.” - Radiology attending

“there should be some criteria that you have to fulfill in order to place the exams. So, like a positive D-dimer should be one of them for a PE study.”- Radiology attending

Discussion

Our theory-based, qualitative exploration of CTPA ordering for patients at risk of PE yielded important insights into the roles of key stakeholders and factors influencing their decision making. Both EM providers and radiologists identified EM providers as the party responsible for CTPA ordering. Both groups perceived the radiologist's role as limited: confirming protocol appropriateness, answering technical questions, and explaining imaging contraindications. EM providers described experience- and gestalt-based heuristics as their most important consideration when ordering CTPA; often more important than evidence-based algorithms or D-dimer. Both groups also saw deficiencies in the current practice of CTPA ordering and wish to work to improve guideline-concordant imaging.

EM provider experience- and gestalt-based heuristics appear to be the main influencers of imaging ordering. While most EM providers reported using a decision tool, they also stated such tools were unlikely to sway decision-making if they already felt that the patient was at moderate risk for PE based on a personal heuristic. EM providers also reported inconsistently documenting the medical decision-making process or prediction scores. This failure excludes radiologists from the decision-making process. The use of gestalt-based heuristics in CTPA ordering has been explored in prior studies without a clear indication of its association with guideline-concordant imaging. Gestalt-based heuristics have outperformed both Wells' and Geneva scores in predicting PE.²⁸ On the other hand, EM providers' preference for gestalt-based heuristics over clinical decision rules has been postulated as a main reason for CTPA overuse.¹⁰ The subjective portion of the Wells' score - “PE was the most likely or as likely as any other diagnosis” - may increase the perceived risk of PE and justify the increased use of CTPA to confirm that suspicion.¹²

In addition to experience- and gestalt-based heuristics, we observed that the fear of missing an important diagnosis like PE and its medicolegal implications was another factor facilitating CTPA utilization. This phenomenon is well-described in prior CTPA and advanced imaging research.^{10,11,15} A survey of EM providers suggested that defensive medicine was the reason for CTPA ordering among 55% of study subjects.²⁹ Fear of litigation was considered more important than a Wells'/Geneva score and more important than the expediting of a diagnosis in prior studies.²⁹

There were conflicting views on the utility of D-dimer. While radiologists believed D-dimer was an integral part of the PE workup, EM providers found D-dimer results difficult to interpret when elevated. In certain cases, EM providers felt pressure to order a CTPE based

solely on a positive D-dimer result even when they felt PE was unlikely. This distrust of D-dimer in situations where the risk of PE is very low seems to lead EM providers to avoid D-dimer in other situations where it could be helpful. Perhaps for this reason or simply to expedite CTPA, EM providers reported regularly bypassing the D-dimer.

The Choosing Wisely initiative recommends using D-dimer and clinical decision rules to guide CTPA ordering in low risk patients. However, our EM providers' opinions of the importance of experience- and gestalt-based heuristics relative to D-dimer testing and prediction rules suggest that simply implementing such decision rules may not be an effective tool to decrease CTPA overutilization. Yet, both EM providers and radiologists, when asked how to improve the ordering process, suggested incorporating D-dimer or prediction scores to standardize the CTPA ordering process.

These paradoxes suggest that a more nuanced intervention may be necessary to curb overuse of CTPA. Such an intervention will likely need to be multifaceted, combining several implementation strategies.^{30,31} A successful decision support tool will likely need to address and incorporate both the EM provider's bias toward experience- and gestalt-based heuristics as well as evidence-based criteria that would help standardize the ordering. Additionally, an audit/feedback component to inform EM providers of their CTPA ordering habits and pertinent results like the yield of positive PE imaging exams with comparison to peers could be incorporated. This would provide continuous feedback on EM provider performance, which can lead to more rapid improvements in imaging ordering.¹⁹

Limitations

Our study has several limitations. First, our findings are based on semi-structured interviews with a group of radiologists and EM providers representative of the important stakeholders in the CTPA ordering at our academic institution and may not be generalizable to other clinicians in other settings. Second, patients were not included in our qualitative analysis. Although neither group mentioned patients as a major influencer of CTPA ordering, patients may have provided important insights regarding their preferences for evidence-based imaging or may have provided confirmation that they are not concerned with the specifics of their clinical workup. Future work should address this perspective.

The study's strengths include utilization of a qualitative approach, novel to this clinical problem. These data help us understand the motivations and beliefs of physicians involved in this imaging process and can now inform potential interventions to improve the ordering of this examination.¹⁹

Conclusion

The results of our qualitative analysis suggest that EM providers are the main drivers of CTPA ordering. Experience- and gestalt-based heuristics were the main influencers of CTPA ordering, while radiologists perceived a limited role. Both EM providers and radiologists saw deficiencies in current practice and both wished to work to improve guideline-concordant imaging. There were inconsistencies between how EM providers currently order CTPAs and what they believe would improve this process. These findings suggest the

necessity for a nuanced, multi-faceted intervention rather than the directly stated desire for clinical decision support including a D-dimer and a prediction score.

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Summary Sentence

A successful decision support tool will likely need to address and incorporate both the EM provider’s bias toward experience- and gestalt-based heuristics as well as evidence-based criteria that would help standardize the ordering.

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Take Home points

1. Experience- and gestalt-based heuristics were the main influencers of CT Pulmonary angiography (CTPA) ordering for the evaluation of pulmonary embolism, often more important than evidence-based algorithms or D-dimer.
2. Both emergency medicine and radiology groups perceived the radiologist's role as limited: confirming protocol appropriateness, answering technical questions, and explaining imaging contraindications.
3. While radiologists believed D-dimer was an integral part of the pulmonary embolism workup, emergency medicine providers found D-dimer results not as useful.

Table 1

EM Provider Demographic Information

Total Interviewees	20	
<i>Age: Mean (Range)</i>	36 (28–46)	
<i>Sex: Female, Male</i>	8, 12	
<i>Position Held</i>	Attendings	11
	Residents	6
	Physician assistants	3
<i>Average Years of Experience</i>	Attendings	7.5 (post training)
	Residents	3.5
	Physician assistants	11.7 (post training)
<i>Board Certification Status</i>	Board certified	14
	Board eligible	4
	Not board certified	2

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Table 2

Most Applicable Theoretical Domains Framework Domains for Emergency Medicine and Radiology Providers

Relevant EM domains	Relevant Radiology Domains
Social/Professional Role and Identity	Social/Professional Role and Identity
Beliefs about Consequences	Emotion
Memory, Attention, and Decision Processes	Memory, Attention, and Decision Processes
Environmental Context and Resources	Goals
Goals	

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Table 3

Radiologist Demographic Information

Total Interviewees	13	
<i>Age: Mean (Range)</i>	41.8 (30–57)	
<i>Sex: Female, Male</i>	8, 5	
<i>Position Held</i>	Attending	8
	Fellows	2
	Residents	3
<i>Section</i>	Thoracic imaging	6
	EM radiology	2
	Not yet specified	5
<i>Average Years of Experience</i>	Attending	16.1 (post training)
	Fellows	6
	Residents	5
<i>Board Certification Status</i>	Board certified	9
	Board eligible	4

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