Engaging Residents in Quality Improvement and Patient Safety: A Positive Deviance Study

ENGAGING RESIDENTS IN QUALITY IMPROVEMENT AND PATIENT SAFETY: A POSITIVE DEVIANCE STUDY

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Abstract

Background: Quality Improvement and Patient Safety (QI/PS) curricula are vital components of graduate medical education. However, variability in the depth and intensity of this curricula persists nationally. Existing literature places emphasis on reporting the clinical and educational outcomes of QI/PS curricula, but there is limited investigation of the learner experience. This study aims to utilize the positive deviance approach to characterize the lived experiences of QI/PS champions in order to draw broader conclusions regarding best practices and future directions for resident engagement in QI/PS initiatives.

Methods: Semi-structured interviews were conducted with 17 QI/PS champions, 9 residents and 8 faculty, from 6 institutions in the ACGME Pursuing Excellence Initiative, Innovator and Leader cohorts. Purposive and snowball sampling was utilized with GME leadership acting as key informants. Qualitative content analysis was conducted iteratively to analyze transcripts and generate emerging themes regarding resident and faculty motivations for participation in QI/PS and future opportunities for engagement.

Results: Analysis revealed that though barriers to QI/PS education appeared to be comparable among participating institutions, an alignment of personal and professional values with the work of QI/PS led learners to a path of becoming QI/PS champions. A three-phase process of learner transformation into a QI/PS champion emerged, initiated by a spark that ignited interest, followed by a continued pursuit of QI/PS experiences, ultimately resulting in a new professional identity for learners that incorporated QI/PS as an essential role for a physician. Interviews also revealed a secondary theme addressing opportunities for decreasing barriers to entry and increasing resident engagement in this topic.

Conclusions: QI/PS champions emerge when learners detect a concordance between the purpose of QI/PS initiatives and the values that inform their professional identity as a physician. Future curricula that address this topic should place a stronger emphasis on helping learners appreciate the personal and professional relevance of QI/PS initiatives on their role as a physician.

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CHAPTER 1: BACKGROUND

As the landscape of healthcare in the United States changes rapidly, graduate medical education has a dual mission to not only train a workforce equipped to tackle the needs of society, but also contribute value to the healthcare system in which it operates.[1,2] Quality improvement and patient safety (QI/PS) initiatives provide a unified opportunity to fulfill this mission by providing rich learning experiences for residents while also improving patient care and organizational efficiency. In fact, the current ACGME requirements for residency mandate that all residents participate in QI/PS activities before the completion of their medical training. [3]

Though graduate medical education programs have made efforts to expand QI/PS curricula over the last decade, progress has been slow, and barriers to successful delivery of this education are widespread. The Clinical Learning Environment Review (CLER) program reports over the last several years have shown variability in institutional efforts to integrate QI/PS into medical training.[4–6] The Building the Bridge to Quality consensus conference focused on determining the best strategies to promote integration of QI/PS and clinical care found that collaboration is needed on a widespread scale, with an alignment of both extrinsic and intrinsic motivators to improve the state of QI/PS education.[7]

Current literature addressing QI/PS education places a predominant focus on reporting the clinical and educational outcomes from the implementation of experiential learning activities.[8–13] Qualitative investigation of the lived experiences of learners and educators in QI/PS initiatives is particularly rare. A recent study at the University of Utah contributed to this knowledge gap by exploring resident attitudes about quality improvement through the use of focus group discussions.[14] The results of this study showed themes of confusion regarding both the vision of QI and the value placed on contributions to the QI process for residents.

Nevertheless, the role of residents in a clinical setting places them in a unique frontline position to contribute an important perspective to institutional and program level QI/PS initiatives.

Spreitzen and Sonenshein (2004) define positive deviance as "intentional behaviors that depart from the norms of a referent group in honorable ways".[15] The positive deviance approach has been successfully utilized in quantitative and more commonly qualitative studies in healthcare to explain variations in healthcare outcomes in multiple disciplines.[16–19] This study utilizes the positive deviance approach to better understand the extrinsic and intrinsic motivators that lead residents to engage in QI/PS. By targeting institutions with a strong presence in QI/PS education and conversing with QI/PS champions at these institutions, this study aims to learn more about individual and contextual factors that lead trainees to pursue this education despite significant barriers. The hope is that insights generated from this study will inform best practices for increasing all learner and educator engagement in QI/PS while simultaneously increasing both the clinical and educational value of these experiences.

CHAPTER 2: DATA AND METHODS

2.1 Setting

Following approval from the Harvard Medical School Institutional Review Board, 16 members of the ACGME sponsored Pursuing Excellence Initiative were contacted for participation in this study between November 2019 and March 2020. The Pursuing Excellence Initiative is a collaborative of 21 institutions that have made a commitment to improving the clinical learning environment of their institutions through quality improvement, patient safety, and other efforts over a period of four years. Within the Pursuing Excellence Initiative, organizations that identified as Pathway Leaders and Pathway Innovators were approached for recruitment in this study.

