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The Leaky Pipeline in Emergency Medicine: Understanding Factors Pushing Women Away and Informing Interventions

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while on shift in the ED. The impact of using EBM on shift to patient care has not previously been described.

**Objective:** This project seeks to describe how EBM activity by EM residents impacts clinical patient care.

**Methods:** This IRB approved study was conducted by a PGY 1-4 EM residency. Residents are required to complete logs of on-shift EBM activity in the program’s procedure software system New Innovations™. The logs are a convenience sample, with an N of 3-5 per 28-day EM rotation. The logs include a patient description, clinical question, search strategy, information found, and subsequent application. Using qualitative methodology described by MacQueen (CAM 1998), a codebook was created to analyze resident free text to the prompt: “Based on your research, would you have done anything differently”. The coding framework is shown in Table One. Results are analyzed descriptively.

**Results:** From June 2013 to May 2020, 11,145 discrete logs were identified. Of these, 571 were excluded (298 incomplete and 273 duplicate), leaving 10,574 logs for analysis. These logs were completed by 137 residents, of which 46 were female (34%). The 10 most utilized log codes (97.5%) are in Table One. The remaining 29 codes were 2.5% of the dataset. A total of 1977 (18.7%) logs affirmed that

**Table 1.** Qualitative analysis of resident reported application of EBM to individual patients while on shift.

Code	Meaning	Total (%)	PGY 1 (%)	PGY 2 (%)	PGY 3 (%)	PGY 4 (%)
231	The care of this patient was not influenced by what was looked up PLUS the care of future patients may be influenced by what was looked up PLUS the possible change in future care is based on evidence OR The care of this patient was not influenced by what was looked up but learned something based on evidence that may be applied in the future OR A clinical question was asked without reference to a patient and some useful information based on evidence was learned for possible future use	3343 (31.6)	880 (26.3)	877 (26.2)	679 (20.3)	907 (27.1)
331	The care of this patient may have been influenced by what was looked up PLUS the care of future patients may be influenced by what was looked up PLUS the possible change in present and future care is based on evidence OR Evidence was found, but there was no indication of whether what was looked up influenced the care of this patient or will influence the care of future patients	2263 (21.4)	450 (19.9)	522 (23.1)	512 (22.6)	779 (34.4)
221	The care of this patient was not influenced by what was looked up PLUS the care of future patients will not be influenced by what was looked up PLUS this decision to not change care was based on evidence OR What was looked up confirmed what was already being done PLUS the care of future patients will not be influenced by what was looked up PLUS this decision to not change is based on research	1319 (21.4)	278 (21.1)	311 (23.6)	298 (22.6)	432 (32.8)
211	The care of this patient was not influenced by what was looked up PLUS the care of future patients will be influenced by what was looked up PLUS this future change in care is based on evidence	1062 (10.0)	348 (32.8)	249 (23.4)	202 (19.0)	263 (24.8)
131	The care of this patient was influenced by what was looked up PLUS the care of future patients may be influenced by what was looked up PLUS this change in care is based on evidence	1047 (10.0)	246 (23.5)	221 (21.1)	230 (22.0)	350 (33.4)
311	The care of this patient may have been influenced by what was looked up PLUS the care of future patients will be influenced by what was looked up PLUS the change in future care is based on evidence	443 (4.2)	134 (30.2)	114 (25.7)	82 (18.5)	113 (25.5)
111	The care of this patient was influenced by what was looked up PLUS the care of future patients will be influenced by what was looked up PLUS this change in care is based on evidence	392 (3.7)	97 (24.7)	92 (23.5)	92 (23.5)	111 (28.3)
431	The care of the present patient was influenced by outside influences (e.g., an attending physician made the decision, treatment was deferred to a specialist, the most efficacious treatment method was not able to be provided) PLUS the care of future patients may be influenced by what was looked up PLUS the possible change in future care is based off of evidence	265 (2.5)	57 (21.5)	67 (25.3)	59 (22.3)	82 (30.9)
227	The care of this patient was not influenced by what was looked up PLUS the care of future patients will not be influenced by what was looked up PLUS found contradictory evidence OR The care of this patient was not influenced by what was looked up PLUS the care of future patients will not be influenced by what was looked up PLUS the evidence found was outdated OR The care of this patient was not influenced by what was looked up PLUS the care of future patients will not be influenced by what was looked up PLUS the evidence found was insufficient/low quality and was not strong enough to change the decision on how to treat the current or future patients	97 (0.9)	21 (21.6)	22 (22.7)	20 (20.6)	34 (35.1)
411	The care of the present patient was influenced by outside influences (e.g., an attending physician made the decision, treatment was deferred to a specialist, the most efficacious treatment method was not able to be provided) PLUS the care of future patients will be influenced by what was looked up PLUS the change in future care is based off of evidence	80 (0.8)	23 (28.8)	22 (27.5)	12 (15.0)	23 (28.8)
Other	The aspects of evidence acquisition and application included scenarios not articulated in the above categories.	263 (2.5)	53 (20.2)	68 (25.9)	61 (23.2)	81 (30.8)

evidence researched will change their future practices. Of those, 392 (3.7%) explicitly stated their research influenced care while the patient was in the ED.

