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For this project, I knew that I wanted to focus a medical profession. My interest has always focused on the natural sciences, and my grades are also strong in the advanced placement science classes, such as chemistry and biology, that I have taken my junior and senior year. Within a few days, I did some research on which professionals I would be able to shadow and decided the best career for this particular project would be pathology. My mentor was Mrs. Marianne Beckman from Jefferson Regional Medical Center. When I first arrived at Jefferson, I visited various parts of the lab in which pathologists had the potential in which to work. Before entering even, it was explained to me that “pathologists work with various tissues and fluids, and we essentially figure out any complications based off the samples that doctors receive” (Birringer). One portion of the lab contained most of the solid organs or tissues that had been removed during or before surgery. This field of pathology, called histology, dissects and records their findings and theories about the condition of the possible diseased tissue. In another area of the lab, blood was the primary study. Often, the workers used a centrifuge to separate the plasma of the blood from red and white cells. This helps in diagnosis of disease, as different cell types than be further examined. Yet another room of the lab held cell cultures. These cultures often grew a weakened strain of disease. For example, the employees were running tests on a weakened strain of MRSA in order to test the bacteria’s reaction to certain treatment. Following this, actual possibly diseased cells can be tested in the same manner, and if they yield the same result, the cells are infected. Throughout my visit, I also observed other machines are work, some of which had the ability to write a report of a chemicals composition. During my visit, there was also an emergency call for an immediate consultation, in which the pathologist had to create a

slide from a fresh sample and produce accurate results within only minutes. Later on, I was permitted to participate. I created my own slide from an old sample and wrote a description for a tissue sample. My shadowing provided me with an overview of all pathological fields.

In pathology, one uses their education to “study the nature, cause, development and clinical management of diseases in people, and the structural and functional changes caused by them” (MyFuture). Etiology, the study of the disease, is one of the prime parts of pathology that is most commonly acknowledged. However, pathologists also attempt to understand disease prevention methods. Also, pathologists often examine the disease and its development is noted. Pathologists consistently use the examination of bodily fluid or tissue to draw their conclusions. Within a clinical pathology lab, there are many jobs that must be filled and can be completed by a trained pathologist. Hematology, for example, studies blood and any abnormalities found within this particular fluid. Meanwhile, pathologists also study chemistry to draw conclusions based upon the structure of matter. There are also four major pieces of biological study that pathologists encounter daily. Microbiology, the first biological study, studies biological specimen that are not visible to the unaided eye. It is very closely related to histology, which focuses on somewhat larger but still microscopic evidence on cell tissue. Even more diverse, and studying larger components of biology, is the study of cytology which researches disease based upon cell. Finally, the largest examination that would involve a pathologist is the autopsy, which includes examining the organs after death to piece together the cause. Often, pathology does not extend to autopsy study, as pathologists are continually trying to find the cause of a disease or find signs of early detection. It confirms diagnosis, which allows for medicines to be more accurately tested on patients. Pathologists, overall, work in diagnosis based off biochemical changes in tissue and fluids.

Typically, the working conditions of a pathologist are fairly pleasant and sanitary despite the somewhat invasive work that is required. Usually, “only the most severe types of disease can make me feel nauseas,” (Beckman). Often, the use of laboratory equipment will create a more suitable and clean environment, as blood or bodily fluid samples are separated and easily examined with the use of a centrifuge. Many machines crowd the lab and it smells like strong disinfectant in most places, as materials need to be kept clean so no sample is contaminated. There is also a lingering scent of formaldehyde in the histology department of a pathological lab. Other than these moderate discomforts, most people find the lab to be suitable. “The smells are not too strong once you get used to experiencing them on the daily basis” (Beckman). Like any medical profession, sanitary habits are held in high regard. Like most medical professions, the time spent in training is often inconvenient and random. Most pathologists who are still interns are on call or work extensive hours, whereas pathologists with more experience and a solid job position will work the average eight hour work day for five days a week. On occasion, pathologists are on call, but they also receive benefits and vacation like most other full time employees. The pathologists that I witnessed interacted with one another or with technicians or physicians constantly.