2.2 Participants

Designated institutional officials of 16 institutions in the Leaders and Innovators cohort of the Pursuing Excellence Initiative were contacted via email to ultimately recruit six institutions for participation in the study. From this point of contact, a key informant and snowball sampling process was utilized for recruitment. Participants were purposively sampled, with a focus on variation sampling. The first point of contact at every institution was the designated institutional official and from this point of contact, various key informants including chief quality officers, program directors, and other GME Leadership were employed to identify faculty and residents with a demonstrated commitment to quality improvement and patient safety initiatives at their institution. Suggested participants were contacted via email and consent for participation was obtained given that the participants met the following criteria:

Inclusion Criteria:

1. Residents and Faculty must be active members of an ACGME accredited residency program participating in the ACGME Pursuing Excellence Initiative.
2. Residents must have at least one year of experience in residency. Faculty must have at least one year of experience in delivering QI/PS education.
3. Residents must be in good standing at their institution and able to participate in the study without impacting their clinical duties.
4. Residents must have shown involvement in one or more QI/PS projects during their clinical training. Residents can also qualify through participation in house-staff quality/patient safety council or other related positions.

Exclusion Criteria:

1. Residents or faculty in remediation or probation within their respective institutions.
2. Residents who are in their first year of training or Faculty with less than one year of experience delivering QI/PS education.

2.3 Data Collection

Semi-structured interviews were conducted with selected residents, faculty, and leadership and ran for a duration of 30-60 minutes. Interviews were conducted via Zoom and WebEx Conferencing and were audio-recorded and transcribed verbatim. The audio recordings were deleted upon transcription and any identifying information was removed. Descript software (Descript 2020, San Francisco, CA) was utilized for transcription, and text was manually verified for accuracy. Transcripts were then stored on Dedoose software (Dedoose Version 8, 2018, Los Angeles, CA: SocioCultural Research Consultants, LLC) for analysis.

Data collection was rooted in qualitative research principles and utilized semi-structured interviews as the primary data collection procedure. Semi-structured interview guides were created through iterative discussion and consensus with the primary investigator and experts in QI/PS in the primary research team. Frameworks regarding the use of positive deviance methods in healthcare research and the model for success in quality improvement were utilized to design the interview guide.[16,20] The goal of the semi-structured interviews was to gain current resident perceptions of the barriers and opportunities present in their path to QI/PS education in residency as well as faculty perceptions on the delivery of the same QI/PS education. The interview guide aimed to capture the process of resident and faculty involvement in QI/PS from the time of their first exposure to their current involvement at the departmental or institutional level. Consistent with the principles of purposive sampling, participants were recruited and interviewed in an iterative process to increase both the depth and breadth of the project sample. Of note, two resident participants consented to participate in the study but declined audio-recording of their respective interviews. Written notes from these interviews guided project analysis but excerpts were omitted from the study results. Saturation was reached for residents at the ninth interview and faculty at the eighth interview at which point the data was processed for analysis.

2.4 Analysis

The lead researcher (S.M.) with two other study members (R.B. and G.G.), utilized the principles of inductive content analysis to generate a preliminary codebook. Three interviews were utilized for the preliminary open coding phase and reviewed by all three study members (S.M., R.B., and G.G.). After initial coding, findings were reviewed, and discussed, and consensus was reached on the preliminary codebook. This codebook was then piloted on two additional interviews for verification and review. The final codebook was then utilized by the

lead researcher (S.M.) to open code the complete data set. After the open coding phase, axial coding and selective coding were completed to generate broader categories and themes. The lead researcher communicated regularly with G.G. and the primary investigator, J.C. during the category and theme generation phases to maintain consensus on all aspects of data analysis.

CHAPTER 3: RESULTS

3.1 Participant Demographics

17 interviews were conducted of nine residents, seven physician faculty and one non-physician faculty across six ACGME Pursuing Excellence Initiative Institutions. Most residents were in their final year of training or currently completing a chief year or fellowship year in QI/PS. Most faculty held leadership roles in QI/PS education either at the program or institutional level. At least one resident and one faculty member was interviewed from each institution. Interviewee demographics and specialties are summarized in Table 1.

Table 1: Interviewee Demographics (n=17)	
Residents	*9*
PGY 2 Resident	1
PGY 3 Resident	5
PGY 4 Resident	1
Chief Resident	1
Fellow	1
Faculty	*8*
Participant Specialty	
Anesthesia	3
Pediatrics	4
Internal Medicine	7
Otolaryngology	1
Pathology	1
Medical Education	1

3.2 Qualitative Results

Content analysis resulted in 65 initial codes which coalesced into 42 categories, 20 subthemes and 2 main themes.

All participating institutions offered QI/PS education to residents in multiple different formats, ranging from embedded didactics, experiential projects, QI/PS house staff councils, to institutional level involvement. However, a primary overarching theme emerged, irrespective of the opportunities available or environment present, it was only when QI/PS champions recognized a connection between their personal interests and values and the outcomes of QI/PS initiatives did they choose to authentically engage in these experiences. A three-phase process of trainee transformation into a QI/PS champion emerged. The process was initiated by a *spark* that ignited QI/PS interest, followed by a *pursuit* of continued experiences, ultimately resulting in a new professional *identity* for residents that incorporates QI/PS as an essential role for a physician. We expand on this theme and the process of identity transformation below.

Barriers and opportunities to QI/PS education appeared consistent among participating institutions. Though several institutions have implemented creative solutions to decrease the barrier of entry for both faculty and residents in the field, and we report on a selection of these experiences.

