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The long game: Evolution of clinical decision making throughout residency and fellowship

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Abstract

Background: The purpose of this study was to explore the trajectory of autonomy in clinical decision making.

Methods: We conducted a qualitative secondary analysis of interviews with 45 residents and fellows from the General Surgery and Obstetrics & Gynecology departments across all clinical postgraduate years (PGY) using convenience sampling. Each interview was recorded, transcribed and iteratively analyzed using a framework method.

Results: A total of 16 junior residents, 22 senior residents and 7 fellows participated in 12 original interviews. Early in training residents take their abstract ideas about disease processes and make them concrete in their applications to patient care. A transitional stage follows in which residents apply concepts to concrete patient care. Chief residents re-abstract their concrete technical and clinical knowledge to prepare for future surgical practice.

Conclusions: Understanding where each learner is on this pathway will assist development of curriculum that fosters resident readiness for practice at each PGY level.

Keywords

Autonomy; Clinical decision-making

Introduction

Clinical decision-making and operative technical skills are two prerequisites for a surgery resident to competently and confidently practice as an independent surgeon. Numerous studies have investigated resident technical skills development regarding the dynamic relationship between attending surgeons and the surgical trainees, which influences resident

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Declaration of competing interest

The authors report no proprietary or commercial interest in any product mentioned or concept discussed in the article. RS sits on advisory boards for Astra Zeneca, Clovis, Tesaro, Ethicon, Genentech and Genmab. RS also is on the speaker's bureau for Genentech.

operative autonomy. Resident operative performance and the typical autonomy granted by the attending surgeon are the strongest predictors of resident autonomy.¹ The resident-described pathway through which residents attempt to build operative autonomy includes building rapport, developing entrustment and finally obtaining autonomy.² Our previous studies together with existing literature suggest this pathway toward operative autonomy would likely progress in a linear fashion throughout the residency training spectrum toward the acquisition of greater autonomy and more complex technical skills.²⁻⁴

While operative autonomy and technical skills are essential, clinical decision-making is an advanced skill critical for residents to be independent surgeons. Clinical decision-making has been defined as a “contextual, continuous and evolving process where data are gathered, interpreted and evaluated in order to select an evidence-based choice of action.”⁵ Both an intuitive/subconscious and analytical/conscious processing combine to feed into this process.⁶ Research into decision-making has primarily focused on disease or procedure specific consensus guidelines, which are established by leaders in the subspecialty or through the development of highly specific clinical decision support tools. Examples range from guidelines regarding the need for endoscopic retrograde cholangiopancreatography for choledocholithiasis⁷ to a support tool to guide the appropriateness of outpatient imaging ordering by primary and specialty clinics.⁸ The Accreditation Council for Graduate Medical Education (ACGME) competencies clearly cite this aspect of clinical development as essential to the ability of a physician to graduate from residency and move into independent practice.⁹ Furthermore attending physicians also repeatedly cite the ability of residents to assess patients, make clinical judgments and decide whether or not to offer an operation to a patient as a key surgical skill.¹⁰

We conducted a qualitative study using interviews with residents and fellows from general surgery and obstetrics and gynecology (OBGYN) to explore operative entrustment, autonomy and preparedness for independent practice in 2018.^{11,12} As the thematic analysis progressed, we noticed that autonomy in clinical decision-making was frequently mentioned with the development of operative autonomy. The interplay between these two distinct types of autonomy then links to overall preparedness for surgical practice. However, limited study has focused on the development of clinical decision-making and acquisition of surgical judgment during surgery residency training. There is little insight in the current literature into how this process occurs during residency and how residents go about developing those skills. There is evidence that this process is ever evolving and even among attending physicians there are distinct shifts in clinical judgment as they progress in their careers. For example, Szatmary et al. conducted a study to examine factors influencing surgeons’ decision-making on whether to operate in emergent cases and found that, when presented with clinical scenarios, junior faculty (those with less than 5 years of time in independent practice) decided to operate significantly more than those with greater than 5 years of experience. They concluded that this was likely rooted in the junior faculty having more uncertainty as to the clinical outcome.⁹ However, a hallmark of expert surgical judgment is the ability to tolerate uncertainty and anticipate multiple outcomes.¹³ Junior surgeons prefer more certainty even when the available information may not fully support their diagnosis and management plan.^{14,15} Thus, there is a need to further our understanding of the complex

and lifelong clinical decision-making process that starts in residency and help residents develop this skill in order to ensure graduates achieve competency for independent practice.

