

BRIDGING THE GAP

Training and Education in the Pathology and Cytopathology Sphere

Edited by Dr. Diane Davis Davey



Robin D. LeGallo, MD

Department of Pathology, University of Virginia, Charlottesville, Virginia, USA

Robin D. LeGallo is an associate professor of pathology at the University of Virginia, where she received both her medical school and residency training. She practices general surgical and autopsy pathology with specializations in pediatric and placental pathology. LeGallo is current chair of the Undergraduate Medical Education Section of the Association of Pathology Chairs and cochairs the University of Virginia Pre-Clerkship Leadership Committee.



Kristen A. Atkins, MD

Department of Pathology, University of Virginia, Charlottesville, Virginia, USA

Kristen A. Atkins is a professor of pathology and the director of anatomic pathology at the University of Virginia. She practices cytopathology and general surgical pathology with an emphasis in breast pathology. Atkins serves on the executive board of the American Society of Cytopathology and on the University of Virginia Graduate Medical Education Housestaff Council for Diversity and Inclusion.

Recruiting the Future of Pathology

Did you know?

- There is no authoritative source that can predict the needs of the pathology workforce.³
- There are twice as many pathology postgraduate year 1 positions as graduating US and Canadian medical school applicants.⁴
- Groups underrepresented in medicine are even less represented in pathology.⁵
- The amount of pathology teaching in medical school may have little impact on the number choosing the specialty.²

This year, seven medical students from the University of Virginia (UVA) applied for pathology residency; this is an exciting blip on the graph of national trends. Like many programs, we search for ways to expose students to our discipline in the hope that some may choose it for themselves. Predicting the needs of the pathology workforce is challenging; most agree

that the job market is stable, but the concern lies on the side of a dwindling applicant pool.¹ The tendency is to focus on what influences students who are already in medical school, although it is unclear whether any one practice or program has a significant impact.² That is not to say that these endeavors have no worth; they are critical for the few who do choose pathology. Exposure to the practice of pathology is also necessary for all students despite their specialties. Favorable experiences with pathology may help students to champion the specialty as physicians and take on potential mentoring roles themselves. After years of different initiatives, we have found that the pathway to pathology starts well before medical school, with the engagement of K-12 and undergraduate students being critical for sparking interest. Our anecdotal experience shows that those entering medical school while considering pathology more often than not persist in this career path.

So, what did we do?

Correction added on 17 June 2022, after first online publication: The authors' photos were reversed and have been corrected in this version.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](#) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2022 The Authors. *Cancer Cytopathology* published by Wiley Periodicals LLC on behalf of American Cancer Society.

Undergraduate medical education engagement

Praised undergraduate medical education pre-clerkship activities

- Practicing biopsy techniques with assorted props (a grape in a glove full of flour for fine-needle aspiration)
- Mock tumor boards where students self-select as the pathologist
- Blood smear laboratory with actual microscopes
- Gross specimen wet labs for all organ systems

As schools have moved to an integrated system-based curriculum, there have been concerns that dissolution of the traditional pathology course would decrease contact time with students and impede the learning of pathology. In contrast, our experience has been that the pathologist's role has shifted from that of a professor to that of a physician. The students watch us interact with our colleagues and begin to see the role that we have in patient care. It is important to have at least one faculty member with time dedicated to being a strong undergraduate medical education advocate, someone who is well versed in the curriculum and can insert the practice of pathology into integrated sessions. The decrease in classroom hours results in negotiations for time. If a pathologist is not at the curriculum table, pathology may be cut. Cytopathologists are in a fabulous position to highlight the patient-facing aspects of pathology and to demonstrate the interdisciplinary approach to diagnostics through rapid onsite evaluation. Working these scenarios into the course allows for an engaging way to teach content and explore career options.

Medical student fellowships

Clinical opportunities

- Summer clinical fellowship for first-year medical students
- Post-sophomore fellowship
- Intersession experiences during clerkship
- Interdisciplinary electives (radiology-cytopathology)
- Two-week electives for fourth-year medical students

The Innes fellowship (named after a former beloved pathologist with a passion for medical student teaching) sponsors two UVA students in stipend positions to spend 7 weeks between the first and second years of medical school in our department in an integrated clinical experience, including cytopathology. Of all of our endeavors, this has perhaps been the most rewarding. All eight of our Innes fellows to date have gone into pathology, and all have stayed at UVA. This has become a competitive program and has drawn some

of our brightest students. Some entered medical school unfamiliar with pathology but found themselves drawn to it during their first semester. Being able to offer a pathology experience early in their medical training puts this career option in students' minds before they start clerkships, and it is common for them to visit during the M3 year to review specimens of patients in their care. We are unaware of other schools offering this specific experience and highly encourage creating such an opportunity.