When interviewees were asked to reflect on future opportunities, a secondary theme emerged, addressing the importance of designing and implementing educational interventions that increase the relevance of QI/PS activities to trainees' perception of their role in the health system in an intrinsic and personal capacity. This extends with the primary finding that QI/PS initiatives are engaging to residents when they align with professional interests and/or personal values, and connections between primary and secondary themes will be elaborated in the discussion.

3.3 The QI/PS Champion's Journey

Central to the drive of the QI/PS Champion's journey was realization of the concordance between the champion's personal values and the goal of QI/PS initiatives in a healthcare setting.

> "I had this aha moment once I realized that improving quality isn't just a thing you do in the hospital. It's something that you do in your daily life…. I have this mentality that if you're not continuing to improve your life, you're probably not going to be happy… I think that I have found that QI Zen, if you will, that if I can embody the spirit of quality improvement personally in my daily life, then hopefully it'll manifest itself in the organizations and places that I'm a part of. We want to go into medicine to help others. And a lot of times we don't think about helping others as being equivalent to improving the systems that serve others… that's not something you can just tell someone in a lecture and expect them to get it. And it's also not something that everyone values, but it just so happens that my personal values really align with the values of quality improvement." (Resident 4)

We identified and propose a three-phase process of trainee transformation into a QI/PS champion. The process is initiated by a *spark* that ignited an initial interest in QI/PS, followed by the individual's *pursuit* of continued experiences that build upon one another (supported by individual efforts and external support), ultimately resulting in the development of a new professional *identity* for residents that incorporates QI/PS as among several essential roles of a physician (Figure 1).

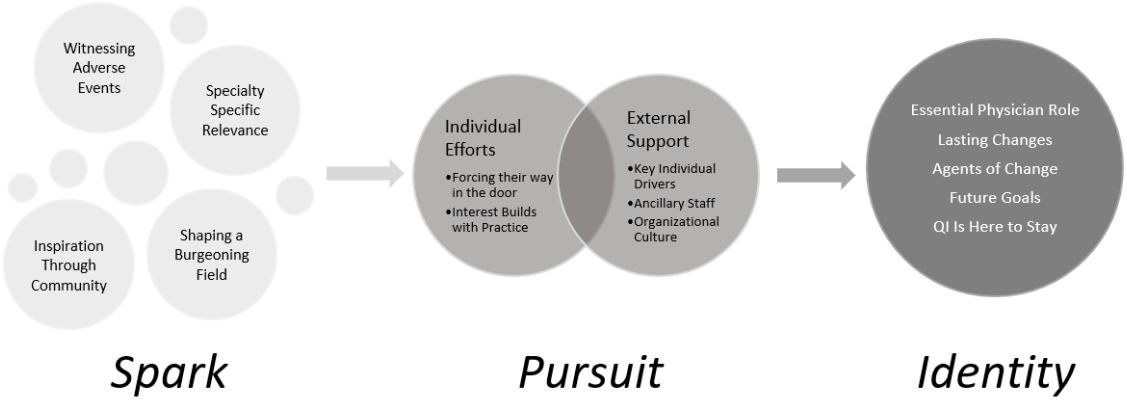

Figure 1: The QI/PS Champions Journey

Spark

QI/PS champions typically described an interest in the field that was sparked either before or during residency through activities that included: 1) witnessing adverse events; 2) recognizing specialty specific relevance of QI/PS; 3) being inspired by mentors/leaders in the community; and 4) identifying the opportunity to shape a burgeoning field.

Witnessing Adverse Events

For some QI/PS champions, particularly residents, witnessing adverse events gave them the emotional bearing to see the relevance of QI/PS work and its impact on patient care.

> "Honestly, the things that got me interested in it were really, I don't want to say adverse events… but things that could have been done better. When I was a med student, there was a patient who I did not know at the time, but then in retrospect, learned was becoming septic in front of me, and it was not something that I knew the words to describe or really to understand…And then when I was a very early intern there was a patient that got transferred out of the NICU that ended up having panhypopituitarism that

was undiagnosed and not picked up in the time when he had been in the ICU and then came up to the floor and decompensated and had a code event." (Resident 2)

Specialty Specific Relevance

Many QI/PS champions saw current or future specialty specific relevance to their QI/PS activities. They described a recognition of the inevitability of risk and error in their work and stated that QI/PS work was a way for them to not only minimize the risk of error and improve their own practice but contribute to their specialty field in a broader capacity.

> "I think anesthesia is very well suited to QI work and you would hear about events that happened, or things that could happen, right? Like how easy it would be to, administer the wrong drug or wrong dilution… There's just so much that seems like could go wrong. … You do something tens of thousands of times over the course of your career…You draw 50 meds every day, and even if it's only a one in a 10,000 event how can we minimize that risk?...how can we make things safer at a systems level...I just wanted to, think about that more and get involved with that." (Resident 5)

Faculty described similar experiences of seeing specialty-specific relevance in their field and learning QI/PS principles on the job as their specialty demanded a mastery of QI/PS skills within the context of their clinical or administrative role.