We decided to conduct this secondary analysis study to explore resident and fellow experiences of their development of autonomy in clinical decision-making along with their progression of autonomy in technical skills throughout the postgraduate year (PGY) training spectrum.

Materials and methods

Qualitative secondary analysis is the use of existing qualitative data to find answers to research questions that differ or build from the questions asked in the original research.^{16,17} In this study, we drew on two de-identified qualitative data sets from recent interview studies with residents and fellows about intra-operative learning, autonomy, and preparedness for independent practice.^{2,11,12} Participation in both studies was voluntary and no compensation was provided. All participants gave informed consent to participate in the parent study and were informed that the deidentified data may be used for multiple studies in the future. The parent study was approved by the Ohio State University Institutional Review Board (IRB).

Primary study participants and data collection

Primary data set from resident interviews—Between January and May of 2018, we conducted focus group interviews with 18 residents from a General Surgery (GS) residency program (8 PGY1–2 and 10 PGY3–5) and 20 residents from Obstetrics and Gynecology (OBGYN) residency program (8 PGY1–2 and 12 PGY3–4) at the Ohio State University Wexner Medical Center. A non-MD investigator (XC) and/or trainee investigators (IW and BS) facilitated all focus group interviews in total. The original interviewers and the manuscript authors are the same individuals and thus are familiar with the socio-cultural nuances of the source data. Participants were asked to describe their perceptions and experiences of increasing their own autonomy, gaining attending entrustment and setting expectations for themselves. The key interview questions are included in Table 1. Each focus group interview lasted approximately 60 min. Each focus group was comprised of peer residents. The PGY1s and PGY2s were mixed but the PGY3s, PGY4s and PGY5s all interviewed with their same class level. All interviews were audio-recorded and transcribed verbatim.

Primary data set from fellow interview—Between October and November 2018, we conducted semi-structured interviews with 5 fellows from Department of Surgery (2 Surgical Oncology and 3 Minimally Invasive Surgery) and 2 Gynecologic Oncology fellows from Department of OBGYN. The fellows were asked the same questions to gain the valuable perspective of those who had recently completed residency. They were also asked to reflect how their residency training prepared them for independent practice as well as challenges they faced when entered fellowship training. Each semi-structured interview lasted approximately 20 min. The fellows were interviewed individually or in pairs in order to accommodate their schedule. All interviews were audio-recorded and transcribed verbatim.

Data analysis

De-identified transcripts were read to assess whether they met inclusion criteria for this study. This decision was made according to whether they contained any statements related to the autonomy and/or experience in clinical decision-making. After assessing the primary data, we used a structured qualitative framework approach (see Table 2) to analyze the interview transcripts included in this study. We chose this method because it uses both inductive and deductive approaches^{18,19} and thus allowed us to develop themes drawn from the data. Transcripts were analyzed in an iterative process using constant comparative method. Disparities were resolved by consensus among investigators.

Investigators (BQS, IW, and XPC) also reviewed and evaluated the qualitative data to ensure they were suitable and sufficient to develop dependable themes to answer our research question.

