

ABSTRACT

Healing Hands: A Bicontinental Study of Medicine

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A student's journey to becoming a physician is long and arduous. The process exists to properly train and educate physicians, ensuring their competence before entering the complex world of patient care and healthcare policy. This thesis uncovers the structural differences between medical systems in the United States and France, emphasizing the underlying cultural reasons for such variation. The information presented indicates distinct cultural differences, such as the French emphasis on apprenticeship and hands-on training from the outset of medical studies. However, in other instances, there is a considerable amount of overlap, such as in each country's historical unwillingness to adopt a national healthcare system. While a perfect solution to each system's complications and downsides may prove elusive, much can be learned from this comparison of two vastly different approaches to healthcare.

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HEALING HANDS: A BICONTINENTAL STUDY OF MEDICINE

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INTRODUCTION

Origins

In the pre-medical and medical communities, there is an understanding that in order to become a doctor, certain activities must take place. The underlying reasons for such a structured system are rarely investigated and, even more rarely, compared to the parallel system in another country. This thesis explores how the medical field arrived at where it is today and how medicine developed into its current form in both the United States and France. I begin with a brief introduction to outline the thesis's general structure to establish the bases of comparison between France and the United States.

First, this thesis examines the medical field's history, from its beginnings as a modern scientific field to its development as an institution. France holds decisive historical significance in terms of the modernization of medicine worldwide due to the consequences of the French Revolution in 1789. While the Revolution caused violent upheaval within French society, the advancements that came out of that period changed the course of medicine for the entire world. Beyond the development of medicine as a distinct career, chapter one also addresses the creation of health insurance. There are significant differences in structure when comparing American health insurance to that of France, as expected based on these two countries' different political systems. However, despite the apparent differences, there are more similarities than one may think.

In the second chapter, the thesis systematically compares the educational requirements to become a physician in these two countries. As an American, it is easy to

assume, without much thought, that other countries will do things in the same way as it is done in the United States. This chapter challenges that assumption and provides details highlighting the contrast between educational systems in France and the United States and the impact of this academic diversity on medical studies. Explanations of the process a student must undergo to become a doctor span from high school until the completion of medical education.

An interesting point of comparison addressed in the third chapter is the relative importance of preventative and acute healthcare, as indicated by each country's governmental spending on healthcare services. While it is interesting to understand where modern medicine came from and how twenty-first-century doctors learn to practice the art of healing, it is also essential to evaluate the performance of a country's medical system. This chapter examines the effectiveness of health coverage for each country's citizens, the structure of emergency medical systems, and government spending on healthcare and pharmaceuticals. While this is not a comprehensive picture of either France's or the United States' entire medical apparatus, it provides a glimpse into the diverse approaches to keeping citizens healthy.

Chapter five provides a short reprieve from research and data. To supplement the reader's general knowledge of American healthcare, I include firsthand experience from six weeks of fieldwork in France. Living with and shadowing two physicians in the south of France offered a more comprehensive understanding of the societal expectations for French physicians. Throughout this chapter, I combine research findings with my experience in an actual medical practice to illustrate cultural differences in a medical setting.

Finally, the last chapter is a projection of possibilities for the future of medicine. The world is continually changing, and the medical field is far from immune to evolutionary processes. Some may even argue that medicine helps propel society forward. This chapter looks ahead to changes in medical education and developments in technology. The unexpected turn of events when the coronavirus caused a worldwide pandemic undoubtedly changed the medical field's trajectory in ways the world has yet to manifest. Modern medicine has changed its conception of what constitutes appropriate healthcare, as outlined in the first chapter, but now it is only possible to wait and see how much more medicine transforms in the future.

CHAPTER ONE

Historical Foundations of the French and American Medical Systems

The History of Modern Medicine

The development of medicine into a distinctive scientific practice began in France. Physicians before the French Revolution in the late eighteenth century lacked any kind of standard procedure and found no reason to begin researching medical complications. That said, the medical field was not always as respected as it is today. Practices varied from physician to physician, surgeon to surgeon. Before the French Revolution, there was not a set education program for those aspiring to a career as a healer. Hospitals, which are associated with medicine and healing today, were not just for the sick. They were for the poor and those excluded from society, like the chronically and mentally ill. The changes implemented during the French Revolution created the field of medicine that we are familiar with today. Ultimately, the French Revolution completely changed the trajectory of the field of medicine in France, and eventually, the world.

Although the Enlightenment affected a large part of Europe, the proposed ideas had a particularly strong impact on medicine in France as the cradle of Enlightenment thinking. The main paradigm shift concerned a transition from relying on tradition and religion to understanding the world through “reason and logic.”¹ The prominent philosophers of the day were called *philosophes*, and their ideas spurred critical thinking and the spread of ideas such as “order, religious tolerance, rational thought, criticism and

¹ Darius von Güttner, “The French Revolution and Europe – Its Echoes, Its Influence, Its Impact.,” *Agora* 51, no. 1 (January 2016): 37.

human progress.”² While these ideas existed throughout France and Europe, the main developments of interest occurred in Paris. Because a large part of the revolutionary events took place in Paris, the most well-known advancements of medicine also happened there. The economy deteriorated drastically during the Revolution, and the hospitals were grossly overcrowded. The conditions within the hospitals were so poor that many Enlightenment thinkers, government reformers, and medical professionals believed that changes were necessary.³ John Frangos suggests that the revolutionaries held so much power that their ideology directly translated into policy.⁴ The Revolution of 1789 caused a major upheaval in French society, but the subsequent advancements in the medical arena balanced out some of the negative impacts.

Initially, hospitals were for the poor and the marginalized. Those who thought hospitals needed to change wanted the poor to be housed elsewhere, creating more room for the sick in hospitals.⁵ Frangos contends that the major problem with these new ideas was that the tradition of caring for the poor was a “thousand-year-old tradition” that would not be easy to break.⁶ People were uncomfortable with change, especially during this period when everything was in flux. At the beginning of the Revolution, part of the population wanted to do away with hospitals as a whole, but when people sustained

² von Güttner, “The French Revolution and Europe – Its Echoes, Its Influence, Its Impact,” 37.

³ John Frangos, *From Housing the Poor to Healing the Sick: The Changing Institution of Paris Hospitals Under the Old Regime and Revolution* (Madison : London: Fairleigh Dickinson University Press ; Associated University Presses, 1997), 162.

⁴ Ibid., 14.

⁵ Ibid., 162.

⁶ Ibid., 14.

injuries during the fighting, they needed a place to be cared for, so hospitals remained part of the city's infrastructure.⁷ In the end, hospitals were thus saved.

Before the Revolution, hospitals in Paris had been classified into three categories. The first, the *hôpital général*, mainly interacted with the poor. It provided care for “the aged, abandoned and, in some cases, the sick and morally corrupted,” including “prostitutes, persons suffering from the advanced ravages of venereal disease, the insane, and others considered incurable and in need of long-term care.”⁸ The second category consisted of Hôtel Dieu. Hôtel Dieu was more or less consistent with modern-day hospitals, intended for “patients with fevers, those suffering from some kind of physical injury, and abandoned infants.”⁹ Still, only the poor went to Hôtel Dieu. The third served retired and old nuns and priests, and these establishments were called “hospice.”¹⁰ In the process of transforming all hospitals into places to treat the sick during the Revolution, society witnessed “the process of medicalization.”¹¹

Politically, the revolutionaries won against the traditionalists, and hospitals became a place for the sick. Hospitals then also became the location of formal medical instruction for doctors. Patients received care while physicians conducted analyses of symptoms, and medical advances multiplied.¹² Before physicians and surgeons were

⁷ Frangos, *From Housing the Poor to Healing the Sick*, 248.

⁸ Ibid., 17.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid., 13.

¹² Maurice Crosland, “The French Academy of Sciences As a Patron of the Medical Sciences in the Early Nineteenth Century,” *Annals of Science* 66, no. 2 (April 2009): 248, <https://doi.org/10.1080/00033790802292638>.

formally educated, there was a “sharp distinction” between the two specialties, but training modernized and the two began to overlap.¹³ According to Frangos, during the process of medical modernization, doctors became “the new center of authority.”¹⁴ He further asserts that “Revolutionary legislators made hospitals financially dependent on government, suppressed religious groups, and stripped administrators of independent authority,” which created a “vacuum” for government officials and doctors to model hospitals after their ideas of how they should look.¹⁵ As time progressed, the lessons learned and the medical advancements resulting from the French Revolution spread to neighboring European countries.

