# A Closer Look at Pathology Curriculum in US Medical Schools

October 25, 2024

**Becca Battisfore:**

Welcome to the latest edition of the College of American Pathologists' CAPcast. I'm Becca Battisfore, content strategist with the CAP. As you can probably guess from the title, today we will be exploring the evolving landscape of pathology curriculum in the United States. I'm joined by Dr. Swati Bhardwaj, chair of the CAP's Residents Forum, who will take us on a deep dive of this important topic. Dr. Bhardwaj spoke with several key stakeholders to learn about some new and ongoing projects aimed at enhancing the perception of pathology within undergraduate medical education. And we'll get to hear their thoughts in a moment. But first, welcome Dr. Bhardwaj and thank you for being here. Can you tell our listeners a little about yourself and then we'll dive in.

**Dr. Swati Bhardwaj:**

Thank you for the introduction, Becca, and I'm very excited to talk about today's topic. Like you mentioned, I serve as the chair of the CAP Residents Forum, and I'm currently pursuing a genitourinary pathology fellowship at Johns Hopkins Hospital. I did my residency in AP/CP from Mount Sinai Hospital, New York.

So let's get started with today's topic. We currently have a growing medical student membership who are delighted to discover the joy of pathology, but at the same time, they have this regret of not discovering this so-called "Hidden Secret" soon enough. So this stems largely from the exposure to pathology in medical school. So let's take a deep dive into this topic. In today's podcast, we explored the state of the current pathology curriculum and medical school from what the medical students are currently learning, how it influences their choices, how it affects engagement with pathology and the perception of the specialty overall. So let's start with Dr. Valerie Fitzhugh, who is the leader in the undergraduate medical education realm.

**Dr. Valerie Fitzhugh:**

My name is Dr. Valerie Fitzhugh. I'm a professor and joint chair of pathology at both Rutgers New Jersey Medical School and Rutgers Robert Wood Johnson Medical School. And I'm also the Senior Vice President for Pathology Services for Robert Wood Johnson, Barnabas Health, which is the largest healthcare system in New Jersey. I am still an avid undergraduate medical educator. I actually gave the medical students their first lecture from a physician today, so it's an interesting day to be doing this. I am still a member of New Jersey Medical School's curriculum committee and I was actually chair of the curriculum committee until I became interim chair in 2020. So that was an important role in that it allowed a pathologist to have the seat at the table. And I think it's really important when you're looking at curriculum and particularly changes in curriculum that pathologists are present in those conversations so that pathology is not lost in the curriculum. So that is a committee that's been near and dear to my heart for many, many years. I'm also still the chair of the Association of Academic Pathology's Undergraduate Medical Education Committee. So I do work with them as well to really promote undergraduate education amongst chairs in the United States and really get people kind of appetite whet for what we can do as chairs to advance and support undergraduate medical educators across the country.

**Dr. Swati Bhardwaj:**

That's exciting and those are some very important roles. So you mentioned that you're involved in the curriculum committee at your medical school, and I've heard of a number of pathologists who want to be involved and who want to be on the curriculum committee. So across different programs, what would your advice be to pathology leaders within different departments on how they can get that seat at the table in terms of the medical school curriculum?

**Dr. Valerie Fitzhugh:**

So it's really important for faculty to let their chairs know that they want to be involved in the committee. We are always looking for pathologists to be involved because there's never really enough of us to be involved in these committees, I think nationwide. And so once your chair knows and your chair can advocate for you with the appropriate leadership in the institution to get you onto the committee, every school works a little bit differently in terms of how the committees are chosen and structured. At NJMS, you can actually fill out, every year they send out a questionnaire and it has all the committees in the entire school and it asks which committees do you want to be on. So for us, it's easy. You can just click the curriculum, academic policies and procedures, which is our curriculum committee, and boom, you're on the committee. It's really, really easy at some places, but in other places, if you have to be nominated by your chair or by another member of the leadership, it's important to let those people know that you're interested and you can show that interests, I should say, obviously by teaching in the medical school. because no one's, if you say, oh, hey, I want to be on the curriculum committee and you teach zero lectures and you show no interest in education, they're going to kind of look at you like you're a little nuts.

So it's important to kind of get your boots on the ground, teach the students, whether it be in the preclinical years, which is really, really important because that's the primary introduction. Or as you move into the clinical years where you may not get all the students, but you'll get the ones that are definitely interested in pathology. That's all really, really important. So I would say if you have the opportunity to volunteer for the committee, just volunteer for it. But if you need a chair to advocate for you, it's a good idea to let your chairperson know that that's where your interest lies.

**Dr. Swati Bhardwaj:**

I actually have two follow up questions to that. One would be, do you think how fluid is the curriculum from year to year, how flexible it is and how much can you change it in a matter of years? And then at the same time, if we take it in sort of a long-term perspective, how do you think has the pathology curriculum in the undergraduate medical education has evolved over the years?

**Dr. Valerie Fitzhugh:**

So the first question is an interesting one, because curricula can change from year to year in small ways. It's usually not an overarching sweep. But then of course when you have a large curriculum review and you create a new curriculum that's more long, and that's a several year project, pathology curricula have changed significantly since I was in medical school. When I was in school, most curricula were subject-based. So you had a pathology course, a biochemistry course, a genetics course. You don't see that so much in the United States anymore. There are some schools that do maintain standalone pathology courses, but most schools have gone to what we call an integrated curriculum. So instead of having standalone physiology, pathology, biochemistry, instead you learn by organ systems. And so in a lot of places, the curriculum starts with a foundational course. That's a course where you get a lot of very early basic science that you build the foundation on foundations foundation that you build your foundation on to then get to the organ system courses and you learn everything by organ systems. I'm heavily involved in the musculoskeletal course and I teach the Bone Soft Tissue Pathology in a couple of other areas to students at NJMS and it's very different. But I'm also fortunate that I have a lot of face time with the students, and that's really, really important too, because if you want them to consider your specialty, they need to know who you are first.