Results

The primary qualitative data sets included 12 transcripts from interviewing 45 participants, and 11 of the transcripts (91.7%) were included in this qualitative secondary analysis. Re-analyzing these de-identified interview transcripts revealed that developing autonomy in clinical decision-making was uniquely distinguished by participants' four training experiences/stages: early stage, transitional stage, final stage in residency training, and post-residency stage (Table 3). Overall, surgical trainees progress along an "hourglass" pathway in their development of clinical decision-making from intern year to fellow training (Fig. 1). The Early stage is defined by the pruning of abstract knowledge gain in medical school and transitioning it to concrete knowledge useful in providing concrete patient care. In the Transition stage, those concrete applications become ingrained into clinical practice and decision-making. As trainees progress toward autonomy, they begin to take the concrete knowledge they have gained and re-abstract it in order to prepare for applications in future patient care, in the Final stage. This progression was reflected as residents acquire increasing autonomy through the clinical years.

Early stage in residency training: Trimming the knowledge base and gaining practical understanding

Early-stage in residency training (i.e. PGY 1–2) was a period that residents had limited autonomy in clinical decision-making. Residents begin as primarily task-oriented learners. Seniors on reflection looked back at their time as junior residents as primarily a time of executing concrete tasks.

“When you're a first- and second-year resident, you're often just task-oriented, you know, write the notes, put in the orders, go pull a drain, whatever it is.”

(Senior Resident, GS)

Even though early stage residents recognize that they are primarily task and small detail oriented, they understand that they should be working to learn big picture clinical decision making in complex patients and they appreciate when attending surgeons and more senior residents discuss these finer details with them so that they can learn.

Even the cases where you [resident] don't do a lot, it's still extremely helpful for them [attendings] to walk you through the clinical decision-making for each case.

(Junior Residents, GS)

Junior residents face the task of taking all the knowledge that they acquired from medical school and pruning it down into scripts that are useful for patient care. They understand that they must be able to actively apply the knowledge they have in order to provide effective patient care. As one junior states:

"I'll take the initiative to go up to the [Senior] resident or the attending and say, "Hey, I was reading this [book]." Or "I was looking into the patient case about this. Is this how we would proceed? Would we follow these steps?" [I] Kind of take initiative to show I know what's going to happen."

(Junior Resident, OBGYN)

Residents described they sought to integrate their knowledge from the book into a concrete ability to care for patients. They did this by asking their senior residents or attendings for guidance in regard to specific patient care plans and attempting to demonstrate that they are striving to start making those plans as well.

While interns enter their residency training with a large knowledge base and have to work on applying their fund of knowledge to clinical situations and challenges, they usually enter the operating room with limited technical skills. They understand the importance of starting with the basics and establishing that foundation prior to progressing.

"Just the scale of the autonomy changes. Right now, we're deciding how do I [resident] hold a scalpel? How do I make this incision? There's probably a million different ways you can do that with small, minutia, but making those decisions on your own, and following through with that, and understanding why you chose to do it in that way is part of that autonomy. Then the scale increases as you go along in your training."

(Junior Resident, GS)

Transition stage in residency training: Successful distillation and interpretation of clinical parameters

Residents described improvements in developing autonomy in clinical decision-making during the transitional stage. They were able to clearly interpret clinical data and begin to formulate an action plan. They were also able to see the big picture and synthesize data into a clear diagnosis and problem. By the end of this transitional stage, residents would likely start to construct an immediate and safe action plan. For examples:

"As a third year [resident], a skill you develop is differentiating sick/not sick, who needs an operation, who doesn't need an operation."

(Senior Resident, GS)

"Whenever we're [resident] on call, we're making...we have to make decisions about who's going to go to the operating room on a fairly routine basis..."

typically we're communicating with the attendings [surgeon] on every service about consultations.”

(Senior Resident, GS)

Some residents noted that autonomy in clinical decision-making developed gradually within the transition stage. They understand the basics of the flow of the operating room and most surgeries and they attempt to conduct some of those steps independently when able. As one resident commented:

“By the time you enter fourth year [residency training], you're just a little more comfortable in that [operating room arena]; that even if you don't always know – you know, you can't do the operation by yourself-you might know ‘This person needs an operation’...I think that's something that develops over third year and then moving into fourth year.”