> "I would say the early motivations were really just very pragmatic. My work, my clinical work, and my role administratively was focused on ICU outcomes. And that's really all about standardization of care and therefore quality improvement." (Faculty 6)

Inspiration Through Community

Several QI/PS champions described their spark being ignited at conferences or meetings as a result of interactions with QI/PS leaders and experts in the field. These encounters had a lasting impact on trainees, allowing them to see the power and opportunity in QI/PS work and initiated the process of socialization that incorporated QI/PS into their identity as a physician.

> "For me it really took going to the IHI national forum, the QI leadership Academy. Meeting people with similar interests…to really feel, wow, this really is important to me. And that feel good feeling that you get leaving those conferences kind of carries into your work and you remember those positive emotions…I think that it's easier to remain positive when you've seen other people's exciting work. So, to me, I think it should be mandatory…you start to see QI work in action. And you also see that people aren't sitting around and complaining about the system… people are sitting around and thinking about how you can make things better, my type of people, optimists." (Resident 4)

Opportunity to Shape a Burgeoning Field

Some QI/PS champions described their desire to contribute to a field that is still developing and spoke of the excitement in shaping the QI/PS initiatives clinically or educationally at their institution.

> "Because that's one of those things where I know that it does help with academic advancements and especially at an institution that doesn't have too much. There's a lot of room for me to help build it. So, then I was like, yeah, tell me more…. once I realized how big of a field this is and how important it is, obviously to our hospitals, to residents, to patients, everything, that's when I started to get more involved in it." (Resident 3)

Educators echoed a similar sentiment and emphasized particularly the excitement of building and shaping QI/PS experiences at an institution where it is not a predominant focus.

> "I find it to be one of the most important things that I do, on a daily basis. And it's really not a focus here at all. And so, I found that it's especially interesting to bring something to the table that no one else is really talking about that much at my institution when they're interacting with residents." (Faculty 2)

Pursuit

After their initial interest is sparked, QI/PS champions sought opportunities to build experience through self-directed involvement, by forcing their way in the door and recognizing that interest builds with practice. Essential to this phase were external supports including key individual drivers, ancillary staff, and organizational culture which created an environment for QI/PS champions to pursue and build upon these experiences.

Forcing Their Way in the Door

Many QI/PS champions described an act of "forcing their way in the door". Regardless of the numerous QI/PS opportunities available for residents at institutions, there was an understanding that these experiences inevitably take time out of clinical duties and crucial meetings and project progress often happen during work hours. For this reason, successful residents showed persistence in their efforts to stay connected to the projects that were meaningful to them by fostering relationships with key individual drivers and ancillary staff to stay informed.

> "How I was able to do it is really just by happening to be connected with the people who remained active in a problem…Being a little bit annoying and being like when's this next

> meeting I have? I've heard that these things are going to happen. Would it be okay if I came to this meeting, forcing your way in the door a little bit. And I think that just comes from my personal interest and investment in whatever the project was to see how it turned out, ….I very easily could have not done that and it may or may not have continued forward." (Resident 2)

In some cases, faculty likewise described the act of forcing their way in the door, in order to advocate for residents and connect them with projects that sparked their interests.

> "So that came from… making a lot of connections over my early faculty career…and just stumbling through and asking a lot of questions and sometimes making people a little bit upset…and then unwinding and saying…I'm trying to help and being very humble, but it needs, some organizational memory or connections within the organization…like Hey, who's working on this? Where is it happening in the organization? Who are these people? And helping guide the residents saying, oh, you need to talk to a nurse manager. And not only do you need the nurse manager, but you need this person in nurse management around education…and I know this person and let me make that connection for you." (Faculty 7)

Interest Builds with Practice

Most QI/PS champions had limited exposure to QI/PS prior to residency and did not describe an instantaneous interest or natural inclination for the topic. But with sustained, self-directed learning and involvement, they began to see the relevance of this topic in their practice.

> "And it kind of grew on me. I mean, it's not something that you like right away, but it grew on me. And once, I learned some of those strategies, I just kept reading and going through modules more and more and more." (Resident 3)

Furthermore, residents expressed a preference for graduated involvement in QI/PS initiatives that they found to be helpful in both building their interest and combating beginner errors. This topic was addressed by faculty as well, though faculty expressed difficulty in the implementation of such a curriculum for residents.

> "So some of the feedback we've gotten is that they want it to be graded even more…like as an intern you're getting an intro, and then your second and third year you're doing projects. They want it to feel different every year so that they experience leadership more by the end and that the third year looks different than the second year, which is hard to do." (Faculty 2)

Key Individual Drivers

Both residents and faculty described the importance of identifying key individual drivers to push projects forward, individuals including but not limited to faculty, leadership, staff, and other colleagues who were critical to gaining buy-in, securing resources and ensuring successful completion of QI/PS initiatives.

> "The project that I proposed for a safety huddle and having more of a tangible dashboard in some ways or a list or some sort of a reference material about patients that we were worried about would never have happened in the same way if I had not had literally the chief point safety officer in attendance at that one particular huddle and he was like

you're right, why aren't we doing this? We need to do something like this. He mobilized his team to get some resources behind it." (Resident 2)

"But there was a champion related to that discipline who was super excited and married with our residents, and it's moving, and making significant changes, not only for that service, but for multiple services where that was kind of set up. And so it took somebody in the organization to be that champion" (Faculty 7)

Importance of Ancillary Staff

QI/PS champions described the vital activities completed by ancillary staff in supporting their QI/PS projects. This sentiment was resoundingly expressed by both faculty and residents. Support from individuals who provided project management, access to data, statistical analysis and other administrative help was absolutely vital to the completion of QI/PS initiatives.