In the United States, medicine resembled European practices due to its European colonists and its relative youth as a country. The different stages of medical development followed a timeline from preindustrial America to postindustrial America to modern development since the mid-1900s.¹⁶ The preindustrial era incorporated the mid-eighteenth century through the end of the nineteenth century. European practices remained significantly more advanced than the practices of their American counterparts, whose medical procedures were considered “primitive.”¹⁷ As was the case with early medicine in Europe, the field lacked legitimacy and did not require more training than any other craft of the time. With no general education requirement to become a physician,

¹³ Crosland, “The French Academy of Sciences As a Patron of the Medical Sciences in the Early Nineteenth Century,” 248.

¹⁴ Frangos, *From Housing the Poor to Healing the Sick*, 164.

¹⁵ *Ibid.*, 163.

¹⁶ Leiyu Shi, Douglas A. Singh, and Leiyu Shi, *Essentials of the U.S. Health Care System*, Fifth edition (Burlington, MA: Jones & Bartlett Learning, 2019), 47.

¹⁷ *Ibid.*, 47.

medical knowledge varied from person to person. Hospitals were as lacking in hygiene and guidance as the pre-revolution French hospitals, with “poor sanitation and unskilled staff.”¹⁸

Institutionally, hospitals shared a function similar to early Parisian hospitals. There were scarcely any hospitals in the United States in the mid to late nineteenth century, and those that existed only served major urban cities.¹⁹ These hospitals cared for the sick, the traveling, and the poor, but they failed to provide an adequate location for gathering scientific intelligence about diseases. Rural America still mainly relied on passed-down, published home remedy books and treatments.²⁰ By this time in France and Britain, hospitals proliferated throughout Western Europe, medical research continued to advance, and new policies were “readily adopted” into contemporary practices.²¹ This backwardness concerning medical knowledge, as well as the fact that hospitals persisted as locations more dangerous than the home, contributed to the negative view of hospitals as a last resort.²²

Medical schools began to arise at the end of the nineteenth century, but they did not resemble modern medical schools in the slightest. These schools served an economic purpose: physicians could educate multiple students at once with direct payment.²³ The physicians trained students as deficient in qualifications as they themselves had been the

¹⁸ Shi and Singh, *Essentials of the U.S. Health Care System*, 48.

¹⁹ Ibid., 50.

²⁰ Ibid.

²¹ Ibid.

²² Ibid., 51.

²³ Ibid., 48.

decade prior, so science did not yet contribute to medical education. Among the reasons to consider medicine as a working-class trade were the lack of anesthesia or antiseptic, no diagnostic imaging techniques (even the x-ray was not yet invented), and suspected diagnoses came only from observation and experience rather than testing and confirmation.²⁴ Education had a close association with the clergy due to the clergy's level of education. Often better educated than most doctors, the clergy had a wide variety of patient exposure in their field of work. Successful physicians typically had more education than their competition and, therefore, medicine kept its close religious ties.

The transition into the postindustrial era during the 1870s marked a total overhaul of medical education. Shi and Singh note that the European curriculum involving chemistry, physiology, anatomy, and pathology incorporated new medical programs affiliated with universities.²⁵ College degrees became the new requirement for entry into medical programs instead of a high-school diploma, the academic year lasted nine months instead of a meager four, and the length of education increased from two to three years.²⁶ Hospitals became increasingly high-tech and students completed a residency, gaining experience in hospitals before attaining their degree. The institutionalization of hospitals in America followed after their European predecessors, and along with this came increased sanitation practices and training of nurses.²⁷

The French Revolution turned French society inside out. Hospitals before the revolution were filthy and not well ventilated, but as soon as doctors gained power in the

²⁴ Shi and Singh, *Essentials of the U.S. Health Care System*, 49.

²⁵ *Ibid.*, 51.

²⁶ *Ibid.*

²⁷ *Ibid.*, 55.

system, that changed. The prestige of the medical field increased after scientists obtained an official platform from which to study the physiology of the sick. Had the French Revolution never happened, we would not have the same idea of the role of the hospital in society today. In the end, medicine was not simply saved, it was expanded. The changes that occurred in France in the late eighteenth century led to the modernization of hospitals and the care provided by physicians.

The Creation of Health Insurance

The beginnings of National Health Insurance (NHI) began with Otto von Bismarck in Germany. He intended to increase productivity among workers by providing accident and health insurance.²⁸ Contrary to stereotypical American perceptions of the nature of French society, the French did not support an NHI policy until France reclaimed Alsace-Lorraine from Germany in 1919, a population that already enjoyed “Bismarckian health insurance.”²⁹ Although the foundation of NHI in France was grossly a political move, French citizens realized the benefits of access to healthcare. The Social Insurance Law of 1930 required the enrollment of blue-collar workers in the existing mutual provided by the government, leading to coverage of nearly half the French population within the first decade of implementation.³⁰

In the United States, the proposals for NHI in the 1910s did not receive adequate support. Many states rejected the proposals, and with the beginning of World War II, new

²⁸ M. Gorsky, “The Political Economy of Health Care in the Nineteenth and Twentieth Centuries,” in *The Oxford Handbook of the History of Medicine*, 2011, <https://doi.org/10.1093/oxfordhb/9780199546497.013.0024>, 436.

²⁹ *Ibid.*, 437.

³⁰ *Ibid.*

ideas were simply discarded. The legislation encountered multiple issues. Geopolitically, America did not absorb outside territory or people into its country. The French wanted to keep their new citizens content, but no such impetus existed for the United States.

Secondly, America did not have the benefit of a fully supportive labor force. In France, the laborers endorsed the new policy relatively quickly, allowing a large portion of the population to support the new legislation. In the United States, workers worried the new health coverage would “undermine trade unionism” and the possibility of higher wages.³¹ Additionally, worker’s compensation already covered many workers, which went into effect during the 1910s.³² Finally, existing medical infrastructure provided no institutional support. Everyone from doctors to the American Medical Association (AMA) resisted NHI propositions.³³

The historical context of each country provides the basis of the divide between France’s path to socialized healthcare and the United States’ adoption of private insurance. The creation of private insurance in the United States in 1929 consisted of a “hospital insurance plan for teachers” through Baylor University Hospital in Dallas, Texas.³⁴ This plan became the prototype for Blue Cross spanning the entire country. Other hospitals mimicked the Baylor University Hospital’s plan and offered single-hospital plans.³⁵ Soon, the American Hospital Association (AHA) became a coordinating committee that united the plans of multiple individual hospitals with groups of hospitals

³¹ Gorsky, “The Political Economy of Health Care in the Nineteenth and Twentieth Centuries,” 437.

³² Shi and Singh, *Essentials of the U.S. Health Care System*, 56.

³³ Gorsky, “The Political Economy of Health Care in the Nineteenth and Twentieth Centuries,” 438.

³⁴ Shi and Singh, *Essentials of the U.S. Health Care System*, 57.

³⁵ Ibid.

that had consolidated their insurance plans and created the Blue Cross network.³⁶ The popularity of private insurance rose, and soon, commercial industries followed suit.

After World War II, Charles de Gaulle took advantage of the nationalistic feelings in France in order to put forth the Social Security Law of 1945, and instated mandatory insurance under “the democratic management of boards dominated by trade unions.”³⁷ This proposal did not extend to all of society; physicians maintained autonomy over billing levels and co-payments still existed, keeping *mutualités* alive.³⁸ Nevertheless, by the 1970s all of France was almost wholly covered medically.

Considering the rest of the global powers that fought in World War II, the United States was an outlier when it came to medical insurance. Most countries initiated some form of universal health coverage, but instead, the AMA used rising fears of communism and socialism to turn citizens away from NHI.³⁹ The only governmental support the medical field received was money to build hospitals, and insurance was left to private insurers. Starting during the Cold War, as a result of the aftermath of World War II, government mandated NHI was largely viewed as un-American and a direct threat to freedom.

Change finally occurred in the 1960s with the introduction of Medicare and Medicaid. Originally an extension of Social Security, the programs extended to hospital and nursing home care for the elderly.⁴⁰ Initially, Medicare and Medicaid failed to

³⁶ Shi and Singh, *Essentials of the U.S. Health Care System*, 57.

³⁷ Gorsky, “The Political Economy of Health Care in the Nineteenth and Twentieth Centuries,” 441.

³⁸ Ibid.

³⁹ Ibid.

