Applying for Residency: Pathology

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Part I: Overview of Specialty

Description of Specialty
Residents in Pathology can get training in one of three general programmatic areas, all without a medicine or surgery preliminary year: Anatomic Pathology (AP; 3 years of Residency), Clinical Pathology (CP, AKA: Laboratory Medicine; 3 years of Residency), or combined AP/CP (4 years of Residency). In broad strokes, AP is what most people think of when they consider Pathology; training is in the diagnosis of solid tissue specimens, including autopsy pathology, cytology/fine needle aspirates, and surgical specimens—including intraoperative frozen section diagnosis. CP involves liquid-based diagnostics and includes Clinical Chemistry, Hematology, Microbiology, Molecular Diagnostics, and Transfusion Medicine (Blood Banking). In academic settings, most pathologists practice either AP or CP, commonly with one year of Fellowship specialization beyond residency (e.g., Hematopathology, Neuropathology, Pulmonary pathology, Microbiology, Transfusion Medicine, etc.).

Career trajectories: academics, clinical, research, teaching, etc.
Combined training in AP and CP usually prepares Residents to work in community-based pathology; in academic practice, most people will elect to do either AP or CP, but not both. In top-tier programs, there is a higher percentage of MD/PhD trainees, but MD-only residents with a potential interest in clinical-translational research or education are equally valued. When anticipating an eventual position in an academic setting, Pathology Residents will often do additional research, either on a specific research track (involving 2-3 years in the laboratory), or through clinical-translational projects as part of the Fellowship experience. Many pathology residents who anticipate going into academic medicine get involved with research projects as early as first year of residency, even in very high volume programs. Pathology also lends itself to providing protected time for teaching, and most academic programs will have a reasonable component of medical school and peer-to-peer instruction.
Practice Models

Community-based pathology involves working in a small- to medium-sized group (2-10 pathologists) typically in a smaller community hospital (≤ 100 beds or so), with responsibility for ‘signing out’ (diagnosing) all types of specimens on a rotating basis—although individual pathologists within a small practice group will often have areas of specific expertise and can serve as a local expert (e.g., dermatopathology or breast pathology). These community-practice pathologists also cover the various CP services and will take rotating night call. Running clinical laboratories is much like running a small business – managing technical employees, addressing issues of costs associated with performing tests, etc. They are reasonably rewarded financially; $350-400,000 per year to begin is not unusual. Increasingly, small-group practices are experiencing out-sourcing of their services to large commercial groups as more financially feasible options for the small hospital bottom-line.

In academia (e.g., in a teaching hospital setting, usually affiliated with a medical school), the pathologist typically (but not always) diagnoses tissue only in his/her area of specialty interest. Many academic hospitals are moving towards a “specialty-specific” sign-out system, where pathologists diagnose tissues in their area of specialty interest. However, there are still a number of programs with a "general" surgical sign out.

Academic pathologists are expected to teach/train Residents and Fellows, and are allocated roughly 30% of their time for academic pursuits (clinical-translational projects, text books, etc.). For those with basic laboratory research interests, they may spend only 10-20% of their time “signing out” and the remainder of their time running a lab (which ideally is well aligned with their clinical interests). Clinical Pathology, in particular, lends itself to a career primarily focused on research, since the clinical laboratory supervisory element can often be more easily time-compartmentalized. Starting salaries in the academic setting are more in the range of $200,000.

Pathologists can also work for large, private practice diagnostic labs, e.g., Quest Diagnostics, where they sign out almost exclusively in their area of expertise; salaries are on a par with community-based pathologists.