"That whole experience only happened because we had different pieces to the puzzle together that fit together well. We had someone to get the data, we had someone to analyze the data. We had someone to implement it, to change, let's say EMR or etc. And then we have people to help write it. And everyone does their part." (Resident 3)

"My opinion is anytime you have a project manager to keep a busy clinician on track and get them to where they need to be with the timeline. That's got huge value. I'm always in favor of having somebody, who can herd the cats a little bit." (Faculty 6)

Supportive Organizational Culture

Departmental or institutional culture regarding QI/PS was an important factor in facilitating resident engagement. Particularly when it came to their participation in experiential learning projects, leadership buy-in was key to ensuring both the necessary personnel and resource allocation was in place to ensure project success. This sentiment was strongly expressed by both faculty and residents.

> "I think it's important to have buy in from your department's administration, which fortunately we do. But yeah, you might have to miss rounds or need to start late in the operating room occasionally to be able to go to some of these, meetings that have set times. So, I think that can be a challenge depending on the department... Like I said, fortunately within anesthesia, I think we have a strong culture and it's something that we're all exposed to early on, but I can imagine that that may not always be the case." (Resident 5)

> "Second part is providing access to the resources that they might need because you can say whatever you want but if you're not providing them the much needed access that they need for various different resources, and then it doesn't matter what you say. The last part is being engaged, sometimes showing up, sometimes showing interest, following up with the queries in a rapid fashion, making sure that teams feel supported." (Faculty 3)

Identity

After extensive involvement in QI/PS, residents begin to incorporate QI/PS into their professional identity both as residents and future staff physicians, recognizing it is an essential

physician role. Trainees began to reap the rewards of their efforts, inspired by the lasting changes and impact of their projects. They seek further education and project opportunities, becoming an agent of change and aligning QI/PS with their future goals. Learner perception of their role in the health system changes as well, as they transition into a more empowered state as a QI/PS champion. Residents and faculty alike recognize "QI is here to stay" and want to be a part of it.

Essential Physician Role

Upon reflection of their involvements in QI/PS initiatives, residents described their transformed perception of the role of QI/PS in patient care, stating that they view QI/PS not as an addition to optimized patient care but a crucial component of it.

> "I'm really happy I have done this position because there's only a couple of ways you can really improve patient care one is by developing better drugs and better treatments and the other is by optimizing your processes that are in place. So, it makes sense to become well versed with both of those and get involved with both of those. So, I think the motivation is that you can really impact patient care, I think almost much easier than developing a new drug and developing new treatments by just focusing on your processes. And I've been really excited and happy about some of the things we've done this year and I really think we've impacted patient care positively." (Resident 7)

Conversely, when prompted to reflect, faculty comments often address the changing role of the physician in the time that they have been in practice.

> "The way healthcare delivery is changing…when I went to medical school…I had this Marcus Welby white picket fence vision of what medical practice was. I was my own boss and would have plenty of time to develop great relationships with my patients. And

that model, which I think a lot of people still [envision] when they think about the idolized doctor…Not exactly how the world is now. And I think people, physicians, trainees, students, everybody is trying to figure out how you function as a physician in this world and still figure out the ways that those very, important and lofty goals that you had about what you wanted to accomplish in your career can be realized but in a very different setting than what existed 30, 40 years ago."(Faculty 1)

Seeing Lasting Changes is inspiring

Seeing the outcomes from QI/PS initiatives gave residents a sense of inspiration, reinvigorating them to commit to further QI/PS initiatives and training.

"So, seeing that now, that's something that will last for years to come. Us just putting that in there… improved patient safety. And that's just one example. I can think of multiple other projects of residents identifying a problem. And then coming up with an intervention and then seeing it stick and its really inspiring." (Resident 5)

Agent of Change

After consistent engagement in QI/PS initiatives, residents began to redefine their identity and role in the health system not only as a learner but as an individual with power to inspire change, speak out about issues, and contribute to improving the institution in a critical manner. Rather than feeling "victimized" by challenges at work, they gained a new sense of control.

"It's very easy to feel victimized by our jobs and by the systems that we operate within…And that's where a lot of the guilt and general unhappiness about our job stems from…once you view yourself as an agent of change within that system… that change in perspective of being a victim to being someone who has agency, just naturally changes

your perception of things that are going on around you. You don't see new job duties as being things that you're being punished for because you don't have the power and someone else has the power, you start to view it more as, maybe these are things that I'm being asked to do because of a bigger picture… and if I don't believe that this is actually helping the bigger picture…it's my duty to tell someone that and to act on it and so you shift the perspective of everything happens to you as …You have no control over that to Hey, I could possibly have some control and I should exercise that control." (Resident 4)

Alignment with Future Goals

Through increased involvement in QI/PS, residents began to understand the importance of QI/PS in their future career and began planning to apply and integrate what they have learned into their future plans and professional goals.