(Senior Resident, GS)

Final stage in residency Training: Taking ownership, crafting a style and preparing for the future

Residents and fellows commented that, in the final year of training, they would rely on pattern recognition from their previous experiences to guide their clinical decision-making and develop their own particular style for managing patients. They expected when in the last year of training, they would take the management of patients seriously and strived to ensure that each step of patient management was carefully considered and well founded. As one resident noted:

“When I was the chief resident on that service, oftentimes you would round independently with your junior residents, often make decisions, whether it's just pulling NG tubes or deciding – just making decisions on rounds. You're forced to think about your decision, decide whether you are right or wrong, decide the consequences or impact to the patient, depending on the choices that you make. Then often, at the end you might run the list with the attending, and they are trusting you to really care for their patients and take everything into account.”

(Senior Resident, GS)

Chief residents also noted they were attempting to re-abstract the concrete patient management tenets that they had learned and attempted to synthesize them into plans of action for problems they might encounter after leaving residency. As this resident stated

“I've learned to take from that what I can, as far as, there's a reason why someone older than me, more experienced than me, made that decision. I may not agree with it, but there was something in his or her thought process that I need to go over and understand to move forward.”

(Senior Resident, GS)

Residents described that as a chief they expected to have a more thorough understanding of the operations they were going to perform and appreciated the complex operations that they under-took. They should feel confident to proceed through an operation with the attendings

as guides only when necessary. They should be ready to challenge themselves and want to optimally prepare for their future career. For example,

“For cases like that, in particular, I [resident] will often just insert myself as though I’m expecting to do everything. Then, if they [surgeons] decide they want to do more, then that’s fine. I think, for cases like that, especially the ones that I am very comfortable doing independently, I will stand at the surgeon’s side, take my instruments as though I’m gonna do the whole thing and somebody would have to tell me different, versus the other way around.

(Senior Resident, GS)

Post-residency stage: preparing for independence with some caveats

Fellows commonly recognized that they were close to independent practice (both operative and clinical decision-making) and would soon be responsible for the care of often-complex patients across various specialties. They also noted that they would be looked to as the experts for their specialized training within surgery and would be able to make clinical decisions independently. As one fellow described:

“Some of the things, [fellow] just not being confident in myself being able to do something by myself. If I [fellow] were put in the same situation, if I were out in practice, I know that I would deal with it and figure it out. Whereas here, I feel like I’ve got people to fall back on. I probably push things around a little bit more than I would have if I were out in practice on my own. “

(Fellow, GS)

This quote clearly describes the unique situation of fellowship in which they have constructs and plans for a patient’s care that they feel is safe and they also recognize that they are in a location with resources and faculty that they can look to for feedback in complex cases. They recognize that they want to do the best thing for the patient and look to test their plans against the plans of more senior surgeons.

Similarly to their autonomy in clinical decision-making, fellows appreciated the opportunity for independent learning while having the safety net for more complicated cases to practice their clinical decision-making.

“You get that attending transition practice. Independent learning. I really like that. For more complicated cases, we have mentors to help us through, so I really like that aspect.”

(Fellow, GS)

Discussion

The purpose of this secondary analysis was to investigate the progression of autonomy in clinical decision-making from intern year to fellowship training. During the analysis of our primary studies about the development of operative autonomy we were intrigued by the continued references to clinical autonomy and the development of clinical decision-making. Therefore, we proceeded with this secondary analysis with a focus on the development

of clinical decision-making throughout the residency-training spectrum. We found that the development of these two related but distinct skills progresses in a unique way. In accordance with technical skill development, operative autonomy develops along a linear pathway progressing through residency. Findings from our study, however, suggest clinical decision-making is a much more complex process in which residents enter with certain foundational knowledge. This foundation then must be pruned to maintain important concepts and reinforced with new surgical concepts. The edited information must be synthesized for application to concrete patient care. Finally, during chief years and fellowship that concrete understanding of patient care principles must be re-abstracted in order to plan for the care of future patients during independent practice. Each stage of this process presents unique challenges and has varying degrees of expected expressions of autonomy.