⁴⁰ Shi and Singh, *Essentials of the U.S. Health Care System*, 61.

achieve high levels of success. States had control over how to extend their welfare to low-income elderly but failed to implement new programs on their own. This failure led to the increased importance of President Johnson's Great Society programs in 1964, which pushed for functional health coverage for "the aged and the poor."⁴¹ After much deliberation, a three-part program was put into effect in 1965. Included were Parts A and B of Medicare, provided for the elderly with any income, and Medicaid for the "eligible poor."⁴² Medicare Part A was for hospital insurance and "short-term nursing home coverage" after hospital discharge, and it was to be an extension of Social Security funds.⁴³ Part B was "government-subsidized insurance" to cover the cost of physicians outside the hospital, leaving a fraction of the premium for the patient to pay.⁴⁴ Medicaid, on the other hand, was based on the federal government matching funds depending on the per capita income of each state and that state's financial need. A stigma that began at its creation and endures today is that of popular support for Medicare and disapproval of Medicaid. Because Medicaid catered to the poor, it fell under the umbrella of "public welfare," provided to those who cannot pay, funded by those who can.⁴⁵

Beginning in 1973, the disabled could also receive Social Security benefits through Medicare, coverage was extended to those with end-stage kidney disease in 1978, and coverage for prescription medication was added to Medicare Part B in 2003.⁴⁶

⁴¹ Shi and Singh, *Essentials of the U.S. Health Care System*, 61.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Ibid., 62.

⁴⁶ Ibid, 64.

The size of healthcare organizations increased drastically during the 1990s, and services provided by hospitals expanded, all of which led to physicians losing autonomy and power in the growing hospital systems.⁴⁷ Despite the rising costs and complexity of medical care in the United States, it is clear that the increases in technology around the world have led to better survival outcomes among the ill and injured. Humanity can only hope that inequalities in healthcare causing disillusionment among citizens will lead to changes in the way health insurance functions in the future. If there is one thing that history proves, it is that no healthcare policy changes without the widespread support of a country's citizens.

⁴⁷ Shi and Singh, *Essentials of the U.S. Health Care System*, 64-67.

CHAPTER TWO

The Making of a Doctor

Many Americans assume that education in their country is similar to those of other countries. Commonly, it is also assumed that medical care is better in the United States than anywhere else. In this chapter, I challenge the reader to put aside their biases and approach the differences between the French and American styles of medical education with an open mind. The American and French paths to becoming a physician diverge in distinctive ways, but ultimately accomplish the same purpose. Finally, to close, I perform a cultural analysis of each track.

First, the key to success in the United States starts with this: do well enough in high school to get accepted into a college or university undergraduate program. Then, while an undergrad, students must perform all necessary actions for acceptance into medical school. Such actions include taking and doing well in the required pre-medical courses. The basic requirements of most medical schools in the United States are biology, chemistry, physics, calculus, and associated laboratory classes. In addition, students must arrange shadowing opportunities in order to be adequately exposed to the medical field, demonstrate leadership qualities among peers, and finally take the Medical College Admission Test (MCAT). Once a student is accepted into medical school, the specific path varies depending on which school a student chooses. Finally, at the end of their time in medical school, the student can be called a doctor (at a minimum, eight years after high school graduation). However, this is not the end of education for the new physician. Next

the doctor must match with a residency program at a teaching hospital. The match with a residency is highly competitive as well, and performance in medical school determines these matches.

In terms of flexibility, the United States leaves many career paths open to its young population. In high school, students have the opportunity to take regular classes, Honors classes, or classes for Advanced Placement (AP) credit. None of the more advanced classes are necessarily required to become a physician. However, students must rely on their ambition to pursue the more challenging courses if they want to delve deeper into a subject. For example, if a student is interested in the human body and they want to explore biology more in-depth, it would be beneficial to take an AP Biology course if their high school offers it. In order to become a doctor, upon graduation from high school, the student must seek admission into a college or university. Luckily, for students from smaller towns with less class variety, the admissions committees are generally aware of the courses offered by the individual high schools. For this reason, it is possible for a high-achieving student who only took honors courses to compete for admission against a student from a large high school who had every opportunity to take AP classes. All of this goes to say that if someone is interested in becoming a physician, the first step is to strive for good grades and create a competitive enough application for undergraduate study to be accepted into a degree-granting program.

The path an undergraduate decides to take can vary significantly from person to person. Some choose to attend a local community college for their first two years and receive credit for pre-requisite courses before attending a more expensive, more prestigious university for the final two years. Others take a gap year after high school to

work and explore different career options. Still another group, more traditionally, jumps straight into a four-year university and begins their education in that way. When a student embarks on their undergraduate journey, they do not need to know from the start that they want to pursue medicine. If they realize a year into their education that they want to become a physician, the student can add the courses necessary to be accepted into medical school, and their process is no different from that of a freshman with that end goal already in mind. Becoming a doctor later in life is also an option, and those who decide they would like to pursue medicine after they have explored another career have the option to go back to school and complete the undergraduate requirements for medical school.

Applying to medical school in the United States is a highly competitive process. As an undergraduate, it is imperative to maintain a high GPA, to score high on the MCAT, and to complete considerable amounts of shadowing, research, and leadership experience. According to the AAMC, the mean GPA of medical school matriculants was a 3.73, and the mean MCAT score was a 511.5 for the 2019-2020 application cycle.⁴⁸ For reference, the 50th percentile score of all students who took the MCAT was a 500.5, and a 511 was in the 83rd percentile for test dates between May 1, 2019 and April 30, 2020.⁴⁹ The large discrepancy between scores achieved by pre-medical students and the students accepted into and attending medical school demonstrates the competitiveness of medical school programs. There are many more students wanting to go to medical school than

⁴⁸ AAMC, “2019 FACTS: Applicants and Matriculants Data,” AAMC, accessed February 19, 2020, <https://www.aamc.org/data-reports/students-residents/interactive-data/2019-facts-applicants-and-matriculants-data>.

⁴⁹ AAMC, “Percentile Ranks for the MCAT Exam,” AAMC, accessed February 19, 2020, <https://www.aamc.org/services/mcat-admissions-officers/resources/percentile-ranks>.

there are seats available, leading to a highly competitive environment during the four years of undergraduate education.

In medical school, the curriculum varies by program and location. However, there are basic requirements across all schools. The coursework covers “science, the latest innovations in treatment and diagnosis, problem-solving and communication skills, prevention and care, professionalism, and medical ethics.”⁵⁰ While incorporating these scientific values into the medical curriculum, each school orients its focus toward the needs of the community. Generally, the beginning of the four years is focused on the hard sciences and “book work”. The later years are intended for students to explore various fields and begin hands-on training in the real world. Throughout this time, students can pursue research opportunities or even a dual degree (PhD, MPH, MBA, among others).

At the end of medical school, students match with a residency program aligned with their interests and strengths. This is once again based on academic and clinical performance in medical school and includes any extracurriculars such as research or additional programs. The process of applying to a residency program is lengthy, lasting at least nine months. The official match with a residency program occurs during the final March of medical school, and this is the culmination of a student’s scientific studies and in-depth skill development in different specialties.⁵¹ During residency, which lasts three to seven years, doctors receive hands-on training in multiple settings such as urban, rural, or VA hospitals, so they are prepared regardless of where they complete their residency.⁵²

⁵⁰ AAMC, “AAMC for Students, Applicants, and Residents,” accessed February 19, 2020, <https://students-residents.aamc.org/>.

⁵¹ Ibid.

⁵² Ibid.

This stage is labelled Graduate Medical Education (GME), and once residency is completed, doctors may choose to continue their specialization for up to three years in a fellowship program.⁵³

Conversely, in France, the process of becoming a doctor is entirely different. Choosing which field of study to pursue begins much earlier in a student's academic career, so if they aspire to a medical career, this must be decided earlier on than for an American student. Upon entrance to a *lycée* (high school), students must decide if they want to take the *Baccalauréat (le bac)* or not. This exit exam score determines if they will realistically attend a university.

When students enter their last two years of high school, they apply for a *spécialité*. Based on their performance, school administrations accept (or not) students into the *bac* path they choose. The focused paths of L (literature studies), ES (economic/social studies), and S (science studies), are all part of the general *bac*, but there are other options as well. If students are not interested in attending college, they can elect to obtain a *baccalauréat technologique* or attend a different type of high school altogether, a *lycée professionnel*.⁵⁴ The *baccalauréat technologique* is a diploma awarded after fulfilling education requirements for specific technical skills such as “Science and Industrial (STI), Science and Laboratory (STL), Health and Social Sciences (STSS), Science and Management (STG), Music and Dance (TMD), Agronomy (STAV) and Hotel Management.”⁵⁵ A *lycée professionnel* provides students with the necessary

⁵³ AAMC, “AAMC for Students, Applicants, and Residents.”

⁵⁴ Expatica, “A Guide to the French Education System,” Expat Guide to France, accessed March 19, 2020, <https://www.expatica.com/fr/education/children-education/a-guide-to-french-education-101147/>.

⁵⁵ Ibid.

qualifications to work in the fields of “social/health, driving/transport, catering/hotels, and optics” or to pursue “further vocational studies.”⁵⁶ Finally, there are *lycées du bâtiment* and *lycées agricoles*, which specialize in building and agriculture, respectively.⁵⁷

As the above list makes clear, high school students must choose their pre-university path carefully, because this choice will determine which future careers are possible. Students interested in becoming doctors are most likely to choose the *S bac*. All but 1% of students who succeed in French medical school have a science background.⁵⁸ Unlike in the United States, there is no distinction between undergraduate education and graduate medical education in France. After high school, French students begin a six-year program that differs completely from the pre-medical and medical school system in the United States.