**Dr. Swati Bhardwaj:**

So now that the focus has changed from specialty or specialty based teaching to an organ system based teaching in this setting, one point you mentioned is that letting people know that you're a pathologist, but other than that, how can one ensure that students get adequate exposure to pathology and actually realize what this subject is all about? Because the thrust is all on the clinical aspect and then pathology is still clinical and cannot be just pushed to the side.

**Dr. Valerie Fitzhugh:**

So this is where participation by pathologists, both on curriculum committees and in these larger curriculum reviews when they create new curriculums becomes incredibly important, particularly for the creation of new curriculum. Because if pathologists aren't involved in that, then who's going to put the pathology in the curriculum? No one else is really going to be thinking about it the way we think about it. So when we had our last large curricula overall, and this was back in, I was pregnant with one of the kids, but I don't remember which one. So it was sometime between 2014 and 2016, there were subgroups by organ system to put together the curriculum for those systems. And so I was in the musculoskeletal, I actually ran the musculoskeletal subgroup, and that was really important because I knew what pathology needed to be there. And nobody would say, oh, no Dr. Fitzhugh, you don't know what you're talking about, because it was my specialty. So we knew what pathology had to be there, and then we were able to compliment that with appropriate clinical correlation from a lot of different clinical departments. So it worked as we had radiology, we have physical medicine rehabilitation, we have some dermatology because we also do skin with our musculoskeletal, we have orthopedic surgeons come in. So we are able to get everybody involved, but if you're not there in that creation process, there's a very good chance that a lot could be missed.

**Dr. Swati Bhardwaj:**

Those are important points for in institutional level changes or institutional level reforms. I also wanted to discuss about your role and the Association of Academic Pathologies UME committee. So I wanted to know if you could share with us what reforms are you thinking of at the national level or at a more widespread level in terms of UME curriculum?

**Dr. Valerie Fitzhugh:**

So this is going to be more on my soapbox, I think, than any official position from AAPath. But one of the things I've always wanted to see, and really we discussed it a little bit in our committee meeting yesterday, so it's funny that it comes up. One of the hardest things to do is get exposure to the clinical practice of pathology. Students in the first two years are basically being taught pathobiology and pathophysiology. They don't really get to learn what the day-to-day life of a practicing pathologist entails. And when they do get to the third and fourth year, if they have electives, they generally only see anatomic pathology. And so it is incumbent upon us to try to look at a national level how pathology can become a required rotation within medical schools. Because the reality is you cannot do anything without pathology. And that is the beginning and the end of it.

You have phlebotomists scattered through the hospital every morning to draw labs. Well, you can't get those labs without pathologists. And so yes, anatomic pathology I think has better exposure because that's where a lot of medical schools will set up their elective rotations. But I think we need to be doing more in the clinical pathology space so that students understand what laboratory medicine is because most of them truly don't know. And I think we have to really be we to decide to make a push at the national level for pathology to become a mandatory rotation in medical schools, even if it's only two weeks, students would learn more in that two weeks than I think they would see in a lifetime. And as they come out as physicians, they'd be better prepared to take care of their patients and understand the functions of the lab and the pathologists that they're working with.

And I think that's critically important. And really it's long overdue. It's amazing how many mandatory rotations you have in everything else. At least that's how it feels. But yet we don't have mandatory rotations in pathology. I think one of the barriers to that is that the size of pathology departments tend to be small relative to this number of medical students in the institution. And so if you have an institution that has 200 medical students, it might be a little tricky to rotate all 200 of them through your lab. But that's why I think we should be considering reaching out into our community hospitals as well and leveraging our community relationships in our healthcare systems so that students have more than one place to rotate. Because you can't rotate 200 students through an academic pathology department. The faculty will die. They won't survive it. But I think if we start to really leverage our community partnerships, we could create something that would be pretty magical humble opinion.

**Dr. Swati Bhardwaj:**

How do you think that the current curriculum is influencing students' perceptions about pathology as a specialty?

**Dr. Valerie Fitzhugh:**

So that's an interesting question. And I think a lot of the perception that students have of pathology depends on who's teaching it to know it's not really about the content. Are you as a teacher getting the students excited to see what it is you do? And I will tell you, this is not to toot my own horn, but it just happened this morning, so I might as well bring it up. It's our student's fourth day of medical school. I am the first position that has taught them. And so this will be a memorable day for them because they finally have a real doctor teaching them. And that real doctor is a pathologist that is an opportunity. And I had a line of them after a lecture wanting to talk to me about pathology. That's where it starts. And I actually took some time at the beginning of my lecture to explain a little bit about what pathologists do and the fact that we are physicians, because some of them don't even know that.

So there's a lot of, oh, I thought pathology was just dead people. So we dispel that myth right away. No offense to our friends in forensics and autopsy pathology, but that's kind of all people see. So it's like, wait, you take care of living patients? Oh my God. Sweet. So what is it that you're doing? Oh, that's really cool. Well, can you tell me more about the histology part? Well, can you tell me more about your day work-life balance was a big one today. People wanted to know a lot about do you have time for your family? Do you get to see them? Which yes, I do. I do have time, and as soon as I'm done here, I'm going to go pick up my kids.

But those are the things that students today can work-life balance is a big one. And if they see somebody who looks genuinely happy with what it is they chose, it draws people in. And we have four students that are applying for pathology out of 180 this year, which is actually a lot. I mean it sounds like a small number, but it's actually a lot in a medical school. And it's all because a lot of them I interacted with early on, we have to keep drilling that point home. We are physicians, we take care of patients. We are in this game just like you are. And if we take those opportunities and we're enthusiastic about what we're teaching, the students will also be enthusiastic about what they're learning and they'll want to learn more.