With a clearer understanding of each of these arenas, we expect to be able to tailor our curriculum for optimal advancement of the resident using this pathway. Numerous studies have focused on how to improve resident-attending dynamics and improve the operative experience for residents. Approaches have included standardizing and characterizing case specific involvement and roles for each resident level in order to attempt to provide graduated autonomy as residents progress.²⁰ The progression of operative autonomy is limited by incongruent faculty-resident pairs²¹ and enhanced by increased faculty familiarity with the resident.²² Furthermore, our previous work clarifies the method through which residents take steps to improve their own operative autonomy.² Each of these steps builds on each other in an gradual fashion to gain operative autonomy.

However, practice readiness of a newly graduated surgeon requires operative autonomy and effective clinical decision-making. Our study primarily seeks to explore the development of clinical decision-making. The clinical decision-making that goes into the pre-operative patient evaluation, operative planning and post-operative care is imperative to the ability of a surgeon to care for a patient. The development of these skills are recognized as important and acknowledged in the clinical competencies of the ACGME Common Program Requirements,⁹ formalized in the joint ACGME and American Board of Surgery Milestones project²³ and tested in American Board of Surgery Qualifying and Certifying Examinations.

This study is the first to conceptualize the trajectory of development of clinical decision-making during residency. Most attendings have expectations regarding various levels of clinical decision-making and surgical judgment even if it is not formally taught or announced. Attendings routinely note that clinical judgment is important and utilize it to determine the level of autonomy they will allow that resident during a case.^{24,25} Furthermore, while intraoperative decision making and technical performance is essential for surgical practice, surgeons recognize the importance of the decisions made outside the operating room in the care of surgical patients. A national qualitative study of program directors revealed that much of the judgment of competency in clinical decision making outside the operating was influenced by the trainee's technical performance in the operating room.¹⁰ While the technical ability to contribute to the operation as a resident is a key component of being a surgeon, this cognitive bias and transference of assumed competence could contribute to deficiencies being overlooked and thus not addressed by faculty. This

inattention could result in a vast swath of missed opportunities for learning by the resident in patient selection, operative preparation and understanding of post-operative complications.

Furthermore, the contemporary ways in which we teach advanced cognitive skills in clinical decision-making are highly varied and dependent on the institution and the individual attendings that residents interface with. Instruction is non-standardized and relies on the ability of either the learner to recognize patterns in patient care or experts to understand and then effectively communicate their decision-making. There have been various efforts to define these complex cognitive tasks but most of the current data remains limited and procedure specific. These include bootcamps²⁶ and procedure specific tools.²⁷ Other teams have mapped the hierarchy of requirements for expert cognitive performance in obtaining the critical view of safety during a laparoscopic cholecystectomy in order to define the conceptual pathway which competency could be measured²⁸ along with a novel validated interactive online learning tool to evaluate intra-operative decision making during a laparoscopic cholecystectomy.²⁹ Further work by Madani et al. also focused more broadly on expert performance in the operating room and found five domains of competence including psychomotor skills, declarative knowledge, interpersonal skills, personal resourcefulness and advanced cognitive skills.³⁰ The advanced cognitive skills primarily include “surgical planning and error prevention” as well as “error recognition, rescue and recovery.” The definition of these skills is essential.

Our study builds on this by broadly characterizing the pathway through which this complex learning progresses as residents advance in their training. This model is helpful in framing the learning goals and the expectations for residents and can guide attendings when teaching different levels of learners. For example, junior residents will need assistance with selecting out pertinent positives and negatives and pruning information from an overload of declarative knowledge and clinical input in order to arrive at a diagnosis. This is similar to recent work completed in medical students by Koufidis et al. They found that when learners encountered “disjunctions” in their clinical experience they sought to modify their assumptions in order to reconcile the inconsistent elements of the patient encounter with their new knowledge.^{31,32} Mid-level residents may need help refining plans or ensuring their mental models for patients’ diseases are accurate. And senior residents and fellows can be assisted by re-abstracting the knowledge they have about patient care now and how they will assess and adapt that to the care of their future patients.