"I definitely see myself within my little spectrum of my life… I'm going to be HemOnc physician with my little HemOnc field at my institution. If I see processes within my workflow that are impeding patient care, I am not going to, and I never did this as a resident... I will not just sit idly and watch processes that impede patient care, I will definitely go in there and see what I can do and mess things up a little bit and understand what's going on. So, that's where I see myself more on a micro level with my practice and where I operate, rather than a hospital-wide leader type thing in the future." (Resident 7)

Residents also spoke of the value of QI/PS involvement in the future job market, recognizing their ability to contribute QI/PS knowledge and skills to any healthcare organization they join.

"If you are joining any sort of organization, even a private one, bringing in quality and safety knowledge, it's just going to be a huge positive. It's never going to be a

negative…the amount of people out there that do safety quality work is very limited. And you'll see that there's directors, medical directors or safety and quality directors…But then once you go down a few levels, nothing in terms of clinical faculty, if you get out of the academic setting, you'll find even fewer. As you get further into the, private world, you'll see nothing." (Resident 3)

QI/PS is Here to Stay

Residents and faculty recognized the inevitable role QI/PS will play in their future practice and spoke of its importance while also expressing an urgency to gain QI/PS knowledge and skills.

"I think it's unavoidable. I think it's unavoidable to get involved in quality improvement. If you truly care about your job and you're proud of your job and you're proud of what you do and you care about your patients, I think it's unavoidable to not become involved in QI." (Resident 7)

"I think there's also this mindset about QI. Everyone recognizes that QI is here to stay. It is important. We need to know the skills." (Faculty 5)

3.4 Barriers & Opportunities

We identified several barriers to entry for QI/PS initiatives, as described by residents and faculty. We also report on some opportunities and novel strategies implemented by our participants as possible ways to spark residents' interest in QI/PS and allow them to see the relevance of this topic in their daily work.

Barriers

Barriers to QI/PS education are well described in the literature and found consensus amongst faculty and residents in this study. Common barriers included limited faculty expertise, low prioritization of QI/PS, limited resident interest, and difficulties accessing project data. It was clear that even organizations with well-established structures for delivering QI/PS education faced the same challenges as everyone else.

The notion that QI/PS is low priority for residents when contrasted with clinical duties was reinforced unanimously. Many residents struggled to get involved or made beginner errors. Projects suffered from challenges in implementation and a loss of momentum ultimately prevented trainees from enjoying the fruits of their labor of being part of a successful initiative. This was particularly relevant in resident only collaborations at the program level, where interests, schedules and priorities differed.

Opportunities

However, in spite of these barriers, faculty and residents unanimously recognized that QI/PS is here to stay and when prompted to comment on opportunities and solutions to combat these barriers, faculty and residents mentioned creative solutions that had the underlying goal of increasing both the relevance of QI/PS to residents while also solidifying the importance of the resident role in QI/PS initiatives.

Strategies for increasing engagement in QI/PS educational interventions include: 1) Patient Narratives; 2) Technology and EMR Integration; 3) Trainee Mentors; 4) Gamification of QI/PS; 5) Push vs Pull Systems; and 6) QI/PS on the Fly.

Patient Narratives

Faculty and residents discussed the power of narratives in both motivating and sustaining QI/PS work for residents. Narrative can be a powerful device to both mobilize a resident to participate in QI/PS but also a communication tool to gain buy-in from mentors, recruit other team members, or secure institutional resources for a project.

> "That's where you realize the power, when you bring it down to an individual patient level and hear their story…that's the key and the ticket to getting more people inspired about your project…I would encourage any new trainee to try to find those stories of these people that are involved in the projects that you're interested in and focus on telling that story and then how to use that story to inform the improvements that you're interested in doing." (Resident 4)

> "But one of the things I do know from my work is that we don't focus enough on the patient experience. And I think by incorporating the patient perspective into your learning activities...by bringing patients in to actually teach… that's a different way to motivate people to engage in QI." (Faculty 8)

Technology and EMR Integration

Faculty and residents described the possibility of integration of technology and the EMR to access data on individual or collective practice metrics. It was hoped that having access to individual or collective metrics could serve as an extrinsic motivator to make QI/PS more personally relevant and encourage residents to make incremental changes in their practice to improve patient care.

"I'm a resident that has an outpatient clinic…It should be pretty easy for me…to figure out what percentage of my patients hemoglobin a1c is measured when they came in or what my average hemoglobin a1c of my patients is compared to some other groups or my faculty…But I think people want to know their own data. I think the way medicine is practiced these days, that individual data may not be the way to get this accomplished. It may be more like a cohort. I was on the general surgery service in September. Along with four other residents, a chief resident, and here's our collective data. (Faculty 1)

Trainee Mentors

When prompted on the role of mentorship in QI/PS education, residents reported receiving mentorship not only from faculty but from other senior residents as well. This form of peer mentorship is beneficial in that it not only solves the issue of limited faculty expertise in QI/PS but also allows residents to develop mentoring relationships with individuals closer to them in training who understand the challenges that arise when residents engage in QI/PS initiatives.