**Dr. Swati Bhardwaj:**

That's so true. I was always influenced by the pathology teachers who taught me during medical school, so very rightly said.

**Dr. Valerie Fitzhugh:**

Yeah. And we started a pathology student interest group. That's really important too. Can't say enough about the student interest groups because then you can really get down to the nitty gritty and talk about things like our lives outside of the hospital, what the job actually looks like, what the residency is like. And I'm very honest with 'em. I was like, I did not love my residency. I loved what I was learning. I did not love the process of being a resident. It was not fun. Residency is hard work. It is very, very hard. And so I'm very honest with them and I'm like, but don't worry, that's every residency. You're not going to be madly in love with residency going to, there are days we'll go home and cry. It just is what it is. But the reality is we love what we do. Pathologists are some of the happiest people in the hospital for real.

**Dr. Swati Bhardwaj:**

So actually before we wind up, I just wanted to again give you an opportunity to discuss if there is any project close to your heart in terms of your various roles and involvement with the medical school that you would like to share with us.

**Dr. Valerie Fitzhugh:**

I can't say too much about this because it's a new and early process, but at Rutgers, we're in the process of integrating our two allopathic medical schools into one larger medical school. And I think this is going to be a really exciting time for our university because it will allow us, now I'm thinking of me and my pathologist colleagues to touch so many more students than we had before. And I think this will be a window of opportunity for us to be able to get in there, get the students interested, pull them in, and really want to learn from us, be trained by us, and hopefully join us in the specialty. The thing that I hold near and dear to my heart, and I do a bit of this on social media still, although it's been harder to do it now with my big grownup job here, but one of the things that I've enjoyed about social media is getting people interested in pathology.

Even lay people have a very significant interest in what happens after they have surgery, what happens to a tube of blood after it's drawn from them, what happens after they submit that urine sample in that cup because they don't know. And people want to learn more about that. And I think we as pathologists have to have that voice. We have to be leading positivity and education about what it is that we do. You have to do it in our schools and we have to do it across all kinds of media. And I think as we continue to do that, we will draw the students in and it's really, really important, particularly in medical school when they're rarely really new at it to get them excited about it. Because if we get them excited now we have a better chance at bringing them in. Once they start to see all the other things, we tend to lose them. So getting them excited early I think is critically important. And I'm so glad that I had this opportunity to interact with them early and I hope it continues for many years to come.

**Dr. Swati Bhardwaj:**

Thank you. That's very exciting. And I'm very excited about the future of the specialty with all the initiatives that are being in this regard. So we heard from Dr. Fitzhugh who as a UME leader is taking an active role in talking about pathology and exposing medical students to pathology by not necessarily initiating large scale seismic shifts in the curriculum, but by daily involvement in the current curriculum and by just being a positive role model on a daily basis. Let's move a step further and hear from Dr. Gary Procop on what is his perception as the CEO of the American Board of Pathology, and what is the ABPath doing to ease the transition of medical students into their residency?

**Dr. Gary Procop:**

First of all, thanks for having me and discussing this topic. So I'm the current CEO of American Board of Pathology, and I have been in this role about two and a half years and have a great interest in both undergraduate and graduate medical education as well as the transition from undergraduate medical education to graduate medical education and would like to do all we can to improve that process.

**Dr. Swati Bhardwaj:**

Thank you for that introduction. I like that you mentioned both and the transition because sometimes organizations are either catering to undergraduate or catering to graduates, so sometimes that bridge is lost. Going on to our next question, I wanted to know from your point of view, how do you think has the pathology curriculum evolved in recent years? Again encompassing both the undergraduate and GME part of it?

**Dr. Gary Procop:**

Yeah, well, there has been great evolution both in undergraduate and current graduate medical education and pathology. And not all of it has been good or not all of it has been in the favor of pathology. So let's start first with undergraduate. And I recently reviewed this information and in doing so, I went back to the AAMC curriculum reports and I went all the way back to 2017, 2018 to see what exactly was happening at that time with regards to curriculum. And this is all available on their website online. And if you look at that time period, only about 16% of the programs had stable programs. They really weren't changing. About 35% had a change that was in the planning stage. About 31% were in the process of making a change. And then about 19% had already implemented change. So during that time period, there's a great effort in undergraduate medical education to make changes in curriculum.

And if you drill down, you can find out what were those changes and where were those changes. And the majority of those changes were in the pre clerkship phase. So years one and two, which is important for us because that's where traditional pathology courses were always given. And then if you drill down even further, you can find out from their information what types of changes were going on. One of the changes was shortening the length of pre-clerkship phase, often from two years down to one year. So really reducing and compacting that changing from really lecture-based formats to organ systems or case-based curriculum. And the other was enhance use of self-directed learning formats. And none of these are good or bad in and of themselves. It's really how they're all used and whether the use is better or worse than previous outcomes. And sometimes those outcomes haven't been studied, but sometimes they have been studied and we were particularly interested in potential gaps in the histology knowledge of incoming students. So what were the UME changes that may put the first year pathology resident at a deficit because of some of these changes.

**Dr. Swati Bhardwaj:**

Do you think with that gap that you just described, there are some people, very minority of them who do the post sophomore fellowships, does that completely overcome that gap? And just because it's so rare, probably that still remains a deficiency?

**Dr. Gary Procop:**

Yeah, I think that if somebody did a post sophomore fellowship, they would overcome that gap during that post sophomore fellowship because they would be dumped into the deep end of the pool, so to speak, early versus the first year of residency training. So once they got to residency, they would not be as impacted as the individual who just finished medical school had a month or so off for summer and then started residency. Those individuals, if they had a substandard education in histology, for example, they may be playing catch up for a part of the first year.