There are several limitations to this study. First, this is a qualitative study relying on the self-reporting of residents and their perceptions. Further studies utilizing think-out-loud assessments of clinical judgment or in vivo observations of educational resident interactions could lead to additional findings regarding the acquisition of competencies in clinical decision-making. Second, this is a single institution study, and our findings may not transfer to other training programs. Third, it is impossible to fully eliminate the cognitive bias of the interviewees, which could influence the results of this study. A multi-institutional study with a larger sample size would be necessary to generalize our findings. Fourth, this is a secondary analysis of data collected with the primary goal of investigating the development of operative autonomy and thus the results may be influenced by that lens. However, the data analysis supports a close link between these two domains and the exploratory format

of the interview allowed for the discovery of the important link between operative autonomy and clinical decision-making. Finally, selection bias may have skewed our findings with the inclusion of residents with particularly strong feelings about their training. This may have been partially mitigated by our attempts to increase our response rate.

Conclusion

Clinical decision-making is of high importance in the success of surgical specialty graduates to pursue independent practice and progresses in a defined pathway. Understanding and optimization of its development is of interest to surgical residency programs across the country.

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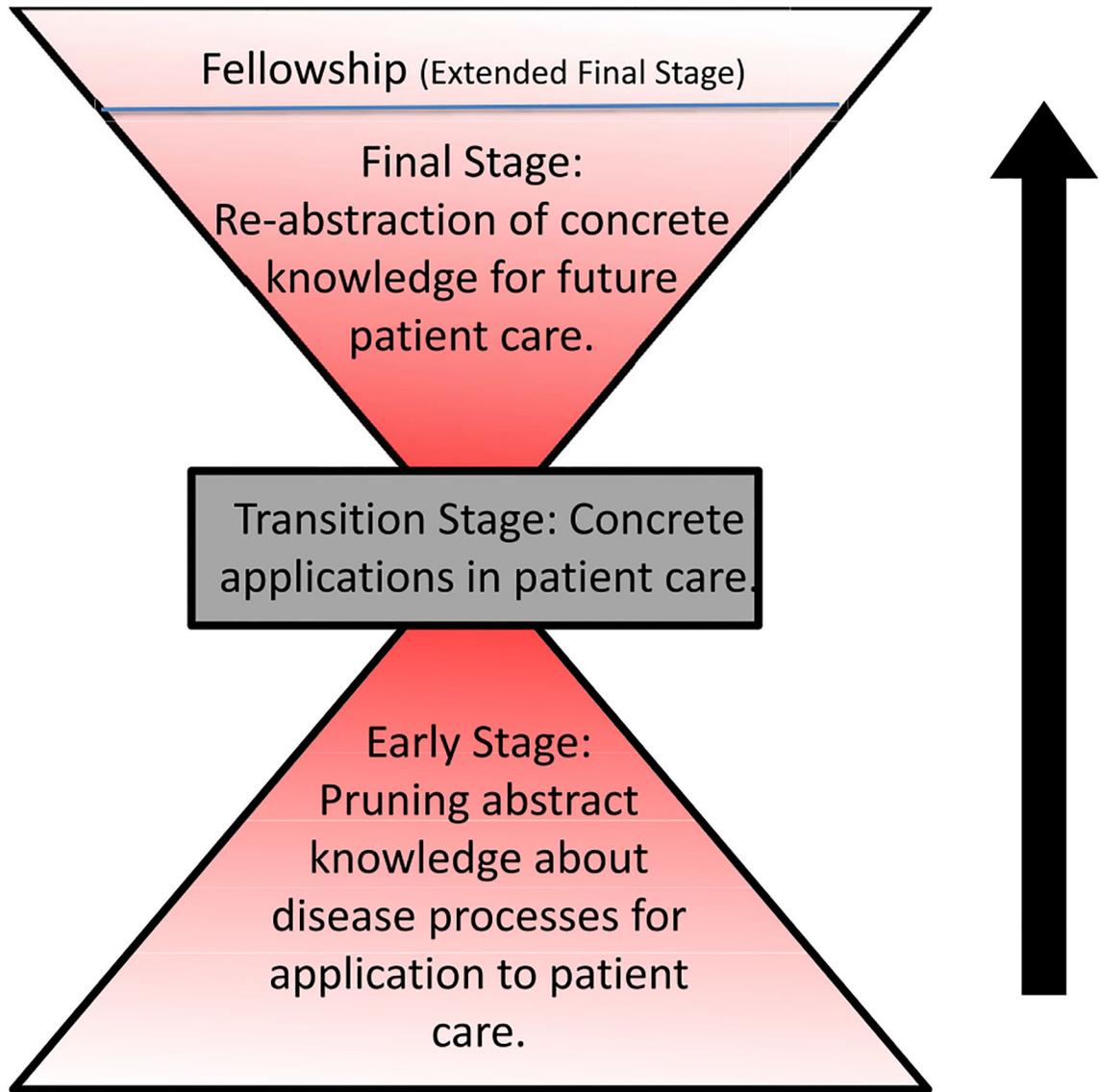