Residency: Length, typical curriculum

AP involves rotating through general and subspecialty pathology services (e.g., breast, GU, cardiovascular, GI, derm, heme, neuro, etc.), initially learning the fundamentals of autopsies, grossing surgical specimens, and performing frozen section analyses, and later getting more comfortable with diagnostic nuances in each specialty realm; in many programs, residents will also perform bone marrow biopsies and fine-needle aspirates on patients. The first two years in most programs provides the fundamentals with a solid core of didactic instruction; the last year in a three-year program is primarily elective time. CP Residents will rotate through various settings (Chemistry, Microbiology, Transfusion, etc.) over the first two years—again with a solid core of didactics—and then have a third year of largely elective time. In combined AP/CP programs, there will be two years of AP, 15-18 months of CP, and 6-9 months of elective time. In some combined AP/CP programs, the AP and CP months are interwoven; in
others, the programs front-load the AP experience. According to the rules governing pathology training programs, up to 6 months of training can be spent in research no matter which trajectory is followed.

**Fellowships offered after residency**

Regardless of career trajectory, most Residents in AP will do at least one year of additional subspecialty Fellowship training in an area of specific diagnostic interest (and may do two or more depending on career path); these include Neuropathology, Hematopathology, GYN Pathology, Pediatric Pathology, Dermatopathology, GI Pathology, Renal Pathology, Thoracic Pathology, Breast Pathology, GU Pathology, etc. There are also Fellowships in the various CP areas, with Molecular Diagnostics becoming extremely popular (also an area of potential specialization for AP Fellows). Not all Residency Programs have Fellowships in all subspecialty areas, and applying from the outside (i.e., competing with internal candidates) can be difficult, so it’s worth checking out what each program offers. Some residency programs offer the option of pursuing a non-boarded Fellowship (e.g., general surgical pathology, GU, GYN, breast, GI) during the third year of an AP-only residency- you can complete your AP residency and a fellowship in 3 years.

**Part II: LIFE AS A PATHOLOGIST**

(see also: [https://www.medscape.com/features/slideshow/lifestyle/2017/pathology#page=25 ] )

**Demographics**

A recent study showed pathologists are overwhelmingly Caucasian (76.5%), with roughly equal proportions (around 5%) of Chinese, Asian Indian, and Latinos; only 2% overall are African-American. There is approximately equal gender representation. Residency programs across the US are highly committed to improving minority representation and will often go the extra mile in the recruitment process to improve diversity in the workplace.


As noted above, private practice pathology is well-compensated, and academic pathologists still do reasonably well; with an average salary of $293,000, 85% of pathologists feel their income is sufficient to support their life goals, and 62% overall feel they are adequately compensated (5th ranking out of 27 specialties). There was a 10% increase overall in salaries from 2016-2017. It is worth noting 60% of currently practicing pathologists are expected to retire in the next decade (with a 30-40% projected shortfall), making for a huge future demand.

**Lifestyle**

Pathology can be well-compartmentalized, with lower rates of call and excess hours (> 80/week) than many other specialties; there is ample opportunity for teaching, research, and family. Pathologists have one of the lower rates of burnout among specialties (43%; only psychiatrists have a lower rate at 42%), and are among the happiest physicians at work; 85% would choose pathology again if given the opportunity (only orthopedics at 95% and dermatology at 96% rank higher). Pathologists do much more than sit at microscopes all day; indeed, they interact with clinical colleagues more frequently (during
intraoperative consultations, in conferences, tumor boards, and providing clinic-pathologic input to
treatment decisions), and deal with the administrative paperwork of billing much less frequently, than
many of their colleagues in direct patient care.

Increasingly, pathologists have become central to personalized medicine; it is often the pathologist who
determines—through some combination of histology, immunohistochemistry, and molecular
diagnostics—whether a patient will benefit from a particular therapy (e.g., targeted therapy or
immunotherapy for cancer). The vast amounts of data which pathologists generate (histologic slides
with a range of staining methods, huge data sets from genomic, proteomic, metabolomic and other
‘omic studies, data from specimen analyzers in the clinical labs) has led to the emergence of Informatics
as a critical component of pathology. This role within pathology, and within healthcare systems and
scientific disciplines, is likely to increase over the coming decades as the volume of data, its complexity
and the need for pathologists to provide tools to interpret the data all grow exponentially.