We also offer a traditional post-sophomore fellowship, which has been variably active over the last 20 years but seems to be regaining popularity. This is a paid position open to both UVA and outside students. Although it is typically done after the second year of medical school, it can be done at any time after completion of the pre-clerkship. The post-sophomore fellowship includes bootcamp training with our intern class and essentially acts as postgraduate year 1 with a slightly modified workload. It tends to be heavy in anatomic pathology (including surgical pathology, autopsy, and cytopathology), but the student also is exposed to clinical pathology and receives a comprehensive overview of pathology residency training. All but one of the students who have completed this fellowship have gone into pathology (the other chose oncology). This includes students who completed the fellowship after not matching in their chosen field and ultimately chose pathology.

Pathology electives

Like many medical schools, UVA has no required exposure to the practice of pathology outside the classroom curriculum. However, our fourth-year electives across areas in anatomic pathology are consistently filled, with up to half of the class rotating through our department (70 students). The popularity of the elective is due to student word of mouth and to the fact that we allow a 2-week elective, which permits students to rotate during the interview season. We offer focused electives in most subspecialty areas, but the most popular is a general pathology elective in which the students are exposed to all areas of both anatomic pathology and clinical pathology. Finally, cytopathology has paired with radiology with an interdisciplinary radiology-pathology ("RadPath") elective that is consistently filled with two students. The students follow patients undergoing procedures in radiology and join cytopathology for sign-out of these cases. The sharing of the students' time with another department is advantageous for smaller subspecialty services. Our experience is that it is rare (but not unheard of) to attract students into pathology during the elective, as they typically take them after the Electronic Residency Application Service has opened. It is not uncommon for students to say that they wished they had explored this path sooner, as they may have considered the specialty. All students remark that despite the degree of pathology exposure in the curriculum, they are surprised by what we actually do and how much they enjoy the rotation. It makes sense that earlier exposure may be beneficial for consideration of pathology as a specialty choice.



UVA residents and fellows participating in SNMA sponsored workshop for UVA undergraduate students.



Many schools are revising their curriculum to either require or offer exposure to pathology during the clerkship years, and this can take many formats. UVA has recently implemented a new opportunity called Intersession, in which students can spend 2 days in a department of their choice between clerkship blocks. We offer spots for up to 3 students at a time and have consistently filled these spots, with an estimated 25 third years rotating with us. The program has not been in place long enough to determine whether it has had an impact on career decisions, but feedback from students has been favorable.

Pathology outreach

The impact of capturing the interests of students as early as grade school is much harder to study but deserves attention. Pathology workshops have been part of larger outreach programs and have been very successful at the elementary, middle school, and high school levels. We encourage reaching out to both the public school and medical school student groups that are active in these programs and offer participation. Our public school systems offer college preparatory programs for grades 7–12, have a high school health and medical science academy, and are always looking for engaging activities for their students. In 2018, the UVA chapter of the Student National Medical Association (a student group committed to supporting current and future underrepresented medical students) created Discover Medicine, a program in which high school students are brought to UVA once a month to explore a different organ system. The wet pathology laboratory, examining organs consented for educational use from autopsy cases, is always a favorite part of the day.

We have also run workshops with the undergraduate student minority premedical organization. They run weekly over 6 weeks and typically cover clinicopathologic topics such as thyroid examinations and fine-needle aspiration technique, electrocardiograms and gross heart reviews, and interviewing

pearls. We both became medical student applicant mentors to a few of the participants and wrote letters of recommendation for them. We do not know the effect of this on overall interest in pathology, but we do know that the students gained experience and contacts that had previously been unavailable to them.

In summary, we have found that there will always be students interested in pathology, and we must engage these potential applicants early and frequently. It takes faculty champions to encourage outreach and participation. If we do not provide exposure, students will not know that we exist and will not envision themselves in our roles. Pathology often picks the person, but if we cannot bring people to the microscope or transfusion reaction or frozen section, then there is no one to entice.

REFERENCES

1. Timmons CF, Black-Schaffer WS, Naritoku WY, et al. Entry of graduates of US pathology residency programs into the workforce: cohort data between 2008 and 2016 remain positive and stable. *Acad Pathol.* 2020;7:2374289520901833. <https://doi.org/10.1177/2374289520901833>
2. Naritoku WY, Furlong MA, Knollman-Ritschel B, Kaul KL. Enhancing the pipeline of pathologists in the United States. *Acad Pathol.* 2021;8:23742895211041725. <https://doi.org/10.1177/23742895211041725>
3. Robboy SJ, Gross D, Park JY, et al. Reevaluation of the US pathologist workforce size. *JAMA Netw Open.* 2020;3(7):e2010648. <https://doi.org/10.1001/jamanetworkopen.2020.10648>
4. National Resident Matching Program. Results and Data: 2021 Main Residency Match. National Resident Matching Program; 2021.
5. Ware AD, Flax LW, White MJ. Strategies to enhance diversity, equity, and inclusion in pathology training programs: a comprehensive review of the literature. *Arch Pathol Lab Med.* 2021;145(9):1071–1080. <https://doi.org/10.5858/arpa.2020-0595-ra>

DOI: 10.1002/cncy.22606

Bridging the Gap represents the opinions and views of the author and does not reflect any policy or opinion of the American Cancer Society, Cancer Cytopathology, or Wiley unless this is clearly specified.