Fig. 1. Progression of resident clinical decision-making from intern to chief and fellow level.

Table 1

Focus group interview questions.

Focus Group Questions	
Q1: when you hear the words "resident autonomy and attending entrustment," what comes to mind?	
• Prompting Question Examples	
–	What contributes to attending entrustment?
–	What actions do you take to show the attendings that you are ready for increased autonomy?
Q2: How have you successfully gained increased autonomy?	
• Prompting Question Examples	
–	What have been the range of responses from attendings when you ask for increased autonomy?
–	What actions would minimize your autonomy?
Q3: At this stage of training, some residents have successfully built trusting relationships with the attendings. Has anyone had the opportunity to ask attendings what contributes to this?	
• Prompting Question Examples	
–	How did trust and autonomy change at each level?
–	How did trust and autonomy change from PGY1 to PGY5? instruments we have in the room, antibiotic necessity, port placement)
–	Q7: What are the systemic flaws that need to be fixed?
FELLOWS ONLY:	
Q1: You have completed residency but are still in a training program. Can you reflect on how the residency training prepared you for fellowship and for independent practice?	
• Prompting Question Examples	
–	What aspect of your residency program prepared you for independent practice in fellowship?
–	What challenges have you faced in the transition from residency to fellowship?

Table 2

Stages of the framework method of data analysis.

Stage	Description	Implementation in Current Study
Stage 1: Transcription	Good quality audio recording and verbatim description.	Interviews were recorded in digital files. Digital files uploaded to a third party commercial transcription vendor.
Stage 2: Familiarization	Becoming familiar with de-identified transcripts and/or field notes. Initial thoughts recorded in margins of transcripts.	Three investigators independently “became familiar” with one transcript from a holistic perspective and recorded their responses & thoughts in the margin.
Stage 3: Coding	Detailed line-by-line reading of transcript. Coding initiated by applying a paraphrase or label describing key aspects of a section.	Same investigators independently re-read transcript noting substantive elements or labels.
Stage 4: Develop Working Analytical Framework	After coding multiple transcripts, research team compares labels and agrees on set of codes to apply to subsequent transcripts. Codes can be grouped into categories to form an analytical framework.	The investigators met to discuss and reach consensus regarding their substantive or “open codes.”
Stage 5: Applying Analytical Framework	Abbreviate codes. Index subsequent transcripts using the Stage Four categories and codes.	Assigned abbreviations to codes. Applied codes to subsequent transcripts. Investigators independently re-read assigned transcripts, coded, discussed, and reached consensus on codes for transcripts.
Stage 6: Charting Data into Framework Matrix	Create a matrix and apply data to the matrix. Reduce data while retaining meaning from each participant.	Recorded categories and codes. Combined some codes and added comments to other codes to clarify meaning and assist in differentiating codes.
Stage 7: Interpreting the Data	Writing analytic memos to examine in-depth a code, category, or theme of interest and discuss with research team. Describe differences/relationships among codes and categories.	Investigators engaged in reflection and continued analysis of assigned transcripts, documenting in analytic memos. Drafted preliminary relationships among the codes and categories.