Finally, the direct access pathologists have to human tissue samples makes them highly valued as
research collaborators, both with clinicians and basic scientists. If you like to "think like a scientist",
and/or are interested in participating in research with immediate and direct impact on patient care,
pathology can be an extraordinarily fulfilling specialty.

**Academic Medicine**
Pathology, in particular, lends itself to other pursuits (teaching, research) outside of the purely
diagnostic. Indeed, in most academic practices, roughly a third of time is allocated for research or other
academic activities. In many medical schools, the core fundamentals (pathology, immunology,
histology, biochemistry, genetics, etc.) will be taught by pathologists.

**Part III: Applying in Pathology**

**How Competitive is Pathology?**

Overall, pathology residency is not considered highly competitive, although there may be some
competition for slots at top-tier institutions. The following is data from 2017. In the US, there were 159
programs in Pathology with 601 total spots available. US Senior applicants accounted for just 232 of
those 601 spots (roughly 1.5 students each year per US medical schools); even with 876 total (US and
IMG) applicants, 33 pathology programs had unfilled positions and needed to participate in the “SOAP”
round.

**Planning the post-clerkship and senior years**
It is helpful if you have taken advantage of the pathology exposure opportunities during the PCE, as it
will have given you some exposure to the discipline and allowed you to meet pathologists (Staff and
Residents). You need at least a one-month general pathology elective rotation, with a letter of
recommendation from that experience. You should do this early enough so you are confident about
your decision, can reflect on it in your application and will have a letter from a pathologist as part of your ERAS application. If you have already determined your path (AP vs CP), you should use the rotation to explore as much as you can within the discipline; if you are unsure, then a month which provides some exposure to each might be helpful (realizing this might mean only 2 weeks of experience on which to base your decision about career path). Because most students have only a cursory exposure to Pathology during the PCE, another month in a subspecialty pathology area (e.g., GYN Pathology, Molecular Diagnostics, Neuropathology, etc., depending on what you like) is highly recommended, although not required.

Pathology is a GREAT elective rotation: no call, lots of time to study pathophysiology, and interesting people; it’s also a good option for an away rotation—mainly to see if a program meets your overall needs. You should definitely NOT worry you might hurt your chances at an away program; it’s virtually impossible to deep-six a subsequent application unless you are unremittingly annoying.

If you would like a more extended experience, there are a number of year-long medical student fellowships in pathology (including at BWH) where you get paid, function like a first-year resident, and can build in research time. You can either participate in this either before or after your PCE year.

Clinical Rotations
As noted, you need at least a month-long pathology elective to have a credible application. Even then, applicants have been successful in applying even before they do an elective rotation (but will need to complete an elective, and forward a letter of recommendation—before Match lists are submitted).

Sub Internships
Other than the medicine or pediatric sub-I, a pathology sub-I is not necessary, except to fulfill the graduation requirements.

Away electives
It’s not necessary to do an away rotation at your program of choice to "audition" for your slot. However, if you have a strong interest in a particular program, doing an away rotation there is an excellent way to learn more about the program, assess fit, and ensure it is non-toxic; there is no better way to get an accurate feel for a residency than to be on the ground for a month. You cannot hurt your chances unless YOU are the toxic one.

Other Recommended Electives
A broad representation of clinical specialties.

Research
Not required, but ‘real’ research (not a case report) does make you more attractive to the top-tier programs.
National Meetings
Not required. More the exception than the rule.

Other degrees
A Ph.D. won’t hurt, but is definitely not necessary. Other degrees (e.g., MPH or MBA) may be helpful if you can weave them into your career plans (e.g., if you have an MPH and are interested in expanding access to pathology in resource-limited settings).

Part IV: Assessing your Competitiveness

What Criteria do Programs Consider?
If you graduate from medical school in good standing, and have done an elective pathology rotation so you understand what you are getting into, you should be in good shape to match at most U.S. pathology residency programs; all the other stuff is mostly secondary. The highly selective programs (BWH, MGH, UCSF, Stanford, Hopkins, UPenn, UCLA) will be a little pickier... but not much.