**Conclusions:** In this single site cohort, residents were able to successfully link EBM activity to individual patients using the program’s procedure recording software. In almost one fifth of this convenience sample, residents described how the activity changed their individual clinical practice of EM, with one in 27 changing patient care in real time. Logging EBM activity appears to generate ACGME outcomes data.

**Table 2.** Resident reported application of EBM leading to a change in future patient care.

Code	Count (% of total logs)	Examples	
211	1062 (10.0)	I'm going to stop prescribing cough medication with codeine since the evidence doesn't seem to support its use and we're in the midst of an opioid epidemic. It's over the counter cough medicine all the way. If we're going to use a placebo, that will be my placebo of choice.	In the future, I will give fentanyl if patient does not get relief with, or cannot have, nitroglycerin.
311	443 (4.2)	At the start of my Peds EM month, I was unsure of which to use for acute pain. APAP or ibuprofen. Parents would ask me, and I was unsure. Now I feel more confident in what I want to use for pain relief in the peds population. Ibuprofen is now my go-to for pain relief as long as there are no obvious contraindications. It was what I will tell parents to use at home. I am less inclined to give prescriptions for acetaminophen with codeine.	Based on criteria for severe CAP, I will now use steroids as part of my treatment plan or at least have a conversation with admitting team about adding on steroids. This Cochrane study showed great benefits of steroids with little side effects (hyperglycemia). Now the study only speaks about severe CAP. I would like to see study on non-severe CAP or hospital/vent associated pneumonia which we see commonly as well. I would assume it would help just as much for HCAP.
111	392 (3.7)	We were planning to treat the patient with a fluoroquinolone to cover enteric organisms, but after looking on PEPID we decided to add the recommended IM $\beta$ -lactam before he was discharged. In the future with this demographic of patient I would use the same regimen.	When I was literally pressed for time in order to help save a man's life, I relied on Lexicomp™ to give me reliable dosing for TPA for thrombolysis of a massive PE. I would not do anything different in the future - Lexicomp™ was quick and reliable.
411	80 (0.8)	It is unacceptable that neurologists in a certified stroke center are going based on outdated guidelines. In retrospect I should have challenged them further to push TPA. In the future I will review literature timelier to advocate the best options for patient.	No benefit of anti-virals. I brought up these articles but was unable to convince the attending. I would not use anti-virals in future cases.
<b>1977 (18.7% of total) of EBM logs indicated evidence acquisition that will influence future patient care.</b>			

## 7 The Leaky Pipeline in Emergency Medicine: Understanding Factors Pushing Women Away and Informing Interventions

*Nicole Klekowski, Sarah Balgord, Rosemarie Diaz, Alex Farthing, Sylvia Escolero, Koryanne DeCloux, John Burkhardt, Mahshid Abir, Adrienne Haggins, Laura Hopson*

**Learning Objectives:** Understand the environmental factors which influence selection of Emergency Medicine as a specialty by women medical students.

**Background:** Women represent 28.3% of EM physicians. There is now gender parity in US medical

schools, but women applicants to EM ranges 33-37%. Prior research does not explain these gender differences. There are known differences in resident experiences and assessments based on gender.

**Objectives:** We sought to explore how clinical experiences and perceptions of the specialty influence selection of EM by women.

**Methods:** Using purposive and convenience sampling to represent diverse learning environments, we conducted semi-structured interviews of men and women US senior medical students who considered EM as a specialty. Interviews were transcribed, de-identified, and coded using constant comparative analysis until saturation. We conducted thematic analysis using a constructivist approach and grounded theory. Reflexivity and credibility activities were performed.

**Results:** 25 students from 11 geographically diverse schools completed interviews. 68% (17/25) were women. The majority (21/25) expressed commitment to EM. Four main themes were identified: 1. EM culture was perceived as exclusionary; 2. Beliefs about attributes of EM physicians and the specialty were influenced by gender; 3. Distressing patient encounters and physician/staff behaviors negatively affected students; and 4. Access to mentors, representation and exposure to EM affected interest. Table 1.