Similarly to the United States, when a student graduates high school and applies to a medical school, they must submit their *Baccalauréat* score and their transcripts online. After this, the process begins to diverge. The prestige of each medical school varies by location and admit class size. Students rank their preferred schools, and based on scores, the schools select which students to admit. If a student is selected to their first-choice school, they must accept or deny the admission. Accepting is the best option because if they deny, they lose their spot to someone on the waiting list and must wait until the second round of admissions, which does not guarantee acceptance.

⁵⁶ Expatica, “A Guide to the French Education System.”

⁵⁷ Ibid.

⁵⁸ Christophe Segouin et al., “Country Report: Medical Education in France,” *Medical Education* 41, no. 3 (2007): 295–301, <https://doi.org/10.1111/j.1365-2929.2007.02690.x>, 297.

The first year of medical study is considered the hardest, and in order to continue, students must pass a demanding examination. If a student does not pass, as only 10% of students are selected to continue into their second year, they can repeat the year (called *redoublement*) once more. About 70% of students repeat the first year, which extends the length of study to seven years for most.⁵⁹ Years one and two are more classroom-based than clinical, so these years most closely resemble the pre-medical curriculum in the United States. However, at the end of the second year, students begin clinical training. This first exposure to practicing medicine is through an introductory nursing course, in which students receive about 200 hours of clinical training.⁶⁰

After the first two years, students have two options. Those who wish to pursue an allied health profession branch off after the second year into a specialized school for their specific career. Those who wish to become physicians move into the second phase of their medical training. Phase two involves studies more applicable to the actual practice of medicine, along with increased clinical hours. Year three is a “bridging year,” meant to connect the basic sciences with medical terminology.⁶¹ Students spend the majority of their time in the classroom, but courses teaching additional clinical skills supplement the traditional classroom studies. Beginning in the fourth year, students rotate through different specialties, and the curriculum closely resembles that of the American medical student’s third and fourth years. This involves specific required rotations. Throughout, students conduct patient interviews and examinations under direct supervision and follow

⁵⁹ Segouin et al., “Country Report,” 297.

⁶⁰ Ibid.

⁶¹ Ibid.

the patient throughout their entire stay at the hospital.⁶² At the end of year six, after passing a clinical evaluation, students receive a diploma that correlates to the MD given to physicians in the United States.⁶³

The third cycle of medical training, more or less equivalent to residency in the United States, is for any graduate of the second cycle who wishes to pursue a specialty. There is a ranking examination, and students are matched with specialties based on their rank. The opportunities to study a specialty are based on this ranking, and students identify where they would like to study and in which specialty. Once they are matched with a “faculty of medicine,” students have three more years of study if they choose general medicine, or four to five more years if they choose a specialty.⁶⁴ Every six months, residents change rotations and can decide which rotations they want to complete “according to their seniority and their scores on the national placement examination.”⁶⁵ During rotations, students also complete theoretical coursework and must submit an essay to judges within their specialty for their final assessment.⁶⁶ After passing examinations and receiving a diploma, doctors must “register on the national list of doctors” to practice legally.⁶⁷

The variation in the organizational structure of medical schools and in the emphasis on early clinical instruction make evident the differences between French and

⁶² Segouin et al., “Country Report,” 297.

⁶³ Segouin et al., “Country Report,” 298.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Ibid., 299.

⁶⁷ Ibid.

American approaches to medical education. However, there are also similarities, such as the intensity of coursework and the method of clinical rotation. Comparing and contrasting France and the United States from a medical standpoint sheds light on the cultural values of each country. Both countries believe in meritocracy, that all physicians should work for what they want. Residencies are determined by educational performance, and those with the highest scores place into the most competitive specialties. However, in France, students begin their clinical training in their second year out of high school. Medical students in the United States generally must wait until their seventh postsecondary year. Interestingly enough, American medical schools are beginning to incorporate clinical rotations as early as year one (the fifth year after high school). The reason for the immediacy of training French doctors in a clinical setting is due to their historical emphasis on apprenticeship in medical education.⁶⁸ Traditionally, students train for long periods to create adequate exposure to the field before being left to practice on their own.

The tradition of modern medicine in France is as old as the nation of the United States of America, so by the time Americans began practicing modern medicine, there was no comparative tradition. The lack of a comparable medical infrastructure in the United States when medicine became a successful enterprise may explain the difference between the regulations of student shadowing in each country, I experienced first-hand. In the United States, students who wish to shadow must go through privacy training and may not interact with the patients except under special circumstances. In France, there is less concern with students helping, especially in a clinical setting. In a hospital, there is

⁶⁸ Segouin et al., “Country Report,” 300.

not much a student can do but watch, but in a clinic the student may be able to help with setting up equipment or assisting patients as they get settled.

In contrast to the French, who tend to have one career throughout their lives, Americans can, and often will, change careers during their lifetime. American high-school students find it hard to imagine choosing a path so early on that would determine their future. Courses for college students allow maximum flexibility; universities offer courses in many fields, so if a student decides to change their major from Biology to English literature, they can remain at the same school. Flexibility is not common in French education, where each university is specific to a certain field. Students do not choose their courses. Instead, the university program outlines the curriculum. Once a student receives a degree, they will most likely work in that field for the rest of their career. If they decide they would like to change within their field, they can participate in an internship to learn a new yet similar set of skills.

However, if someone wishes to change routes entirely, they would need to start over and go to university again. The policy of starting over can only be waived for certain programs that have a bridge in place for students coming in with other experiences. This program makes sense because all students take the same courses, and they do not have the same general requirements that American universities have. The idea of enduring a single profession for their entire working career is unknown to most American college graduates. For example, with a biology degree, someone can decide they do not want to go to medical school at any point, and they will still have a chance at a successful career in research or teaching. Or, they can even decide to apply to a graduate school to continue their education. The different cultural understandings of what it means to receive a degree

explain the difference in educational systems between the United States and France. To an American, a degree is just a launching point from which they can pursue a variety of jobs in a variety of fields. To the French, a degree establishes competency in a specific area and indicates the sector of the working world where that degree-holder will spend the majority of their life.

In terms of motivations for pursuing medicine, there is an overlap between countries. There are pros and cons to be weighed when pursuing a career in the medical field, but the benefits outweigh the costs for a select portion of each population. The specifics of these costs and benefits do vary, however, and may not be evident to outsiders of each country. A major attraction, at least initially, to the medical field in the United States is financial. Physicians make a considerable amount of money, arguably the most money in the United States. They may be beaten by a small percentage of CEOs and some engineers, but in general, physicians sit at the top of the pay pyramid. Students are also passionate about science and helping others, but the prospect of a very comfortable life adds to the draw. Not every specialty makes the same amount of money, but no matter which field of medicine a physician enters, they are guaranteed to make more than most other professions.

In France, this is not the case. Doctors make an excellent living for themselves, but they do not make the most amount of money. The highest-paying jobs are in the business and financial sectors, with few specialties of medicine paying as much. There is a notable difference in taxation between the countries, so in France, the discrepancy is not as large between the highest paying job and the average job as it is in the United States. As implied by the difference in compensation between France and the United States, it is

more likely that the primary motivators to become physicians in France are a desire to learn more about the human body and also how to care for others.

Both France and the United States share other motivators, such as the prestige of the career and family tradition. Physicians are respected and distinguished due to the difficulty of the craft and the tangible impact they have. The knowledge that a physician can save a life contributes significantly to the public impression of a doctor. Family tradition is important, as indicated by the number of physicians who come from a family of physicians. Perhaps not the majority, but a large portion of medical students have a parent (or two) who are in the medical field. This fact stands for Americans and French alike.

The downsides to choosing a career in medicine are almost identical for both countries. The schooling is grueling, the hours are demanding, and the field is ever-changing. However, there is one significant difference between education in France and in the United States. Post-secondary education in France is almost free. There might be something akin to a 200€ fee (about \$230) per year, but education is very inexpensive. Physicians may not take home as much money as they do in the United States because of higher taxes, but they did not go into debt while receiving their education. Therefore, physicians in France live very comfortably without the necessity of paying back loans. Their taxes go to education being free (or almost free), but according to a physician interview, they still earn 60k-250k euros per year (about \$70k-300k), after all taxes have been claimed. The reward to become a physician is high, which likely perpetuates the familial choice of medicine as a career in both countries.