To become a certified pathologist, one must earn a doctorate in the field and attend medical school with a residency. This includes four years of basic schooling, four years of medical school, followed by four to five years of a professional residency. These time requirements are universal, no matter the college one may attend. At the University of Pittsburgh School of Medicine, a MD must be earned in order to practice. The pathology department is separated into distinct divisions. Each division becomes more specific, however, general classes in chemistry and biology and anatomy are required to pursue education in these divisions. One

popular division is the Anatomic Pathology. This division requires all courses specific for the study of organ systems. The Centers of Excellence, which focus on the division's courses, include courses in autopsy, bone and soft tissue pathology, and neuropathology. Also, the Anatomic Pathology division requires four major labs to be completed proficiently. These labs include the Molecular Atomic Pathology lab, the FISH/CGH lab, the Immuno Lab, and an autopsy. Annual tuition for an in-state student at the University of Pittsburgh Medical School is approximately thirty-five thousand dollars. Additional costs make the total estimate per year around fifty-five thousand dollars. Another prominent school of medicine is found at Harvard University. During the first year in medical school, after four years of college, the average student "focuses on human physiology and biomedical sciences...morphology; biochemistry; physiology; pharmacology; molecular biology; pathology; microbiology" (Harvard President and Fellows). The second year one is enrolled, courses include investigation into more structural and functional disorders caused by disease. Third and fourth year students spend their time, not in classrooms with professors, but in hospitals with real doctors in fields of their choice. At this school, tuition is approximately thirty-eight thousand dollars a year. At both schools, the students must take the Medical Licensing Examination. Also, pathologists are certified as either anatomical or clinical or a combination of the two types; however, "gaining certification in specialty generally requires an additional year or two of residency" (Morkes).

As far as scholarships, there are abundant amounts related to any various study in the medical field, including pathology. One of the most elite, nationwide scholarship opportunities for students that show interest in a medical profession is the Davidson Fellows Award, sponsored by the Davidson Institute for Talent Development. Any high school student, who is under the age of eighteen and a legal United States citizen, is eligible to participate in the contest for the

scholarship, however much more work is required than a simple age and legal requisite. All students that compete for the Davidson Fellows Award must participate in a research project. As evidence, the student must submit a research report, as well as a computer or physical model. Additional essays are also necessary. The first paper “describes the project and its significance to the scientific community” (Schlachter). The second essay is to write about the social relevance of the work completed. A third essay is more personal, describing the difficulties, the time spent, and the supervision of the work. Finally, a fifteen-minute video is needed to discuss the student’s interest in the work and how it may be applied to current issues. The scholarship rewards ten thousand, twenty-five thousand, or fifty thousand dollars for the top students, which consists of about seventeen annually. The moneys must be spent on tuition or other school-related expenses at an accredited university. Applications for this prestigious scholarship are the end of March every year. Another scholarship that is available to students of the sciences is the Science Talent Search Scholarships. The Science Service sponsors this scholarship, which rewards over three hundred students annually with one thousand to one hundred thousand dollars. Like most scholarships, participants must be a legal United States citizen and, in this case, high school seniors. An independent research project must be completed for this scholarship as well, including a twenty-page report concerning the project. This research project must be done in a field of science, including microbiology and medicine that relate to pathology. Three hundred students are chosen as semi-finalists from the thousands that turn in their project before November, which is the scholarship’s entry deadline. From these three hundred, forty students are chosen from these and are deemed finalists. The overall first place student receives one hundred thousand dollars. Second and third receive seventy-five thousand and fifty thousand respectively. Fourth through sixth place students earn twenty-five thousand dollars and seventh

to tenth place warrant twenty thousand dollars. The top ten students continue to earn their money for four years. The other thirty finalists receive ten thousand dollars for one year. These scholarships create even more expansive opportunities for the already expensive medical programs today that are required for pathologists.