Table 3

Representative quotes and thematic analysis.

Stage	Representative Quotes	Themes
Early Stage	Clinical:	
	<ul style="list-style-type: none"> • "I would say that when you're a first and second-year resident, you're often just task-oriented, write the notes, put in the orders, go pull a drain, whatever it is." (Senior Resident General Surgery) • "Even the cases where you don't do a lot, it's still extremely helpful for them [attendings] to walk you through the clinical decision-making for each case. (Junior Resident General Surgery) • "Sometimes....I'll take the initiative to go up to the [senior] resident or the attending and say 'Hey, I was reading this' or 'I was looking into the patient case about this. Is this how you would proceed... would we follow these steps?' Kind of take initiative to show you know what's going to happen" (Junior Resident OBGYN) 	<ul style="list-style-type: none"> • Focused on carrying out tasks assigned by someone else. • Recognition of importance of learning clinical decision-making • Recognition of importance of clinical decision-making • Recognition of need to transfer from book knowledge to next steps in patient care.
	Operative:	<ul style="list-style-type: none"> • Task oriented OR learning.
Transition Stage	Clinical:	
	<ul style="list-style-type: none"> • "As a third year, a skill you develop is differentiating sick/not sick, who needs an operation, who doesn't need an operation." (Senior Resident General Surgery) • Whenever we're on call, we're making...we have to make decisions about who's going to go to the operating room on a fairly routine basis...typically we're communicating with the attendings on every service about consultation. (Third Year General Surgery) 	<ul style="list-style-type: none"> • Concrete planning for next steps of patient care. • Concrete planning for next steps of patient care.
Chief Stage:	Operative:	
	<ul style="list-style-type: none"> • By the time you enter fourth year, you're just a little more comfortable in that [operating room arena]; even if you don't always know – you know you can't do the operation by yourself-you might know "This person needs an operation"that is something that develops over third year. . ." (Chief Resident General Surgery) 	<ul style="list-style-type: none"> • Knowledge of when to enact concrete patient care action items.
	Clinical:	
	<ul style="list-style-type: none"> • "Oftentimes you would round independently with your junior residents, often make decisions... You're forced to think about your decisions, decide on whether you are right or wrong, decide the consequences or impact to the patient, depending on the choices that you make." (Senior Resident General Surgery) • "There's a reason why someone older than me, more experienced than me, made that decision, I may not agree but there was something in his or her thought process that I need to go over and understand to move forward." (Senior Resident General Surgery) • "Once you start to learn from you mistakes and see that 'I made this decision to do this with my patient and something bad happened.' You learn from that, because it's your mistake that you made, not because someone else told you." (Chief Resident General Surgery) • "Once you get that foundation of knowledge and that practice of disseminating that knowledge to your juniors... that exchange is more helpful than anything else." (Chief Resident General Surgery) 	<ul style="list-style-type: none"> • Ownership of the patient. • Reflection on how to grow in decision-making. • Ownership of the patient. • Reflection on previous patient care decisions. • Communication of acquired knowledge to junior residents.

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Stage	Representative Quotes	Themes
	<ul style="list-style-type: none"> • "There is a lot more...learning, teaching, if the fourth year can act more like the junior attending...there's more conversation and more problem-solving happening." (OBGYN Chiefs) 	
Operative:	<ul style="list-style-type: none"> • "I will stand at the surgeon's side [of the OR table], take my instruments as though I'm going to do the whole [case] and somebody would have to tell me different." (Senior Resident General Surgery) 	<ul style="list-style-type: none"> • Communication of acquired knowledge by chiefs. • Confidence in technical skills.