Medical education is very competitive, but the distribution of unhealthy competitive behaviors varies between countries. There is a belief in the United States that throughout post-secondary education, both in undergraduate study and medical school, students will push others back in order to get ahead. This belief, whether it is true or not, contributes to a cutthroat environment in which students must live until they are practicing physicians. In France, the first and sixth years are extremely competitive as those are the years culminating in a tough exam. The rigor of coursework contributes to a lack of social life for many students, especially those aiming for the more selective specialties. Saying no to parties with friends is a common practice among medical students in the United States and France.

Despite the differences between France and the United States, there are many similarities across the educational systems meant to create doctors. Students must devote a long period of their life to schooling and even more after that to training. The reasons students choose to pursue a career as a physician vary from person to person in each country, but the overarching themes remain. Students want to care for others while utilizing their scientific abilities. American students must pay a substantial sum to receive this education, but they receive bountiful compensation in return. French students do not owe much money at all, and they will still make a stable living. Despite the differences, and because of the similarities, student doctors both in the United States and France are well prepared for their careers in medicine.

CHAPTER THREE

Preventative vs. Acute Healthcare

A comparison of the healthcare focus in France and the United States in terms of preventative vs. acute healthcare does not indicate any significant differences since both countries are technologically advanced. However, the countries' approaches to how the government finances healthcare and how patients pay for medical services suggest more about societal and national values than the standard of care. Both countries have the capacity to focus on preventative healthcare but thus far have not fully utilized these capabilities. They also both have functioning sophisticated systems in place to address acute and subacute illnesses.

Despite these similarities, each society is structured in a way that is conducive to varying outcomes. In France, because of the socialization of healthcare, the financial burden associated with preventative healthcare is lower than in the United States. Seeing a specialist may be more difficult due to governmental budgetary allowances, but in general, visiting the doctor or even the pharmacy when sick is commonplace and easily accessible. Therefore, the structure of the medical system in France has the capacity to care for patients before their illnesses become acute, falling into a more preventative category. Unfortunately, French citizens do not take full advantage of the structure of

their medical system, and there is an "absence of any health structure specifically dedicated to prevention within the French health system."⁶⁹

By contrast, in the United States, the capitalist structure of the medical system creates barriers for many people to access a doctor. According to the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) and the American Community Survey (ACS), 67.3 % of Americans were covered by private insurance, 34.4% of Americans by public insurance, and 8.5% of Americans had no insurance.⁷⁰ Thus, there are a significant number of Americans without adequate health insurance, and even when insured, over one quarter of the population still cannot afford a doctor. A study published in 2001 found that 2 in 5 uninsured adults reported difficulty affording their healthcare, but even more surprising was the finding that 20% of Medicaid-covered adults and 13.6% of privately insured adults also have financial barriers to receiving healthcare.⁷¹ The Emergency Medical Treatment & Labor Act, enacted by Congress in 1986, established that emergency rooms must treat all patients by law, regardless of their ability to pay. For this reason, many low-income and uninsured patients are forced to either use the emergency department as primary care or resort to hospitals once their illness progresses beyond their ability to care for themselves.⁷²

⁶⁹ Julien Gelly et al., "Preventive Services Recommendations for Adults in Primary Care Settings: Agreement between Canada, France and the USA—A Systematic Review," *Preventive Medicine* 57, no. 1 (July 2013): 3–11, <https://doi.org/10.1016/j.ypmed.2013.03.012>, 8.

⁷⁰ US Census Bureau, "Health Insurance Coverage in the United States: 2018," The United States Census Bureau, accessed September 23, 2020, <https://www.census.gov/library/publications/2019/demo/p60-267.html>.

⁷¹ Robin M Weinick, Sepheen C Byron, and Arlene S Bierman, "Who Can't Pay for Health Care?," *Journal of General Internal Medicine* 20, no. 6 (June 2005): 504–9, <https://doi.org/10.1111/j.1525-1497.2005.0087.x>, 505.

⁷² "Emergency Medical Treatment & Labor Act (EMTALA) | CMS," accessed August 21, 2020, <https://www.cms.gov/Regulations-and-Guidance/Legislation/EMTALA>.

If patients were able to see the doctor more often, it is likely they would not need to utilize the emergency room as a primary care provider. An underlying reason for the lack of adequate preventative medicine includes subpar recognition of the importance of preventing disease instead of simply treating it when it occurs. Culturally, in both countries, the public as well as the government place a greater emphasis on curative medicine and illness than the promotion of health.⁷³ According to the Organization for Economic Cooperation and Development (OECD), "almost 3 million premature deaths across OECD countries could have been avoided through better prevention and health care interventions," such as those related to "heart attacks, stroke, and other circulatory diseases."⁷⁴

The medical model of health explained by Leiyu Shi and Douglas Singh in the *Essentials of the U.S. Healthcare System* defines health as "the absence of illness or disease," stating that someone is healthy when they do not have symptoms.⁷⁵ By focusing on illness and disease as the main issues that need treatment, a society can purposefully or subconsciously decrease disease prevention's importance. Across the member countries of the OECD, one out of every four deaths were due to cancer.⁷⁶ To fully incorporate preventative medicine into the healthcare system, both France and the United States would need to shift to a biopsychosocial model of health as the foundation of medical infrastructure. This model was created by the World Health Organization (WHO)

⁷³ Shi and Singh, *Essentials of the U.S. Health Care System*, 23.

⁷⁴ OECD, "Avoidable Mortality (Preventable and Treatable) | Health at a Glance 2019 : OECD Indicators | OECD iLibrary," accessed October 6, 2020, <https://www.oecd-ilibrary.org/sites/3b4fdbf2-en/index.html?itemId=/content/component/3b4fdbf2-en>.

⁷⁵ Shi and Singh, *Essentials of the U.S. Health Care System*, 24.

⁷⁶ OECD, "Avoidable Mortality (Preventable and Treatable) | Health at a Glance 2019."

and defines health as "a complete state of physical, mental, and social well-being, and not merely the absence of disease or infirmity."⁷⁷ By using the biopsychosocial model of health, countries can get ahead of diseases before they occur, rather than constantly performing curative medicine. However, when acute illness strikes, it is important for people to know they can receive immediate care. This emergent care is surveyed in the next section.

Emergency Medical Systems

The Emergency Medical System (EMS) is composed of first responders such as emergency medical technicians (EMTs), paramedics, and firefighters, based out of fire stations or other ambulance services that are owned by private companies. Each fire department or company provides different levels of medical care based on their staffing.

In the United States, ambulances are staffed by paramedics and EMTs, but rarely by licensed physicians. When someone in a health crisis calls 911, the correct first responder is directed to their location. Depending on the severity of the case, firefighters capable of providing basic life support (BLS) might care for the victim. For more advanced cases, EMTs or paramedics will attend the scene. Once in the care of EMS, the patient is transported to the hospital where a more diverse medical staff takes over. While fire departments often send ambulances and first responders to emergency situations, hospitals can also utilize private ambulances that are staffed by EMTs or paramedics. If there is a specific emergency that requires a physician, hospitals can send a doctor on an ambulance to assess the situation.

⁷⁷ Shi and Singh, *Essentials of the U.S. Health Care System*, 25.

Conversely, in France, there are different tiers of EMS.⁷⁸ Physicians are in charge of dispatch, and they evaluate the situation remotely to determine which level of service is required. The first level is very similar to the United States' EMS system, with ambulances based out of the fire department, staffed by EMTs who can provide BLS.⁷⁹ The second level, however, is staffed by physicians, and ambulances can provide advanced life support (ALS).⁸⁰ Apart from these two general options, however, less extreme and even more extreme options exist. Dispatching physicians can choose to send firefighters if only BLS is needed or send a generalist by private vehicle.⁸¹ In cases of dire emergency, there is the option of a helicopter or a MICU, a Mobile Intensive Care Unit.⁸² Because of the “aggressive triage” of the medical dispatchers, only 65% of calls requesting aid actually result in the dispatch of an ambulance.⁸³

The French MICUs are quite fascinating. They are based out of regional headquarters of SMUR (Service Mobile d'Urgence et de Réanimation [Mobile Emergency and Recovery Service]) locations and have a well-equipped team on board. There is a “senior physician (usually an emergency physician), a nurse (or a nurse anaesthesiologist) and sometimes a medical student,” responding to each call, with a

⁷⁸ Frédéric Adnet and Frédéric Lapostolle, “International EMS Systems: France,” *Resuscitation* 63, no. 1 (October 1, 2004): 7–9, <https://doi.org/10.1016/j.resuscitation.2004.04.001>, 7.

⁷⁹ Heikki Erik Nikkanen, Claude Pouges, and Lenworth M Jacobs, “Emergency Medicine in France,” *Annals of Emergency Medicine* 31, no. 1 (January 1, 1998): 116–20, [https://doi.org/10.1016/S0196-0644\(98\)70293-8](https://doi.org/10.1016/S0196-0644(98)70293-8), 117.