"There were residents in classes above me who were very involved in QI, who served as mentors for me. They were the anesthesia resident delegates before me and seeing them lead these M&M sessions and take an active role in the QI project. So, they were initially both a resource and mentor." (Resident 5)

"I would say that a lot of the faculty I utilize, specifically in my quality improvement curriculum are people that I have trained, former residents here, and former chief residents. And so a good portion of our faculty and our quality improvement curriculum comes from people who were my residents." (Faculty 2)

Gamification of QI/PS

In certain scenarios, faculty and residents described collective activities to increase the awareness of QI/PS across their institutions. This was particularly effective when the activities were casual and gamified in a way that increased the participation of not only of those entrenched in QI/PS initiatives but also others with a mild interest in the work. This opportunity is particularly unique because not only does it increase access to QI/PS education, but it also utilizes play and communal learning to intrinsically engage and recruit new learners.

> "The third is shark tank, which is really fun. It's open to the entire school… There were five presentations…and there were a hundred people at least in the auditorium. There was a panel of judges…and then they kind of opened it up to the audience…it was a five-minute pitch and a five-minute Q&A for clarification. Then the audience voted at the end. The QI projects that were selected got a huge stipend. It wasn't so formal, it was just a quick pitch and it was really, really fun and it was very inspiring having all the people sit there and listen, I think inspires people to participate in the progress a little bit more." (Faculty 8)

Push vs. Pull System

Faculty described the interplay between educators and leadership to determine how residents are engaged in initiatives at the institutional level. Preferring a "pull" system, where residents are recruited for a seat at the table versus a "push" system where educators lobby to insert residents into activities, perhaps in a less active role. Though subtle, the differences between a push and pull system could have implications for the professional identity of residents.

> "It should be a question of the organization being like, Hey, we have a root cause analysis that we need these many residents… and it's a pull system instead of… we often are trying to push our residents into these opportunities and I feel like the opportunity should be pulling our residents into them and saying we actually value the resident perspective. They are trainees, they're the frontline workforce. We need their opinions. We need this. It's valuable for us to say, Hey, as an organization, I might have to pay a faculty to pick up the slack of this resident's work for this day. But I need this person to make our organization better. And I think the perfect world would be an organization that pulls in that perspective instead of us trying to push our residents into those opportunities, which I feel like we're still doing." (Faculty 7)

QI/PS On the Fly

As expected, faculty and residents were in strong agreement that the goal of QI/PS education should be focused on a stronger integration of QI/PS with everyday clinical activity. One way to achieve this goal was through offering education in QI/PS fundamentals that is more casual and immediate, utilizing data that is readily available to both learners and educators. The goal of this approach is not to design projects that require significant resource allocation but to informally incorporate QI/PS in the daily work and language of the wards.

> "We're now focusing on trying to teach QI more on what we call QI on the fly, implementing it on rounds …and during an inpatient rotation, having the team come up with a QI goal based on something related to…a particular diagnosis…or particular operational thing. Can we get our conditional discharges out by 11:00 AM, 50% of them by day number five on our rotation? The feedback has been great residents really understand... they're like oh yeah, it's so simple to come up with an aim statement on the

fly and keep track of your data, you can use your phone… So I think there's a lot of potential in that route." (Faculty 5)

"This year, we were able to integrate something in our wards team where we do an active QI project, every week on this specific ward team. And if things work, then they get spread to other teams. And that's… we're trying it out. I think we're seeing a lot of good results from it." (Resident 3)

CHAPTER 4: DISCUSSION

4.1 Study Summary

As national efforts are made to improve Quality Improvement and Patient Safety (QI/PS) education for medical trainees, it is important that the experiences of all stakeholders involved in this process, particularly the learners, are depicted in the literature. This study sought to characterize resident and faculty experiences with QI/PS educational initiatives at organizations with an established structure and culture of innovation in this field. Utilizing a positive deviance approach[16] to qualitatively analyze the experiences of QI/PS champions resulted in two overarching themes. The primary overarching theme highlighted the importance of values and interest alignment in trainee transformation into QI/PS champions at their respective institutions while the secondary theme addressed future opportunities to design educational interventions that promote resident engagement and facilitate the formation of a QI/PS professional identity.

Analysis confirms that barriers to QI/PS education persist even at institutions with established structures for the delivery of QI/PS education.[4–7] However, as highlighted in the study, QI/PS champions overcome these obstacles through self-directed efforts to seek opportunities, gain knowledge, and foster organizational alliances. QI/PS champions are ultimately successful in creating experiences for themselves that allow them to incorporate QI/PS competence into their professional identity as a physician. Given competing demands in residency and the barriers outlined, it is unreasonable to expect that all residents will have a similar path to obtaining QI/PS education. However, our study suggests that barriers to QI/PS education in GME are as much issues of individual values and motivation as they are of organizational structures and culture. Thus, in addition to bolstering programmatic and

institutional support of QI/PS education and initiatives, it is important to consider the role of individual professional identity formation and its impact on resident engagement in QI/PS.

4.2 Building a QI/PS Professional Identity

Cruess et al. (2014, 2015) define professional identity as "A representation of self, achieved in stages over time during which the characteristics, values, and norms of the medical profession are internalized, resulting in an individual thinking, acting, and feeling like a physician".[21,22] As QI/PS work ingrains itself into the norms of the medical profession, it is important that both resident and faculty incorporate this competence into their professional identity. Consequently, when designing curricula to deliver QI/PS, this consideration must be made, and the values and goals of QI/PS should be explicitly stated as they relate to the professional identity of a physician in the 21st century.