1. Grades and your DSA
While grades are important, not all grades are equally important. HMS is now using the Department Summary Assessment for 2019 and beyond (a small set of seniors will still be in the New Pathways and will not have a DSA in 2019-2021). The DSA is intended to capture a student’s professional growth over time and includes all clinical coursework in the specialty from the clerkship through July of the application year. The medicine DSA and grades in surgery and medicine clerkships are valued by most residency programs. Poor grades diminish your competitiveness, but many programs (even highly competitive programs) use a holistic approach to evaluating candidates.

You WILL need a favorable evaluation and Letter of Recommendation from at least one Pathology rotation, but outside the highly selective programs, overall grades will not be a major impediment to successful application. Having said that, consistently weak performance in clinical rotations will hurt you as it likely reflects some combination of poor interpersonal skills or disinterest, both of which are red flags in pathology, as elsewhere in medicine.

2. USMLE Step Scores
Pathology residency programs accept students with a variety of scores. Data from the AAMC Careers in Medicine website indicate mean Step 1 score of 231 and Step 2 of 241 for successfully matched applicants.

3. Research Experience
Definitely not necessary, but certainly a plus, especially for the top-tier programs.
4. Publications
Definitely not necessary, but certainly a plus, especially for the top-tier programs. Case reports don’t really count in this equation.

5. Extracurricular Activities
Other than research, pathology programs generally aren’t particularly interested in extracurricular activities, unless you ran the Pathology Interest Group at HMS, or other activities related to the field.

Getting an Interview: Attributes Residency PD’s Consider in Granting Interviews
A Pathology rotation and a letter from the course director are recommended. The pathology community is small enough almost any of the more senior pathology advisors (Drs. Mitchell, Frosch, or Lovitch) can get you in for an interview; after that, it’s up to you.

Letters of recommendation:
At least one from Pathology, and—if you did significant research—one from your PI. Any number of letters beyond this would be acceptable.

How many programs should you apply to?
In general, it is NOT necessary to over-apply in pathology. Unless you have special circumstances (for example, you have a spouse with a non-mobile job and need to match in a particular geographic area), or there are significant issues with your application (low board scores, problematic grades, no research), then there really is no need to apply to more than 5-7 programs, and even applying to that many is more about giving YOU options to choose from than about making sure you match. Pathology also has a limited number of top tier programs which are geographically dispersed; often the combination of training and location interact to shape a list of choices.

Common questions you may be asked – specialty specific:
● How did you discover pathology and how much do you actually understand about it?
● What is your anticipated career path? AP? CP? AP/CP (and, if so, why both)?
● Research?
● Attention to detail?
● Do you like looking down a microscope for long periods of time?
● What’s your favorite color? (OK, not that last one).
● You should also be able to demonstrate you have "done your homework" about a particular program, and are familiar with its workflow and its particular idiosyncrasies (e.g., is sign-out divided by subspecialty, or does the program follow a generalist model?).

Communication with Programs: NRMP Code of Conduct for Applicants and Programs
Pathology programs probably are among the most active in pre- and post-interview communications with applicants. Programs will commonly invite applicants back for “second looks” (sometimes covering costs) in order to provide opportunities for less formal interactions. During these visits (and during the interview day) applicants often have the opportunity to meet with potential research mentors.
You should definitely let a program know they are your first choice; earlier is better than later, since programs often try to lock in applicants as soon as possible. CP-only programs are the most aggressive in this regard, and are often replete before New Year’s. In all communications with programs, you are not obligated to tell them anything—and it’s an NRMP violation for any program to make a conditional commitment to you (“If you rank us number 1, we will rank you to match”). At the same time, given Pathology is a small discipline, it is essential to be transparent and honest in communications. If you were less than honest during the Residency matching process, programs are likely to remember.

**Advocating for Interviews**

Let us know ASAP (Drs. Mitchell, Frosch, or Lovitch); in the vast majority of cases, we should be able to get you an interview pretty much wherever you want.