⁸⁰ *Ibid.*, 117.

⁸¹ Adnet and Lapostolle, “International EMS Systems: France,” 8.

⁸² *Ibid.*

⁸³ Nikkanen, Pouges, and Jacobs, “Emergency Medicine in France,” 116.

specially trained ambulance driver.⁸⁴ The MICUs can "obtain a history, perform a physical examination, obtain an ECG and initiate thrombolysis in the field."⁸⁵ After this procedure is complete, the patient does not always need to go to the hospital, especially since the MICU usually arrives at the patient's location fifteen minutes or less after the patient places their call. Because of France's highly trained medical responders at the SMUR, most patients will not need to be hospitalized. However, if subsequent care is required, the dispatcher will direct the ambulance driver to the appropriate hospital based on bed availability and the medical specialty necessary for the patient.⁸⁶

The fire department in France is similar to that of the United States because firefighters are legally prohibited from providing "any medical acts" beyond BLS.⁸⁷ However, most other things are very different about the French fire department. The fire department's services are completely free in France.⁸⁸ In terms of ambulance or helicopter service provided by the French fire department or the hospital, patients pay 35% of the cost, and the government pays the other 65%.⁸⁹ The high price of admitting patients to the hospital is likely an excellent motivator for medical dispatchers to address minor problems over the phone or attempt to help patients at the scene. If the patient "is

⁸⁴ Adnet and Lapostolle, "International EMS Systems: France," 8.

⁸⁵ Ibid.

⁸⁶ Ibid.

⁸⁷ Nikkanen, Pouges, and Jacobs, "Emergency Medicine in France," 119.

⁸⁸ Ibid.

⁸⁹ Ibid.

resuscitated or undergoes fairly complex surgery," then the entire cost is covered by the French state.⁹⁰

In the United States, there is a benefit to arriving at the hospital by ambulance. Instead of sitting in the waiting room for hours on end, "EMS arrival itself attracts immediate attention of the hospital emergency medical team bypassing ED triage and wait times."⁹¹ The fast-track to the operating room or into a physician's care is especially important for patients who are facing life-threatening conditions. In France, there is an interesting setup for heart attack patients. Once a patient is deemed to be experiencing myocardial infarction in the field, EMS transports the patient directly into the catheter lab. This allows no time to be wasted by transferring care and allows the quickest path to recovery. Recovery is often supplemented with prescription medications, leading to questions about how France and the United States differ in this regard.

Health and Prescription Spending

Understanding how a government spends its money can provide insight into a country's level of commitment to medicine.⁹² In 2019, France spent \$5,376 per capita on overall health spending.⁹³ Comparatively, the United States spent about \$11,000 per

⁹⁰ Nikkanen, Pouges, and Jacobs, "Emergency Medicine in France," 119.

⁹¹ Sudha Xirasagar et al., "Why Acute Ischemic Stroke Patients in the United States Use or Do Not Use Emergency Medical Services Transport? Findings of an Inpatient Survey," *BMC Health Services Research* 19, no. 1 (December 2019): 929, <https://doi.org/10.1186/s12913-019-4741-6>, 2.

⁹² OECD, "Health Resources - Health Spending - OECD Data," the OECD, accessed June 7, 2020, <http://data.oecd.org/healthres/health-spending.htm>.

⁹³ Ibid.

capita on its total health spending during the same year.⁹⁴ This finding is the opposite of what would be expected since France has a socialist medical system and the United States operates under a capitalist system.

In terms of private spending on healthcare, the average American citizen spent \$1,150 out of pocket on healthcare during 2018 while French citizens only spent \$477 out of pocket.⁹⁵ The amount spent on healthcare is an average over the entire population, so the number of citizens in each country is irrelevant to this statistic. Consequently, Americans spend more on healthcare than the French, on average. The expensive nature of healthcare in the US is further compounded by the amount of public spending on healthcare. Public spending in this case means governmental provision of medical services through Medicare or Medicaid. Even though only 34% of US citizens are covered by public insurance such as Medicare or Medicaid, over \$4,000 per capita was spent on public healthcare in 2013.⁹⁶ This amount is considerably larger than the average listed above of an average spending of \$1,000 per person, indicating a discrepancy between the allotment of government funds to the public medical system and the average person's medical financial need in the United States.

Considering the per capita Gross Domestic Product (GDP) of each country, it is logical that France would spend less money per person than the United States would. The

⁹⁴ OECD, "Health Resources - Health Spending - OECD Data."

⁹⁵ Ibid.

⁹⁶ The Commonwealth Fund, "Spending, Use of Services, Prices, and Health in 13 Countries," accessed June 7, 2020, <https://www.commonwealthfund.org/publications/issue-briefs/2015/oct/us-health-care-global-perspective>.

per capita GDP of France in 2019 was \$36,172 and in the United States it was \$65,118.⁹⁷ Despite the significant gap between these two values, France is able to provide universal healthcare for its entire population. It is clear that the United States is capable of providing universal healthcare for the whole population as well, based on the per capita GDP, instead of providing government-subsidized healthcare for only one third of the population. Therefore, the reason for a lack of universal healthcare in the United States must be because of a cultural avoidance of such action taken by the government, instead of a lack of available funds.

Ironically, despite the substantial amount of money spent on healthcare in the United States, Americans visit the doctor and the hospital less than their French counterparts and American hospitals have fewer total hospital beds.⁹⁸ The discrepancy between the spending and consumption of healthcare is possibly due to the increased use of highly advanced technology. According to The Commonwealth Fund, "Americans had the highest per capita rates of magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET) exams," leading to interesting speculations as to why this is the case.⁹⁹ The data suggest that either American citizens are sick to a much greater degree than citizens of other countries, or that, as I would argue, more unnecessary high-technology tests are performed in the United States than in other countries.

⁹⁷ The World Bank, "GDP per Capita (Current LCU) - France, United States | Data," accessed August 25, 2020, <https://data.worldbank.org/indicator/NY.GDP.PCAP.CN?end=2019&locations=FR-US&start=2013>.

⁹⁸ The Commonwealth Fund, "Spending, Use of Services, Prices, and Health in 13 Countries."

⁹⁹ Ibid.

This finding begs the question: Why are American doctors performing potentially unnecessary tests on their patients? There are many possible reasons for such a phenomenon. Hospitals are businesses at their core, and patients are the customers. Based on information provided by the American Health Association, 85% of the hospitals in the United States are community hospitals, and of those, 56% are non-government not-for-profit hospitals. For the remainder of the community hospitals, 25% are investor-owned for-profit, and the remaining 19% are state or local government hospitals. Aside from community hospitals, 3% of the hospitals in the United States are owned by the federal government.¹⁰⁰ These facilities are reserved for populations such as members of the military.¹⁰¹ All of this simply means that only 3% of US hospitals are fully funded by the government, and the majority of remaining hospitals rely on patient payment in order to provide services. As a comparison point, 65% of the hospitals in France are public and the other 35% are split between private for-profit and not-for-profit hospitals.¹⁰²

As the data in the paragraph above show, there are considerable differences between the tax and income structure of hospital systems in France and the United States. In the United States, the more tests performed by doctors, the more money the hospital makes. Conversely, if the customer is unhappy or feels as though not enough testing has been done, they can become upset and potentially sue. Physicians may also fear malpractice or negligence lawsuits. Malpractice suits cost almost \$5.9 million dollars

¹⁰⁰ AHA, “Fast Facts on U.S. Hospitals, 2020 | AHA,” accessed August 29, 2020, <https://www.aha.org/statistics/fast-facts-us-hospitals>.

¹⁰¹ Jason B. Liu and Rachel R. Kelz, “Types of Hospitals in the United States,” *JAMA* 320, no. 10 (September 11, 2018): 1074–1074, <https://doi.org/10.1001/jama.2018.9471>.

¹⁰² “France | Commonwealth Fund,” accessed August 29, 2020, <https://www.commonwealthfund.org/international-health-policy-center/countries/france>.

from 2019 until October 2020.¹⁰³ If a physician does not perform all possible tests to rule out potential illnesses and a patient returns with more aggravated symptoms because of a condition the doctor missed initially, it can lead to grave consequences for both parties. Because physicians must be on their guard and test every possible scenario, sometimes at the risk of over-testing and charging too much, they are more likely to practice what is called defensive medicine. In France, malpractice suits are reviewed by boards that “operate outside the court system,” a model adopted from Scandinavia.¹⁰⁴ The focus of these suits in France is more centered around providing compensation to the wronged patients than placing blame on the physicians themselves. Although defensive medicine generally refers to preventing surgical or medical mishaps, the term “defensive medicine” can be applied to prescribed medication as well if patients believe they are under or overprescribed for their condition. Information on pharmaceuticals in each country is presented in the following section.