**Dr. Swati Bhardwaj:**

And also the fact that they're not introduced to pathology and like you said, pathology has been at a disadvantage with the reduction in the pre-clerkship years. Do you think that has also influenced students' perceptions about this specialty or their interest in this specialty?

**Dr. Gary Procop:**

Yeah, it's interesting to think about because the typical introduction to pathology in the first couple years is really the pathologic basis of disease, if you will. It's really not the practice of pathology. And American Board of Pathology does practice and training surveys every year. And we've presented this in the past and we've looked at questioning graduates, what influenced you to go into pathology? And there are a number of course a number of things that influence individuals to go into pathology, but if you dissect those, you can usually find it was some kind of a personal touch. I did a pathology rotation and I found out how exciting it was. The pathologist who presented showed me what a great career this could be. I had a pathology mentor or I went down to the frozen section areas while I was on surgery. So it was usually some kind of a personal connection that got those individuals interested in pathology. And one of our challenges is pathology of course is not a required curricular course, like maybe surgery or internal medicine or pediatrics, et cetera. So we have to go out and find these folks and let them know what a great profession we have since we're not getting all of them rotating through as part of their training.

**Dr. Swati Bhardwaj:**

It's nice that you mentioned about the ABPath survey and that you're constantly looking at that because we usually think of ABPath in terms of GME and about examinations, so it's nice to learn that. Do you also think that the ABPath has specific objectives in relation to pathology within the undergraduate curriculum?

**Dr. Gary Procop:**

Well, I think our biggest objective has been to address the gap in histology knowledge. And I like to take a minute and tell you a little bit about, first of all, is there a gap, right? Is there any evidence of that gap or did we dream that up? Well, a nice paper from University of Michigan in Anatomy Science Education 2022. First author's last name's Gribbon G-R-I-B-B-I-N. And what they did, again, University of Michigan, so high quality medical school, they looked at histology education in an integrated time restricted medical curriculum. They looked at academic outcomes and student study adaptations. And so what happened there, according to their paper, was the preclinical years were compressed one year versus two years. So already things are compressed and in histology, the laboratory and the microscopes were gone. And so they probably had the lectures, I'm not sure what they had with regards to that, but the laboratories were gone and the students were given the option to utilize virtual microscopy on their own time.

So it wasn't part of the requirement. Well, guess what happened? Students cumulative histology examination scores were significantly lower in the new curriculum versus the old curriculum. Kind of not surprising. Students with substandard performance scores, which were deemed less than 75% increased 15 fold in the new curriculum versus the old curriculum. So they were not getting it. And as you read more deeply into the paper, students that were struggling did even worse than that. So there are many good things about case-based organ-based thread approaches, but this may not be one of them. And so we were concerned about this. The trustees of the American Board of Pathology were concerned about this. So we worked with what was APC PRODS then, and we did a survey on the PRODS listserv and we basically asked them about individuals who were coming into residency and we asked 'em how good was their histology knowledge?

And only 15 to 16% were even deemed adequate. None were deemed better than adequate, none were deemed excellent. All the rest were deemed less than adequate, and some were even deemed poor. So that was the reason, and we asked the program directors, would you use it if ABPath built a histology primer? Which we know is really not our space, right? We're an assessment organization, but one of the things that we do have on our website, it is right under our mission as we say, we are working to be helpful to program directors and trainees. And so we thought that that feeds into us accomplishing our mission that way. And so we're pleased to announce, and it was announced in February that a free histology primer is available to everyone.

**Dr. Swati Bhardwaj:**

I did check out the histology primer for myself even though I was a fourth year. I think it's a really helpful tool. Many of our first years have used it. I like the fact that if a pilot may take a lot of time to implement actual curricular changes within the UME, you've developed a tool that is an immediate sort of a solution to that. Alright, with that, do you have any, I guess parting words on the histology primer project? Or do you have any future initiatives that you have in mind?

**Dr. Gary Procop:**

First, we'll give a pitch to the histology primer. You can go to our website and there's a banner up top. So you can click on that banner and it'll guide you to a login page. And so you just need to make a username and password. And from that you'll move to the main menu and you can choose between tissue types or systems. And when you go to those, you have a scrolling page that you can read. And I think on that page we've actually purchased high quality drawings and images, and then we have photo micrographs that if you click on those, they'll expand. In addition, if you're feeling a little bit lazy, you can click on the mini lecture and I will essentially tell you what's on that page. Also included are virtual microscopy slides. So there are slide representations of the things that are included in that section.

And so you can actually look at what would be the glass if there was a histology laboratory. Finally, there's a voluntary quiz. And so the quiz of course is important to test your own knowledge. How good am I doing? So you can identify knowledge gaps and go back and fill those knowledge gaps. And remember, all of this is formative, right? It's all for learning. And so you could take the quizzes as many times as you want. If you're one of those people who have to get a hundred percent every time, you can keep taking until you get a hundred percent. But when you're done, you can also email your results to somebody. So if you want to email 'em to your mom and show her how good your histology knowledge is, that would be awesome if you want to email them to your program director.

So this could be integrated into a bootcamp and folks could show how they were doing along the way. So that's just really the overview of the histology primer. And I also wanted to say at the very end, the very last page, you can see something and we call other cool stuff, and we acknowledge individuals who donated slides to make this project possible, but we also have other resources. And so we've pulled from all of our societies, there's many, many of these from College of American Pathology of what it means to be a pathologist, guidance for people who want to be pathologists. And there are other histology websites. So we want folks not just to use ours, but if they need other resources, they're there. So there's a histology primer. We hope you use it. And my only rule is if you find a slide that's not that good and you want to give us feedback that way, you got to send me a better slide. That's the only rule. And so with that, I will end talking about the histology primer and be pleased to address future initiatives if you like.

