The Long Game: The Evolution of Readiness-For-Practice from Intern year to Fellowship

Research Highlights
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Purpose: Medical knowledge and clinical judgment are key components of graduate medical education (GME) which must be matured to support trainees readiness for practice. Although the level of autonomy and entrustment naturally evolves throughout residency, it is important to ensure that we are graduating residents and fellows who are ready for independent practice in the community. Few studies have been conducted to investigate this topic across a full GME training spectrum. The purpose of this study was to explore the developmental approaches and trajectory of trainee readiness for practice in surgical specialties throughout their training.

Methods: We conducted semi-structured focus group interviews with 45 residents and fellows from the General Surgery (GS) and Obstetrics & Gynecology (OBGYN) departments using convenience sampling. Audio recordings of each interview were transcribed and iteratively analyzed by four coders (junior resident, senior resident and fellow). Emergent themes were identified using a framework method.

Results: The total of 16 junior residents (PGY 1-2; 8 GS, 8 OBGYN), 22 senior residents (10 GS, 12 OBGYN) and seven fellows (5 GS; 2 OBGYN) participated. The progression of readiness-for-practice from an inexperienced surgical trainee to an experienced surgical trainee consisted of the gradual acquisition of medical knowledge and the subsequent application of that knowledge to independent clinical decision making. Inexperienced trainees (junior residents) described how they strived to develop their medical knowledge to enhance their clinical decision making. This included taking abstract information and knowledge they have about disease processes and making the concepts concrete in their applications to everyday patient care. For example, junior residents describe knowing the causes of post-operative hypotension, but then recognizing the problem and ordering the appropriate tests. In contrast, the experienced trainees (chief residents and fellows) noted that it was critical for them to transit their concrete knowledge of patient care into abstract understanding. They have the knowledge of how to perform an operation and routine peri-operative care. However, to be ready for independent practice, they must be able to absorb and apply that knowledge in the care of their future patients. Consultations and independent evaluation of patients were two developmental approaches described by trainees which contributed to the growth of their decision-making during residency. Residency program curriculum or service structure also had an impact on trainees self-entrustment and reported readiness for practice.

Discussion: Readiness-for-practice stems from trainee self-entrustment. This is forged by concurrent increases in medical knowledge and challenges in clinical decision-making capability. Clinical autonomy as a PGY1 resident of course manifests and functions in a different manner than readiness-for-practice as a fellow. Junior residents would expect to be ready to independently perform bedside procedures and evaluate patients with common problems such as urinary retention and inadequate pain control. Fellows and chief residents, however, expect they would be ready to construct an operative plan for more complex surgical cases and anticipate peri-operative challenges. Alignment between trainees expectations and progressive readiness would be important for programs to improve their training efficiency and increase readiness for practice.
Significance: This study provided further evidence of the multidimensional nature of UME students perceptions and preferences concerning the instructional tools used to teach them. The findings obtained in this study can help instructors and researchers in medical education to improve the practice of formative assessment in self-directed learning environments. To our knowledge, our study was the first to investigate surgery and OBGYN trainees readiness for practice across a full GME training spectrum. Our findings provide additional in-depth understanding of this developmental pathway and expectations of readiness for practice from the perspective of the trainee. There is a notable difference in the appearance of readiness-for-practice between inexperienced and experienced surgical trainees, which highlights the need for new educational components to smooth the gap. We hypothesize programs can refine their training and/or rotation curriculum to accomplish this task. This could include a resident run clinic or a resident-run inpatient service. (Wojcik et al., 2016; Jarman et al., 2018)
An Exploratory Study of Career Inflection Points at Four Institutions

Research Highlights
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Purpose: A career in academic medicine is a competitive process, involving multiple decision points, some of which can have profound personal and professional implications(1). Medical students typically anticipate a straightforward career trajectory, but in actuality, academic physicians adapt and construct their careers over time. We (the research team) conducted a GEA-funded exploratory study to investigate career inflection points (CIPs), defined as events that fundamentally influence or alter career trajectories. (1) We used the Career Construction Theory (CCT)(2, 3) as one of several interpretive lenses to characterize how individuals adapt and construct their careers. According to CCT, career construction involves four dimensions, each representing a general adaptive response: (a) sensing concern about ones future career, (b) increasing personal control, (c) displaying curiosity, and (d) gaining confidence to take action.