Pharmaceuticals

Based on OECD data from 2015-2018, pharmaceutical spending as a percentage of overall health spending is relatively similar in France and the United States. Pharmaceutical spending in the United States makes up 12% of total health spending, and in France, it is 13.2% of total health spending.¹⁰⁵ The similar spending patterns show that

¹⁰³ “The NPDB - Data Analysis Tool,” accessed October 6, 2020, <https://www.npdb.hrsa.gov/analysistool/>.

¹⁰⁴ Ed Dolan, “What Can The US Learn From The French Health Care System?,” Business Insider, accessed October 6, 2020, <https://www.businessinsider.com/what-can-the-us-learn-from-the-french-health-care-system-2011-3>.

¹⁰⁵ OECD, “Health Resources - Health Spending - OECD Data.”

both the United States and France are relatively similar in their emphasis on medication. The United States' health budget is much larger than that of France, implying that much more is spent on pharmaceuticals in the United States than France. Is this because more of the population is medicated or because it is much more expensive to buy medicine in the US than in France?

Based on per capita spending in each country, it was calculated that in the United States in 2019, \$1,229 is spent on pharmaceuticals per person per year. In France, the average person can expect to pay \$671 per year.¹⁰⁶ To answer the question posed above, let us examine the following chart comparing costs of five common medications with data from the US House Committee on Ways and Means.

Table 1: Prices of Common Medications

	Average Pharmaceutical List Prices, 2018	Humira – Arthritis Medication	Eliquis – Blood Thinning Medication	Ibrance – Cancer Medication	NovoLOG – Insulin Medication	Genvoya – HIV Medication
United States	\$466.15	\$2,436.02	\$6.98	\$538.94	\$36.55	\$98.19
France	\$104.51	\$329.94	\$1.04	\$146.43	\$5.71	\$29.94

https://waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/documents/U.S.%20vs.%20International%20Prescription%20Drug%20Prices_0.pdf

This chart does not necessarily prove that one country is more medicated than the other, but the cost difference between spending on medications can explain the vast difference between the United States' and France's average pharmaceutical spending.

¹⁰⁶ OECD, "Health Resources - Pharmaceutical Spending - OECD Data," the OECD, accessed August 29, 2020, <http://data.oecd.org/healthres/pharmaceutical-spending.htm>.

Medication prices are governmentally controlled in France, but that is not the case in the United States. That said, medication prices in the United States can continue to increase at the demand of pharmaceutical companies or for any other reason. In France, this phenomenon is unheard of because of the price cap on medication.

Another possible reason for increased spending in the United States is the consumption of prescription medications. In 2013, the average number of prescription drugs taken by an adult in the United States was 2.2 compared to France's average of 1.5, leading to a discussion about how much medication is consumed by each country.¹⁰⁷ This finding can indicate many things, but whether this is due to lifestyle differences or economic reasons is beyond the scope of this thesis.

It has been well established in this chapter that the United States spends significantly more on healthcare than France. French medical insurance companies (as well as those in most industrialized nations) do not have a system of deductibles as the United States does. Of eleven countries surveyed by Schoen et al., the only three countries that use deductibles are the United States, the Netherlands, and Switzerland.¹⁰⁸ Despite other countries employing deductibles, the United States is the only nation without a limit on the value of deductibles that patients must meet. Additionally, out-of-pocket spending is not limited in the United States as it is in other countries.

The structure of the medical system in the United States allows pharmaceutical and insurance companies to generate more income than their counterparts in other

¹⁰⁷ The Commonwealth Fund, "Spending, Use of Services, Prices, and Health in 13 Countries."

¹⁰⁸ Cathy Schoen et al., "Access, Affordability, And Insurance Complexity Are Often Worse In The United States Compared To Ten Other Countries," *Health Affairs* 32, no. 12 (December 2013): 2205–15, <https://doi.org/10.1377/hlthaff.2013.0879>, 2206.

developed countries. The increased revenue is especially useful for pharmaceutical companies as they create new drugs and is beneficial for the insurance companies as the drugs and services Americans need are increasingly expensive. By causing a cyclical effect, the increasing prices only increase the accessibility gap among citizens and require companies to increase their rates further. The only way to stop the continuous progression of this trend is to overhaul the system entirely and increase governmental control in these departments, two unlikely scenarios.

Conclusion

Overall, both France and the United States are well-equipped to deal with any medical emergency that arises among their populations. France has an infrastructure that could more easily allow for increased emphasis on preventative medicine when compared to the United States. Because the cost of visiting the doctor is so high in the United States, even with insurance, many people avoid visiting their physician until it is absolutely necessary. Although France has much more accessible healthcare in terms of affordability, minimal government spending goes toward preventative healthcare. The lack of coordination concerning preventative healthcare results in a lack of utilization of whatever resources exist and little incentive to create more.

In the case of emergency medicine, patients are in equally skilled hands whether the French or American EMS is called. Both systems are equipped with some method of stratification, allowing more acute cases to be handled by those with more training. Arriving at the hospital by ambulance will enable patients in both countries to bypass general emergency room wait times. Still, in France, if the patient is a heart attack victim,

they can be wheeled directly to the catheter lab for stent placement. After a patient goes to the doctor, they can expect to pay a higher fee for both services and medication if they live in the United States rather than in France. Further, the cost of drugs is significantly higher in the US, as are routine tests. Americans are more likely to have medical imaging than the French, possibly leading to higher rates of disease diagnoses but, often it is simply the result of physicians practicing defensive medicine. In the end, the standard of care is comparable between the two countries because of the similar training of physicians, the challenges they face, and the patient base being treated.

Despite the high cost of health care in the United States, there is ultimately a lower life expectancy than what is expected in France (78.7 and 82.8 years, respectively).¹⁰⁹ While there are doubtless many variables that contribute to this value, the above-mentioned lack of access to preventative medicine and inadequate education on health and wellbeing, are likely culprits. This has led to increased obesity and chronic diseases in the United States, and thus a lower life expectancy.

¹⁰⁹ OECD, "Health Status - Life Expectancy at Birth - OECD Data," theOECD, accessed October 6, 2020, <http://data.oecd.org/healthstat/life-expectancy-at-birth.htm>.

CHAPTER FOUR

Field Observations

During my time spent with two married practicing physicians in the south of France, I experienced the daily life of a cardiologist who practices in her own office as well as the responsibilities that lie in the hands of an interventional cardiologist practicing medicine at a hospital. Beyond simply understanding the work life of a physician, I lived with these cardiologists for a period of six weeks and became an integrated part of their family. I cannot personally attest to the work-life balance of American doctors because I have never lived with one, but I can at least go into some detail about my experiences living with Drs. Virginie Roux and Sébastien Armero, who have three children under the age of four.

Beginning medical school in France was very stressful for both cardiologists. They were not yet acquainted, but each described their experiences during the first year as competitive and extremely difficult. Granted, to become a cardiologist (or a specialist of any sort) one must be exceptionally talented compared to one's peers. Both of these physicians are endowed with highly functional intelligence. Further, both passed their first year of medical school the first time, so they were part of the 10% of students who successfully completed their inaugural year on their first try.¹¹⁰

As for many physicians in the United States, the years of medical school and residency passed very quickly for each of them, and before they knew it, they were full-

¹¹⁰ See Chapter 2, page 21.

fledged physicians. The day-to-day activities varied significantly between husband and wife due to their vastly different practice environments. Dr. Roux ran her own practice and every two weeks would spend one day in the hospital performing stress tests. Conversely, Dr. Armero worked in the hospital every day and had varying hours depending on the number of cases and emergency patients each day. He also had weekends on-call, which he alternated with the other interventional cardiologists who worked at the hospital. Sometimes, they would see the same patients if one of Dr. Roux's patient required a stent to be placed, a procedure oftentimes performed by Dr. Armero.

To begin, I will outline a normal day with Dr. Roux in her private practice. Her typical day begins around 8:30 am and the final patient leaves around 6 pm depending on how busy the day is. Each time slot allots 20-30 minutes per patient, but certain patients consume more time than their appointment. Dr. Roux operates completely independently of others and rents an office space with a shared patient waiting room. A psychiatrist, an orthopedic surgeon, and a pediatrician share the floor with her. Each physician is responsible for scheduling their own patients (unless they hire a scheduling service), performing intake procedures such as taking blood pressure and performing electrocardiograms (EKGs), seeing the patient for their needs, processing payment through insurance, and handling any additional costs not covered by insurance. This differs vastly from private doctors' offices in the United States, which typically have at least one receptionist or nurse who can perform office and intake duties. The only experience I have in a clinical setting is in this small seaside town, so some larger offices may parallel how a typical American doctor's office functions.