**Dr. Swati Bhardwaj:**

Yes, please. We would love to learn more about that.

**Dr. Gary Procop:**

Okay. Yeah, we have a number of future initiatives underway, some of which are live now, some of which will be live by the end of the year. And then some really exciting initiatives that will take a bit longer to build. So live right now is terminology updates. So as you know, terminology changes, different additions of WHO come out, tumors change their name, et cetera. So which term is the Board using in the past? No one knew well, and every year we update our item bank, we just don't tell people how we updated it. Well, that's not very helpful. So what we're doing now is every year when we update our item bank, we are posting on the website the old term and the new term. And so residents can go there before they take their examination and they can make sure they're up to date on the new terms.

The other thing that occurred to me, one of my jobs as the trustees of the American Board of Pathology put together the examination and then once the examination's put together, I read through it to make sure there's no duplication, et cetera. Since more than one person put it together, they're basically putting it together based on their subspecialties. Well, one of the things that became apparent to me relatively early was sometimes we will ask a question that refers to a particular guideline, the Paris classification of urine cytology. Well, I said, did anyone ever tell our residents that that's important? Because not all residency programs are the same. And so if we're going to ask a question about a particular guideline, I think it's fair that we tell people this guideline's important. And so what we have that will be live by the end of the year is a guidelines and key manuscripts page.

And so in the different areas, we've asked our test committees and we've also asked our cooperating societies, so CAP had a chance to have input as well as our other cooperating societies. What do you think needs to be? And we said, we don't want books everybody. You have your favorite textbook, but these are really kind of guidelines or new key manuscripts that might summarize something. And so that will be live by the end of the year, and so we'll be ready for students for next year. So not saying you have to memorize everything in each of these, but you at least know the guidelines and key manuscripts that are important to folks who are having something to do with the board writing items, et cetera. So ready for me to move on to a third exciting pilot?

**Dr. Swati Bhardwaj:**

Yes, absolutely. Those two were so interesting and so relevant to the resident's needs that I'm very excited to hear about the next one.

**Dr. Gary Procop:**

Very good. So we give an outstanding knowledge examination. I truly believe that, but it's a knowledge exam. If you look at Miller's pyramid of clinical competence knows and knows how are the base of that pyramid. So knowledge is pretty important, but shows how and does actual doing things. Competencies are the top of the pyramid. And so we really don't have competency assessments. And so we actually just passed a resolution, I won't read the exact resolution to you, but we're really looking into building competencies into the future of American Board of Pathology. And so one of the ways we're working to do that is essentially a simulated signout. And so we're going to try to build and we targeted breast pathology not for any particular reason except it's an important area. Everybody will cover that in surgical pathology, et cetera. And so the idea would be, again, this is all a pilot, no decisions on how or if it would ever be integrated into an assessment is made.

But in the pilot, when the program director and or the resident believe that they're ready and would like to sit down and essentially it be a pseudo hot seat, we would have a virtual library of surgical pathology breast cases, and they would get half a dozen or a dozen and they would do a signout. And the question is how did they do? First of all, did they recognize it in the H & E and get it in the right ballpark? And then the question is, could they make the diagnosis based on that or do they need additional studies? If need additional studies, what additional studies do you need? So the idea is not a multiple choice question, but when you are signing out surgical pathology, you don't get five choices on a breast biopsy that comes across your desk. It's all the possible pathologic diagnoses that exist for breast pathology and normal. It could be normal. And so that's your choice. Those are your selections. And the same story, if you want to order immunos does not pick which one of these five. It's here's your full battery of immunos, which would you order? And the nurses have gone down this pathway and there are assessments and we're learning from them.

And say for example, I often use as an example follicular lymphoma, although I'm not a heme path guy, and I would say, okay, if you have a follicular lymphoma and you are a pretty savvy hematopathologist, you probably don't need to order the B-cell markers, et cetera. You'll just go right to the markers that would confirm the diagnosis of follicular lymphoma. Now, it's not wrong to order the B-cell markers, they're just really not needed. So if you're a not savvy hematopathologist like me, you'd probably order the B-cell markers and that's okay, but you probably shouldn't be ordering things like those should be known to be negative. So the idea, and like I said, the way the nurses have set this up is if you order things that are blatantly wrong out of this full battery, this full menu of immunohistochemical stains, if you order things that are blatantly wrong, you get a minus one. If you order things that are not wrong but probably not needed by the expert, it just counts as a zero, doesn't count for you or against you. And then if you order the stains that are needed to confirm the diagnosis, you get a plus one for each of those. So it really starts getting at judgment and resource utilization, test utilization, if you will. So those are areas in assessment that we have never really explored to this degree anyway.

**Dr. Swati Bhardwaj:**

Thank you. It was great to hear about this wonderful idea. I like that the ABPath is such a dynamic organization that you're constantly evolving.

**Dr. Gary Procop:**

Well, thanks so much. I mean, we are trying and we listen every year we have our May meeting is with all of our cooperating societies. We meet every May in the Omni in Chicago, if someone wants to come and visit and we hear from our cooperating societies, we ask them that, we give them an update, but we also hear from 'em. So nothing is one way. This is a real partnership with the pathology community.

**Dr. Swati Bhardwaj:**

So Dr. Procop gave us a nice overview of the changes in medical school curriculum and how the histology primer is an effort to partly overcome some of the gaps in knowledge resulting from these changes and how pathology assessment is moving to a more competency-based evaluation system as residents. The trainee education is governed by the graduate medical education division. So now let's hear from Dr. Bronwyn Bryant on what are the efforts by the CAP GME committee in understanding the perception of pathology and what changes or projects is the GME committee currently working on?