Methods: We conducted semi-structured interviews with a convenience sample of six academic pediatricians at four institutions (n=24). We conducted and recorded interviews at our respective institutions. The interviewer began by asking interviewees to reflect on CIPs for 3-5-minutes and then verbally describe those CIPs to the interviewer. The interviewer probed for more information about CIPs, e.g., the impact of intrinsic and extrinsic factors pertinent to each CIP. Data collection and data analysis overlapped. The study team developed codes and iteratively refined the codebook, based on incoming data and monthly discussions. Institutional leads coded their interviews and shared coded excerpts with the rest of the team. Given the chosen interpretive lens, we focused on codes related to CCT: concern, control, curiosity, and confidence.

Results: On average, interviewees describe 4-6 CIPs spanning pre-medicine to post-residency. The frequency with which each CCT dimension occurred varied by interviewee and by the institution. Nevertheless, Control occurred more frequently than Concern; Curiosity and Confidence occurred considerably less frequently than Control or Concern. Interviewees expressed Control when, for example, they made personal decisions that conflicted with the advice from others (The division chief said, why are you wasting your time doing that and I said because I like to and I had to make something of my time*). They expressed concern about actual and anticipated career challenges (I cant work in this kind of environment...I thought about it, and realized I really liked kids with pulmonary hypertension even though they were scary). They expressed Curiosity by exploring future outcomes (I knew I wanted to do work with teenagers, but in med school I had good mentors who were surgeons and its like, thats cool, do I want to do that? ). They expressed Confidence when they were aware of their innate and acquired abilities (In the NICU, I was like, oh, my God, they nitpick every little number. But actually, I got good at it).

Discussion: Our study provides theory-informed insight into the influence of Control, Concern, Curiosity, and Confidence on the career trajectories of academic pediatricians. With the increasing competitiveness in academic medicine(4), it may not be surprising that CIPs often involved the general adaptive response of Control. CIPs capture pivotal moments in ones career trajectory; the results of our exploratory study shed light on how individuals respond in those pivotal moments and warrants further investigation beyond pediatrics.
**Significance:** Our interest in CIPs stems from a desire to help trainees adapt and construct careers that align with their talents, interests, and life-style preferences, even if that means straying from a singular career trajectory. We believe that doing so, will reduce the risk of career dissatisfaction. We are building on our findings and developing tools to assist trainees and career advisors in the process of career construction.
Prior healthcare employment and performance in medical school

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Purpose: Increasing numbers of medical students take time between undergraduate training and matriculation to medical school. What students choose to do during that gap time is variable, but increasing numbers of medical scribe positions afford students an opportunity for experience in paid healthcare positions. Studying the impact of prior healthcare employment on student performance in medical school may impact pre-medical advising practices. We sought to examine the hypothesis that students with healthcare employment prior to matriculation will perform better than their peers while in medical school.

Methods: We performed a single-institution retrospective cohort analysis of four consecutive classes of medical students who matriculated to our institution between 2012 and 2015. Admission records were examined for history of prior paid healthcare employment and students who had been employed in healthcare with direct patient contact for at least six months were identified (PHE cohort). Students with non-paid healthcare experience or research experience only were not included in the PHE cohort. MCAT scores, sex, age, and race were also collected from admissions applications. To assess performance in medical school, we examined USMLE Step 1 score, Step 2 CK score, AOA status, Gold Humanism status, and institutional year 3 clerkship performance metrics which included faculty evaluations and NBME Shelf exam scores.

Results: The PHE cohort comprised 11% of the entire student cohort and the number of students with prior healthcare employment increased each year, from 6% in 2012 to 16% in 2016. Thirteen different healthcare positions were represented with 63% of students reporting employment as a scribe or medical assistant. Baseline demographics were similar between the two cohorts as was MCAT score. Step 1 and Step 2 CK scores did not differ between the two cohorts. PHE students outperformed their peers in year 3 clerkships, with significantly higher scores on NBME shelf exams, clinical clerkship scores, and number of clerkship Honors. The cohorts did not differ in the percent of students elected to AOA or Gold Humanism Society. Further analysis revealed a positive trend of PHE students outperforming their peers in each individual third year clerkship, though only four achieved a p-value of <0.05.