Due to the accuracy required with an excessive amount of work, pathologists need to have a natural ability to organize papers and samples, as well as set their precedence. Consistency with language and a powerful ability to describe as necessary would be a special skill required. Marianne, in fact, introduced me to a pathologist that specialized in histology by explaining “that they must provide a detailed description to support their ideas since sometimes tissue degrades quickly before another physician can analyze the pathologist’s diagnosis” (Beckman). A knack for analysis and problem solving is also exceedingly admired in this profession.

The areas of specialization in pathology create a broad range of salaries. Not just years of experience are taken into account since location and specialization are known to be highly important in the monetary factors of the profession. Within one to two years after medical school, a pathologist is expected to make approximately one hundred and seventy thousand dollars annually. The increase with years of experience can be described as nothing short of exponential. After three years of successful work, a pathologist is expected to earn an average of three hundred and twenty one thousand dollars a year. Of course, wages will increase with both experience and achievements to a peak salary of six hundred and ten thousand dollars per annum. In addition to this outstanding salary, pathologists, according to the Bureau of Labor Statistics, have a bright economic outlook. “Due to the expanding healthcare industry, the job outlook for all physicians is very good. According to the Bureau of Labor Statistics, the number of positions

for physicians is supposed to grow faster than average between now and 2014” (Healthcare-Training Center).

With the computerization of medical records and increased attention to detail with the help of technology, pathology is becoming more involved in every field of medicine. This surge in job opportunities will only be fueled further by the additional expectation of openings in any medical field requiring a doctorate. Living in Pittsburgh also provides extensive opportunities with any medical career. Many of those jobs are in some form of high-tech or health care -- two industries which project the region's greatest growth over the next 10 years. Together, tech and health are expected to generate 31,000 new jobs at a combined growth of 18 percent” (The Pittsburgh Channel). Notable hospitals such as Forbes Regional Medical Center, UPMC Health System, Magee-Women’s Hospital, and Children’s Hospital of Pittsburgh are all involved in disease research. Pathologists are in demand for more and more medical areas, especially research into the cause and symptoms of disease. Additionally, major universities such as the University of Pittsburgh or Carnegie Mellon University provide for interesting research outside of hospitals, for which pathologists would be valued for their knowledge and attention to detail. Seeing as this career requires a doctorate, there is very little room for advancement in a hospital, other than heading the pathology department of a hospital. Within these major hospitals, there is room for career advancement. Pathology is a biological career, like most medical sciences. Therefore, many pathologists begin with basic biology and natural science courses before dedicating themselves to a career in pathology. This basic study relates many other careers to pathology, particularly speciality positions in hospitals. Neurologists may often work closely with pathologists, as they can easily study causes of neurological disease from deformations in bodily tissue and fluids. There is even a specialized pathologist, called a neuropathology, works

solely in the diagnosis and detection of neurological disease. Surgeons also study with pathologists, initially. The careers are related through the study of anatomy, and surgeons often rely on pathologists to help with a diagnosis based off samples before or after surgery is completed. This serves as either a consultation or a confirmation of success, respectively. Even within the field of pathology, there are specializations. Cytopathologists, for example, study specifically cells and their structure.

This career would require me to very few lifestyle changes. At most, I would need to attend college out of state, which was my original plan before I examined the career of pathology. Based off this research, I have learned that pathologists require extensive schooling and an orientation for detail. They also have a necessity for broad knowledge of the biological sciences, which I did excel in, as demonstrated by my AP Biology course grade. Considering my inability to focus on tedious tasks and detail, it has become more apparent that this career is not ideal for someone with my skill-set. A lack of patience and inability to lead others, as pathologists are in charge of their technicians, also attributes to the incompatibility of pathology and me. Also, the constant environment of a laboratory can be somewhat repulsive and isolated. I also learned that, during training, there are inconsistent and long hours for pathologists, which would not be compatible for my social life during my twenties, when this interning and training would occur. All of these personal factors, rather than the educational ones, have made it apparent that a career in pathology is not suited for me or my personality and skills.

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