**Conclusions:** The EM gender differential is affected by societal gender roles and an environment that rewards traditional masculine traits. Conflict with behavioral norms may hinder women forming their professional identity as an emergency physician. Potential interventions include recognizing the gendered perception of the field; establishing early, longitudinal mentoring and engagement with the specialty; and building a supportive culture to overcome mistreatment concerns. As for limitations, students hold multiple intersecting identities, and this study primarily focused on gender.

## 8 Towards an Explanatory Framework of Informal and Incidental Learning in Medical Education: A Deductive Analysis of Critical Incidents from Frontline Physicians Working During the COVID-19 Pandemic

*Dimitrios Papanagnou, Urvashi Vaid, Henriette Lundgren, Grace Alcid, Deborah Ziring, Karen Watkins, Victoria Marsick*

**Learning Objectives:** Our study aims to describe how emergency medicine physicians engage in and rely on informal and incidental learning when working through the uncertainty of clinical practice.

**Background:** Informal learning is implicit, organic, and unstructured. Opportunities for informal learning arise in ill-structured, unstable environments where established processes may fail to provide a means of understanding situations or to develop strategies to problem-solve. We examined the Marsick and Watkins Model of Informal and Incidental Learning (IIL) as a framework to describe how physicians learn in the clinical environment, particularly when working through heightened uncertainty.

**Objective:** Our study aims to describe how emergency medicine physicians engage in and rely on informal and incidental learning when working through the uncertainty of clinical practice.

**Methods:** A qualitative deductive analysis of physicians' narratives using the critical incident technique was conducted to gain an understanding of the components of IIL. Six frontline emergency medicine and six critical care physicians who worked during the height of the pandemic (March-June 2020) were interviewed. Investigators shortened narratives from recorded, transcribed interviews into cohesive, chronological stories using participants' words. We applied codes from the IIL Model and engaged in constant comparative analysis to identify categories, patterns, and sequences of IIL.

**Results:** Data suggest that the IIL Model and its components serve as an explanatory framework to describe physicians' learning during uncertainty (Table 1). Consistent with previous research from the non-healthcare sector, the complexity of IIL is captured as cyclical, non-linear, non-sequential and highly intertwined with patient care.

**Conclusions:** Data from physicians' critical incidents clarifies understanding of IIL when working through clinical uncertainty. The Marsick and Watkins Model offers an explanatory framework for how IIL may guide educational programming that links to stages of IIL to prime students for the learning they will engage in when in clinical practice.

**Table 1.**

Themes	Illustrative Quotes
EM culture was perceived as exclusionary	"...men, and this could be like attendings and residents... like the way that they refer to each other, ways that... seem to have this, ... bro-y... collegiality, that's not always accessible to other people." (Female EM-bound student)
	"I was telling this one attending that I want to do emergency medicine, and he was like, "Oh, it'd be a great specialty for you as a woman because when you have kids, it's easier to work part time." I'm like, "That's making a lot of assumptions about what I want to do and it's definitely not why I'm choosing emergency medicine so that I can work part-time." (Female EM-bound student)
Beliefs about attributes of EM physicians and the specialty were influenced by gender	"I think I probably benefited probably more so just... being a tall white male... I think that... people got along with me pretty easily." (Male EM-bound student)
	"...emergency docs... come in and save the day and they can do anything and they're resuscitating, and I... like those kind of traits, ... being a team leader are more typically masculine traits as opposed to like the kind pediatrician and family doctor who are going to sit down and talk about your feelings." (Female EM-bound student)
Distressing patient encounters and physician/staff behaviors negatively affected students	"And at one point one of the nurses was asking two male doctors on an overnight shift to assess her breast implants, not assess them in a medical sense like, do you think I have an infection? But assess like, do you think these make me look hot? And won't this look better if my boobs were two inches higher? And that was just very uncomfortable and bummed me out, because I was like, I don't want these to be my people." (Female EM-bound student)
	"There were a lot of just inappropriate conversations between doctors and nurses joking about sending each other dick pics" (Female EM-bound student)
	"And some of the nurses were criticizing [a 15 or 16 year old female patient who had a miscarried] and speaking about her at the nurses station about how she should be grateful that she's not pregnant anymore... I mean, I've never been pregnant so I can't imagine. And I was really upset that they were talking about her like that so I finally said something and they were pretty snappy back to me as well and kind of reiterated that she should be grateful." (Female EM-bound student)
Access to mentors, representation and exposure to EM affected interest	"... I had... the opportunity to see some really strong women in emergency medicine. And I think if I hadn't seen that and I just had... the experience of my residents, for example who are mostly men, I don't know if I would have wanted to do it." (Female EM-bound student)
	"So I struggled to even find an advisor or somebody who would talk with me or help me out until my M3 year when I finally got into contact with somebody at the main campus where there is an EM program..." (Female EM-bound student)