Discussion: Students with prior healthcare employment, while performing similar on the MCAT and Step exams, outperformed their peers in all examined third year metrics. Clerkship performance and Honors designations are important to residency training programs in deciding which applicants to invite for interviews. Given the results of our study, PHE may correlate with improved student competitiveness during the residency match process. An unexpected finding was that despite similar performance on MCAT and Step exams, PHE students outperformed peers on the NBME shelf exams. Prior studies have shown that delayed matriculation to medical school is not associated with improved performance. Explanations for these findings could include students with PHE are more efficient and comfortable in the clinical environment, or perhaps students who have sought prior employment opportunities have a greater innate passion for medicine. Further qualitative research is needed to fully explain this finding.
Significance: This study is relevant to the medical school community at large, for if these results are replicated at other institutions this could greatly impact pre-medical advising and medical admissions.
Narratives of Women in Later Stage of Careers in Academic Medicine: Applying the Theory of Gendered Organizations

Research Highlights
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Purpose: Gender equity in academic medicine is an elusive goal, even though women have constituted nearly half of US medical students for decades and now exceed the number of men (1). While there is an abundance of research quantifying the problem, narratives describing the experience of women in academic medicine have received much less attention. Narratives provide a nuanced understanding of women's diverse experiences, especially the narratives of women who can look back from the later stage of their careers.

We investigated career narratives of women with established careers using the sociological Theory of Gendered Organizations (2,3). This theory posits that organizations are not neutral but inherently gendered, such that advantages and disadvantages throughout the organization are patterned in terms of masculine and feminine.

Methods: We conducted a constructivist grounded theory (CGT) study, and used purposeful and snowball sampling. In the summer of 2018, we recruited women on faculty (MD or PhD) at one academic medical center who participated in workshops for women in the later stage of their career (n=10). We expanded the sample by asking those women to identify female colleagues of similar seniority but who did not attend the workshops (n=18). Consistent with CGT, we conducted in-depth interviews and analyzed data in an iterative fashion. We created inductive codes based on patterns in the data and concepts relevant to the theory of gendered organizations. We explored these patterns in subsequent interviews, and organized patterns around 2 major themes.

Results: Theme 1. Gender salience at the level of the organizational structure, workplace culture, and interactions
For women with established careers in academic medicine, gender was salient at the level of organizational structure, including organizational policy. One woman spoke of her efforts to address policy: There was no maternity policy but I made sure that every woman in my division was able to take 3 months of maternity leave...all the things I had to figure out myself, I try to pass on. Gender was also salient at the level of workplace culture. Another woman shared her experience on a male-dominated physician-scientist track: He gave me an apron with the [institution] insignia when I left... I said, Gee, an apron, after 10 years? He told me I was over-reading it. By contrast, gender was less salient at the level of individual interactions between men and women. One said, I feel like it hasn't been part of my professional experience, even as a medical student. I mean, there was always banter but it wasn't ever anything.

Theme 2. Gendered organizations in the broader social context.
Public discourse, and the social context in which the organization was situated, shed light on past experiences of gender inequity for women in later stage of careers in academic medicine. Several spoke of the impact of the #MeToo movement: I have always felt that my own career path has not been impeded by the fact that Im a woman... but with all the #MeToo stuff, you recast what you thought at the time.
**Discussion:** For women with established careers in academic medicine, gender was more salient at the level of organizational structure and workplace culture than at the level of interactions. Our findings situate the theory of gendered organizations within a broader social context; public discourse can shape and recast past experiences of gender inequity in academic medicine.

**Significance:** We have demonstrated the importance of the theory of gender organizations and narrative data to yield a nuanced understanding of why gender equity has been an elusive goal in academic medicine. Initiatives to promote gender equity should target the organizational structure and workplace culture, and be framed within current public discourse.