**Dr. Bronwyn Bryant:**

First of all, thank you for inviting me. I'm glad to be here and talk about some of the work that we've been doing. So I'm Bronwyn Bryant. I am a GYN pathologist at the University of Vermont Medical Center, and I believe I've been invited here is my role of the current chair of CAP's Graduate Medical Education Committee and some of the research that this committee has done. I also should say that I teach the GYN pathology content at our medical school, the Lerner College of Medicine, and I'm the associate program director of our residency program.

**Dr. Swati Bhardwaj:**

That's wonderful. Thank you so much. So you also mentioned that you've been involved in teaching at least the GYN path part to the medical students. So I wanted to know from your point of view, how has the pathology curriculum evolved in recent years within undergraduate medical education?

**Dr. Bronwyn Bryant:**

And it was a nice chance to sort of reflect on this. I've always seen that pathology, the exposure that students get to pathology is about pathology as the basis of disease. And that's primarily their exposure in their first two years of the preclinical curriculum. And it's really important because we need, as physicians, we need to understand how disease process works. It's a foundation for how we diagnose, how we treat and how we understand disease. What I think has been less apparent is pathology as a clinical practice and education around that. And I think that's a really important distinction that we need to start making. Some people are certainly giving some of that exposure to students during their clinical clerkships, but as we'll talk about, I think that that can be really hit or miss. Some of the other changes that we've seen that I think has been a really common theme is that what used to be a standalone pathology course for weeks, months is really integrating into the curriculum.

And that's actually something that I had in my medical school and I really enjoyed that piece of it. I know there's been a lot of concern about has that decreased the exposure of pathology, but I don't think that, and I think we have data that shows that that itself is not the only impact here, but I think that there's that clinical aspect of pathology I think is missing. And we're seeing we're starting to see some required rotations, some elective opportunities, and I think that's where the curriculum is starting to change and where we might be able to have the most impact.

**Dr. Swati Bhardwaj:**

So you mentioned that there may not be enough clinical exposure even though people get to know, our students, get to know pathology as a subject. So do you think the curriculum as it is structured right now influences students' perceptions about their interest in choosing pathology as a specialty or as career option?

**Dr. Bronwyn Bryant:**

Yeah, I think that there's a lot of people who see pathology as Robbins pathology basis of disease and whatnot, and they think that's what a pathologist does every day. And you and I know that pathologists do something very different every single day and that we touch a lot of different patients. And if students get a chance to see that exposure, I think it helps them be better stewards of the laboratory and sort of invested in how they do laboratory testing and how the consumers of laboratory testing, I think is the term I was looking for there. And I think it's just really variable. There's certainly some year out experiences if people are really interested in pathology interest groups, and there's been some good impacts that we've been able to see from some of those, but a whole year of a post sophomore fellowship, if that's not an established program, that can be a really, really big lift for programs which can be challenging.

So the other thing is I think social media is one of the challenges that we contend with. We've just completed a survey trying to understand some of those attitudes, and it was shocking and not shocking at the same time of some of the responses that we got. But one thing that we noted is that the people who make some of the stereotypical comments about pathologists and their attitudes and understanding of that in truth really have no idea what it is that we do as a clinical practice. And I think it's up to us to start changing that image.

**Dr. Swati Bhardwaj:**

So getting out there and really changing the perception of what pathology really is like. So one of the things that Dr. Fitzhugh earlier mentioned that one of the ways that we could do that is actually be in the curriculum committee, try to change the patients and be involved in the curriculum management, et cetera. I also wanted to ask that with this change in the curriculum in undergraduate medical education as a GME educator for residents, have you noticed a change in the baseline knowledge level that they come in with and how to overcome that gap?

**Dr. Bronwyn Bryant:**

Yeah, I think we are really seeing some changes in that. We recently completed a survey asking first year medical students how prepared they felt for pathology residency and asked the program directors as well and not surprising the way that they felt prepared for histology is certainly a little on the lower side. So I think we're seeing some declines in that. What I think is also telling is we're seeing papers about bootcamps or summer curriculum that really help prepare residents as a first year residents for pathology. There's definitely talk nationally about helping the UME to GME transition and helping residents move from being students towards being physicians, which I think is really important across specialties. But I think what we're seeing in pathology is that I don't know that it's going to be achievable for medical students to prepare their perhaps one or two, maybe at most five students who are going into pathology.

So I think that's going to fall to the residency programs or perhaps some national either organizations or national efforts to provide a virtual experience that multiple students can do at one time from multiple different medical schools. So we're definitely seeing that of what are some of the foundations and how do students understand what their role is moving into residency and being a first year pathology residents. So I think we've seen some papers, I think we're seeing in some of this research that we'll be excited to share. And it's also telling when our American Board of Pathology spends the time to put together an entire histology primer free of charge, that's telling you something. What I think is a little, I'll go on a silent, and I don't know how we would study this, but I think it's an important question to ask if our pathology residents are not necessarily getting the histology exposure that they need to do pathology, what are all of the other physicians missing out on?

What kind of anatomy, what kind of histologic understanding and I think about this of maybe medical school isn't necessarily the time to learn it, and maybe it's something that they learn in their residency, what's applicable to that residency? And I'm a surgical pathologist. My oncologists know pathology of their organ system. Well, and I think you'll see that across surgical subspecialties, but that's also can be really, really variable. So maybe some of this role will get transferred over to the residency level, but it's an interesting question of what others are missing out on that I don't know how we would ask that.