The formation of professional identity in medicine is complex and includes both conscious reflection and unconscious acquisition from role models and mentors and from a variety of clinical and non-clinical experiences.[21] The current focus on restructuring QI/PS education is aptly placed on increasing collaboration between graduate medical education and the broader health system to pair learners with experiential learning projects that provide both educational and clinical value.[7] The underlying assumption here is that alignment between educational and health system goals will result in QI/PS experiential learning interventions that will not only herald the necessary resource allocation to be successful but also provide utility for all stakeholders involved. However, there is limited research on the enduring understandings that learners gain from these activities. Prior research on resident takeaways from QI/PS involvement is conflicting. Some research indicates that the formal, informal, and hidden

curriculum of QI/PS education has shown largely positive outcomes, indicating that the message from QI/PS education tends to reinforce the importance of providing high quality patient care.[22] However, other research has revealed that residents perceive a disconnect between QI processes and care processes, expressing concerns that QI work can be focused on cost-saving measures, or achieving quality outcomes and not seeing the connection of this work to improved patient care. Our work suggest that part of the problem may be a misalignment between institutional and trainee goals for QI/PS work. Institutional goals in many cases are defined and shaped by market forces and external regulatory bodies and may be of less importance to trainees among competing demands in residency.

As the work to improve QI/PS education for both learners and educators continues, it is important to examine the design of the educational interventions more carefully – not only in terms of structure (e.g. alignment with institutional goals, support by institutional objectives and processes) but also their function, namely in promoting the emerging professional identity of medical trainees as "agents of change" with QI/PS knowledge and skills. Where possible, aligning projects with trainees' personal interests may provide intrinsic motivation to support change, in addition to the external factors frequently studied and implemented.

4.3 Future Directions

Explicit commentary on the role of patient experiences in driving QI/PS initiatives was notably missing from the results of this study. Though it can be implicitly inferred that all activities partaken by interviewees are driven by the central value to provide high quality patient care, only a small minority of interviewees explicitly framed their commentary on QI/PS initiatives in the context of patients. Issues that were top of mind for both learners and educators

focused on the improvement of operational processes and the logistics of involvement in QI/PS initiatives, seemingly divorcing the daily experience of QI/PS work from its ultimate outcomes. Literature has confirmed that QI/PS education has been delivered in ways that is separate from clinical care delivery[7]. From our data, it can be hypothesized that the volume and range of QI/PS activities are not only separate from clinical care but also from that of the patient experience as well. This is an avenue that is yet to be explored. As institutional and professional goals are aligned to increase resident and faculty engagement in QI/PS initiatives, patient goals and experiences should play an important role in this endeavor.

In addition to providing excellent patient care, residents are clearly committed to thinking about and planning for professional and career advancement. Analysis has revealed that nearly all resident discretionary time is spent on activities directly related to residents' next step in training or practice. This may be a barrier to QI/PS involvement—despite increased recognition of the importance of QI/PS in the field of medicine, residents continue to hold the perception that QI/PS activities hold a lower value of scholarship. This is a myth that needs to be demystified. In fact, there are tangible career related benefits to resident engagement in QI/PS and for many this remains a significant motivator.[9,14] This is a challenge that warrants further exploration, especially in academic medical centers that place high value on traditional pathways of resident scholarship and in which QI/PS initiatives may not be seen as one such option.

Finally, one of the seemingly intractable barriers to QI/PS education is limited faculty expertise in the field. There have been many efforts made to foster faculty development in this field.[23–25] One opportunity to focus faculty development efforts, as suggested by our work, could be to focus on professional identity formation for faculty in QI/PS education. Recent work by Sternszus et al. (2020) showed that when asked to reflect on professional identity formation in

learners, faculty expressed difficulty discerning the magnitude of their influence on this topic.[26] Future faculty development in QI/PS education should thus not only focus on equipping faculty with the foundational principles of QI/PS but also compel faculty to reflect on the role of QI/PS on their own professional identity as a physician so they are prepared to aid learners in undergoing the process of professional identity formation as well.

4.4 Limitations

Though this study aimed to include a variety of participants, the sample was limited to organizations participating in the ACGME Pursuing Excellence Initiative. Though this is an appropriate way to identify institutions that demonstrated a commitment to QI/PS education, other institutions may also function as positive deviants and were not included in the study. The results may not be generalizable to other institutions, although given the convergence of barriers listed by our participants and in the literature, we believe the results and our suggestions for improvement opportunities likely apply. Additionally, there are limitations to utilizing the insights of QI/PS champions to generalize the barriers and opportunities present in delivering QI/PS education at all institutions and to all trainees. As shown in the literature, there is significant variability in the delivery of this education, and this variability presumably could also exist in the experience of the learners and educators involved. Study participation was limited to organizations and individuals that self-selected to participate and residents were recommended by faculty rather than being randomly selected. Some positive deviance studies include low performing deviants as well and this sample was not included in this study.

4.5 Conclusion

QI/PS champions emerge when learners detect a concordance between the purpose of QI/PS initiatives and the values that inform their professional identity as a physician. Future curricula that address this topic should place a stronger emphasis on helping learners appreciate the personal and professional relevance of QI/PS initiatives to their role as a physician.

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