**Dr. Swati Bhardwaj:**

Yeah, you bring up a very interesting point, especially when it comes to other specialties, whether they're ordering correct tests or not, because sometimes they may not have an understanding of that expectations of when the results should be back and also expectations from frozen sections, what we can and cannot tell, but also everything will stem from their basic understanding of pathology. So in your role as the chair of the GME committee, would you like to discuss a specific project or initiative that the committee is currently involved in or your leading currently in terms of undergraduate and graduate medical education?

**Dr. Bronwyn Bryant:**

So there's a lot of different things that we're doing, and there's a few of them that I'll tell you a little bit more about. Now, I know that CAP has started an undergraduate medical education project team, and I believe you're also speaking with some of the members of that. And we have a representative on that, which I think is going to be a great way to build on what we really accomplished with the futurist Pathologists Future Pathologist champion committee to really provide early exposure and have CAP members get out there and tell people about pathology. So I think building on that and the success of that, but looking really at the undergraduate medical curriculum and where we can make changes, I think that's going to be some really great opportunities. Not everybody can build a new pathology post sophomore fellowship, that's a really big lift, but can they do a two month elective experience between first and second year that students can sign up for to get some exposure that might be a more reasonable lift? Where can they ask the clinical rotations? Can we have a few hours? Because some of the people who are integrating it into other clerkships, it's on the matter of hours, some as much as two weeks. So I think we have to think creatively about what has been successful and how to expand that. So that project team is going to look at that, and I'm really excited to see what they come up with.

The papers that we have published have looked at both US medical graduates of the allopathic and osteopathic schools, what their attitudes are about pathology. We did a short follow-up survey on that to see how our Future Pathologist Champions initiative have impacted that. And then there were some good news out of that. And so that data analysis is getting wrapped up and sharing with that committee, which is really great to see. One of the other things that came out of all of this is that we wanted to survey residents on how prepared they feel for residency. And so we really looked at six months into residency after they've kind of settled in, maybe feel like they at least know their way around the hospital, how prepared that they feel and having some rotations. And so that's going to be really interesting to see and not surprising histology, how to use a microscope, some other things about how pathology interacts with different parts of the hospital.

And so I think that's going to be really informative to help people understand what maybe other early bootcamps or early seminars would be helpful for residents, whether that's something that a home program does for their own home residents or something that is a little bit broader and offered nationally as people are finishing up their fourth year. So our last project, which I'm not sure what we'll make of this data, was asking current pathology residents, what were some of the things that they heard when they said during medical school, I'm interested in pathology or were they said, I'm not admitting that I'm interested in pathology because of the ways that they would be viewed by other people in the clinical teams during clerkships. So there were a lot of stories. We asked people to tell us stories and they came out in droves. And so we have a very long thematic analysis to do on that.

But there was a lot of things that I know I had heard at times myself that I'm sure many pathologists have heard one time or the other. So it gave us a really interesting view, or it gives us a very interesting view of how the rest of medicine sees pathology as a specialty, which I think will give us a chance to address areas and where we can maybe show how important pathology is to the field of medicine because it's quite clear from the quality of some of the comments that there are people out there who are practicing medicine who don't understand what laboratory medicine is, how it helps their patients, what other areas of anatomic pathology are. So what comes of this I think is really going to help being able to promote our specialty and how we are assets to patient care.

**Dr. Swati Bhardwaj:**

That's all really exciting. I'm very interested in this survey on the perceptions of pathology because only when we have the data we'll be able to address it, like you said. I also like the idea about having national guidelines on sort of a bootcamp or onboarding for residents, especially now that it may be lacking during the undergraduate medical education.

It was nice to hear from Dr. Bryant about the importance of introducing pathology as a clinical specialty on how there are some deterrents that prevent and dissuade medical students from going into pathology with some comments and perceptions from other specialties, how the curriculum has evolved and how that has affected the perceptions as well. The CAP has actually created an undergraduate medical education project team to specifically address this. So finally, let's hear from Dr. Kalisha Hill, who's the current Board of Governor and Chair of the UME Project Team on the upcoming plans and actions pertaining to this.

**Dr. Kalisha Hill:**

I'm Dr. Kalisha Hill. I am a second term governor for the College of American Pathologists. With that, I am Vice Chair on the Council of Education and the Undergraduate Medical Education Project Team reports to that council and I am the chair of that project team.

**Dr. Swati Bhardwaj:**

That's wonderful. Thank you, Dr. Hill, for the introduction, and those are some very exciting roles and I'm looking forward to learning more about that during our interview. So before we proceed, from your point of view, how has the pathology curriculum evolved in recent years, especially in medical school?

**Dr. Kalisha Hill:**

Absolutely. So when I graduated in the late nineties, there was a clear delineation between what pathologists would do and what the medical students perceived. We had a lot of hands-on exposure in medical school when I was there because we would get assigned a microscope, we would get a box of slides, we would see gross specimens with labels and figure out what they were, and we would get both benign histology. And then we had pathology where we would see abnormal tumor cells, and we got a really broad spectrum education and exposure. And then added to that, we would often get invited from time to time to autopsies or frozen sections. So we would get to see pathologists doing some of their work. It wasn't as robust as we're trying to get it now in that we're really trying to have more exposure to a pathologist and what they do day to day.

But at least back then the pathologist had carved out time with the medical students to teach in many institutions. Over time that exposure has declined. Some schools literally only receive a PowerPoint presentation of pathology slides with no exposure to a pathologist. Other programs still have full robust electives and time to shadow pathologists in their day-to-day work. So what we are most concerned about in 2024 is the disparity in education between medical school programs. Some get robust exposure to pathology, some receive minimal exposure. So we're really trying to level set that touchpoint so that medical students really can see how wonderful pathology is as a specialty.

**Dr. Swati Bhardwaj:**

It would be great for medical students to see the day-to-day life, like you said. But the way it is structured right now, how do you think that influences students' perceptions about pathology and about pathologists?

**Dr. Kalisha Hill:**

There has been a lot of conversation about the image of pathology in the media. So for example, a lot of the television shows demonstrated pathologists doing autopsies and having conversations about forensics. And that has been the perception in the media for some time, even back in the day when Quincy was a popular TV show. So what we have really tried to do, particularly coming out of the COVID pandemic, has really expressed the broad diversity of pathology as a specialty. Everything from microbiology to COVID testing to blood banking, to surgical pathology, to cytopathology. There's so much that you can do within this specialty. And many of us do not do autopsies anymore. We did our requirements doing residency, we did a few after, and then many of us had our practices tailored where we don't do them anymore. So that is the benefit that I think many students are missing of just knowing how vast our specialty is and how you literally can cultivate what you do every day as a pathologist.

So that's the current state where I see the biggest issue in terms of what the students have exposure for. So we really to address the curriculum and make it more meaningful. Just like everything in life, there's competition as more medical students are in programs where orthopedics may be a focus or radiology may be a focus or other internal medicine needing more requirements as the requirements for graduation change. There's a competition for space and time in the classroom. So what really needs to be done is to make sure is they're adjusting curriculums to meet the requirements that they're incorporating pathology in a meaningful way. And that is why I stated it's very important that we create curriculums that are not one size fit all, but that can be managed regardless of the program type. And that is our goal.

**Dr. Swati Bhardwaj:**

You did a lot of work to address that and to get more the message about pathology out during the Future Pathologists campaign and the Future Pathologist Initiative. And currently you mentioned about your role as the chair of the Undergraduate Medical Education Curriculum Committee. So would you like to tell us more about both these roles?

**Dr. Kalisha Hill:**

So the Undergraduate Medical Curriculum Project Team is designed to evaluate first the current state of the curriculum for pathology in medical schools across the country. Then try to get some educational materials to those programs by utilizing the Future Pathologist Champions. We have them in many schools across the country, and we're expanding every day. We have well over 250 champions currently, and we continually invite pathologists as well as residents to be champions so that they can nurture those medical students and attract them into our specialty. So right now, because the project team just started, we are gathering information, we'll be sending out surveys to really get real-time input from medical students and what they're looking for as well as faculty and what they want to see provided to their medical students. So once we have that data, then we will try to create a curriculum that can be standardized, knowing that it is not a one size fits all. Some programs have much greater funding than others, and some programs have very strict curriculums that they have to follow. They all have one body that all medical schools have to abide to. And so all of that education falls within a framework. But even with that framework, there are opportunities to expand pathology exposure in those curriculums to make sure that the students are getting what they need. So really currently our goal is to utilize the future pathologist champions as conduits to implement the curriculum changes that we desire

**Dr. Swati Bhardwaj:**

Overall in the larger picture, what impacts do you anticipate eventually from this initiative?

**Dr. Kalisha Hill:**

I anticipate an expansion of what we're already starting to see. Just with the Future Pathologist Initiative alone, we have seen an uptick in applications to pathology residencies. The match rate has gone up significantly, and people are really starting to understand what we do and how vast our specialty is. So I anticipate that the more we expand exposure in pathology, in curriculum, in medical schools, we will start to see more and more students applying for pathology. And that really will speak volumes to just how much of a secret pathology had been. And I would always say it was one of the best kept secrets that we cannot keep secret anymore.

**Dr. Swati Bhardwaj:**

That's a wonderful way to put it. And even at the Residents Forum, our medical student participation has increased largely because of the efforts of the Future Pathologist Initiative. Okay. So before we close today, are there any last words or ideas that you would like to share with us regarding pathology and undergraduate medical education?

**Dr. Kalisha Hill:**

As a mom who has a daughter in medical school currently, I saw firsthand that in her curriculum, literally the first week they got exposed to pathology. And she is part of the pathology interest group at her medical school. Even though that is not going to be her specialty, she is thinking of dermatology. But I did tell her to keep an open mind. But I will say the most important thing and the best argument to change the curriculum is that even if you are not choosing pathology as your specialty, pathologists touch every patient that comes into a hospital or a care center in any manner because virtually every patient gets blood work done and the pathologist has their name on those results, and that is the person that's making sure that every patient is getting accurate test results. And that is so important to make sure that we're caring for our communities and that they're getting the right treatment. So in my mind, changing the curriculum so that all medical students recognize and appreciate just how important pathology is as a specialty, it will benefit not only the medical students and the programs where they're learning, but it will benefit the patients that they will care for in the future.

**Dr. Swati Bhardwaj:**

Okay. So that was a nice overview by Dr. Hill, and I'm definitely looking forward to the work of the UME project team on this aspect. We heard from the UME to GME and right up to the American Board of Pathology, the need for increasing awareness about pathology and for establishing an early point of contact with medical students is very apparent. What's absolutely heartening to hear is the efforts that are being done by various organizations on this front. And while some of these efforts the organization write surveys and curricular changes may be longer term goals and the histology primer and the UME project team work will lead to larger actionable impacts. All of us as pathology educators, can make an impact on a daily basis by being more active and enthusiastic participants in teaching and reaching out to medical students. We don't just want increased pathology interested applicants, but also more appreciative clinical colleagues who have a better understanding of the work that we do.

**Becca Battisfore:**

Thank you, Dr. Bhardwaj, for this thorough look at pathology undergraduate curriculum. And we are both so grateful to our guests for their time, insights, and commitment to shining a light on pathology as a career choice and a critical field in medicine. And I want to thank you all for listening. We'll have links to the resources mentioned during the episode in the show notes, including ABPath's histology primer, and the CAP's Future Pathologist Initiative. And for more information about the CAP visit cap.org.