In terms of equipment, Dr. Roux has a modern EKG machine with eight leads and a sophisticated ultrasound machine. The space is small but functional, has an examination table and a desk with two patient chairs, and a personal air conditioning unit controlled by remote—an essential inclusion because of the humid and hot summers on the Mediterranean coast of France. In a tall cabinet behind her desk, Dr. Roux keeps her Holter monitors (portable EKG machines meant to measure a person's heart rhythm continuously over a 24-48-hour period), digital blood pressure cuffs, and extra paper for the EKG machine's printer, among other paper products meant for the patient's benefit.

While in her office, I occupied the rolling stool that doubles as the doctor's ultrasound stool. I remained behind the desk during the consultation. When the patients were ready to transfer to the exam table, I would assist the elderly and help children become comfortable sitting still. After a couple of full days, Dr. Roux showed me how to set up and operate the EKG machine, a job I promptly took over. Since I already knew how to take a patient's blood pressure, I quickly became her intake assistant, providing Dr. Roux with the time to organize patients' charts and begin immediately performing an ultrasound if necessary.

Similar to doctors' offices in the United States, the wait time for patients increases as the day goes on. Once one patient surpasses their scheduled appointment time, it automatically sets the rest of the schedule back, becoming even more compounded when the next patient also exceeds their time slot. Despite this trend, Dr. Roux usually has a no-show or cancellation to help her recover lost time. Sometimes, her days are so full that we were only able to eat a few bites of food to carry us through, but Dr. Roux saved time

on many days by sending me to a nearby bakery to pick up sandwiches. One of the downsides to working in private practice is the lack of access to a cafeteria.

While I was working there, at the end of each day, Dr. Roux and I turned off the air conditioner, made a list of supplies to collect from her home storage and bring back to the office, locked her personal office door and the entire building's door (we were almost always the last people to leave), and rushed to pick up her children before the daycare center closed. Dr. Roux's juggling of a full-time career as a physician with the full-time job of being a parent is immensely impressive. Her husband leaves before she wakes her children and returns only sometimes in time for dinner, so the burden of caring for the children rests primarily on her shoulders.

During consultations, I kept a running list of words I heard that I did not understand so I could ask her what they meant when the appointment was over. Some of the terms were similar to English words, but I was not yet familiar with their meaning, such as *angina* in English and *angine* in French (which I learned was a pain in the chest due to the constriction of blood vessels surrounding the heart). Whenever a patient presented with a new condition with which I was not yet familiar, Dr. Roux would explain the illness and the symptoms, and even the patient would sometimes contribute to the conversation and tell me of their experiences living with the condition. This occurrence was common during my shadowing in the United States as well, indicating a ubiquitous willingness among physicians and patients to educate and train those earlier on their journey to a medical profession.

One major difference between my shadowing experiences in the United States and in France was the amount of involvement I had with patients. When someone needed

an EKG, Dr. Roux expected me to perform the diagnostic test and blood pressure measurements without her explicit instruction to do so, something I was never able to do throughout my many hours of shadowing in the United States. Because she ran her own practice, and because of the apprenticeship mindset of learning in France, my opportunities with Dr. Roux were decisively more hands-on than any of my experiences stateside.

Shifting focus to the hospital life, I noticed many more similarities to typical American medical settings while shadowing Dr. Armero. Instead of having a five-minute drive to work like his wife, Dr. Armero drives half an hour to reach l'Hôpital Européen and usually encounters a significant amount of traffic on the way, even at 7:00 am. We would have the majority of our conversations in the car on the way to and from the house, because as soon as we stepped foot into the hospital, Dr. Armero's work began. On my first car ride to the hospital, Dr. Armero mentally prepared me for the day. He warned me that he may not have time to explain everything that happens and also told me he may have me shadow other doctors on the cardiology team. The days were long and much higher stress than Dr. Roux's cozy office.

As soon as we arrived at the hospital, we went up an elevator and down a hallway, turned left, walked some more, and finally entered the conference room. This was where I was first introduced to the cardiology department. As a newbie, non-doctor, non-French person, I was quickly intimidated by the schedule put up on the screen. I had no experience in the United States that would have prepared me for this meeting because any shadowing I did in a hospital was either *after* rounds or in the emergency department. After the whirlwind meeting, I followed Dr. Armero to the changing rooms, donned

disposable scrubs, booties, mask, and hair cap, and met him on the other side where the procedure rooms were.

There were two procedure rooms that shared a jack-and-jill-style monitor room in between them. This space is where I spent the majority of my time. All day long, Dr. Armero and his colleague in the conjoined room checked the arteries of many patients for stenosis (*une stenose*), a narrowing of the vessels, and placed stents in the hearts of patients who needed them. Each patient was more or less like the one before them when viewed under an x-ray machine, but with the help of the nurses and technicians who also inhabited the middle room, I was able to start discerning the differences between heart structures and saw with my own eyes that just as each American's heart differed in the development and location of their cardiac arteries, so did French hearts.

Just as I was able to be more hands-on in Dr. Roux's office, I had my chance at real patient interaction during an afternoon in which I shadowed one of Dr. Armero's colleagues, Dr. Camilleri. As one of my most interesting shadowing experiences, I spent the afternoon watching Dr. Camilleri perform transesophageal electrocardiograms (TEE). This procedure involves passing a tube down the patients throat and into the esophagus, where physicians can better view the upper chambers of the heart. Patients who require a TEE have an irregular cardiac rhythm and their hearts need to be shocked back into a normal sinus rhythm. The TEE ensures that there are no clots in the patient's heart. If there is a clot in the heart while the patient receives an electric shock, the clot could travel to their brain and cause a stroke. After witnessing a few unconscious patients being shocked by paddles or by automated external defibrillators (AED), the physician offered

me the paddles to shock the next patient. I definitely would not have been offered that opportunity in an American hospital.

Another learning experience was at the hospital's cafeteria. I was escorted downstairs by Dr. Armero and was faced with a few choices for lunch. Unfortunately, I was unfamiliar with all of the dishes, so I chose what looked like sausage. Soon, but not quickly enough, I found out that this was in fact a sausage made of pork intestines that was considered a delicacy by many French people, which generally means it is an acquired taste and is made from questionable sources, at least from my American worldview. The taste of this sausage will forever scar my memories, but at least the French doctors were impressed with my willingness to try new foods, even if I was only able to eat two bites. The rest of my time at the hospital passed without incident, and it was a great experience witnessing the teamwork that the cardiology department enjoyed at this hospital.

On another day at l'Hôpital Européen, I followed an intern around the cardiology department's intensive care unit (ICU). This was yet another enlightening experience because I was able to see what a first-year resident can do in France. As a disclaimer, I have no firsthand experience of what a first-year American resident can or cannot do. I thus have no concrete comparisons to make concerning this young doctor's actions. The intern checked in on all of the ICU patients and consulted with Dr. Camilleri when necessary. As a general observation, he operated mainly on his own and worked with others just as much as the senior physicians collaborated with each other, only asking questions to confirm actions he already took. We visited a patient in the emergency room and he performed an ultrasound, but later admitted to me that he was not yet very adept

with that specific technology. According to my basic knowledge of the American residency, this all seems to be standard for this period in a doctor's career.

Some of the most interesting conversations occurred around Drs. Roux and Armero's dining table. They would invite their doctor friends over for dinner, and that is when I was able to learn the cultural significance of medicine from a French doctor's perspective. The majority of questions were directed at me, with questions about the schooling process for a doctor in the United States and questions about cost of care. As a result of these conversations, I left the doctors baffled with the American healthcare system and how it functions. The main points that astounded them were the cost of higher education and the cost of basic and emergency care. When I explained the cost of my undergraduate education and the subsequent cost of medical school, they legitimately asked why anyone decides to become a doctor at such a high a cost. My response was simply that education was expensive no matter what you decide to do, so you might as well do what you want.

The conversation quickly moved to a question about what doctors do when a patient needs a specialist or a follow-up after a visit to the emergency room. If a patient cannot pay for the necessary service, they do not receive that service. Beyond this statement, I shared the differences I noticed between costs of emergency transportation in my home country and theirs (exorbitantly expensive vs free). The conversation ended at that point, with the doctors realizing they would never understand how people managed to stay healthy in the United States if they could not afford a doctor.

Overall, I thoroughly enjoyed my summer living and working alongside cardiologists in France. I learned to look at healthcare through an entirely different lens

and saw that quality healthcare can be provided in a medical structure vastly different from the one in which I grew up. The time in a doctor's office taught me the importance of relating to patients and being genuinely interested in their lives. I learned that hospitals in France and the United States are very similar in their process of treating large populations of patients. While this thesis addresses a broad range of topics, I fulfilled my primary intention to begin understanding medicine and the effects of healthcare systems on different populations.

CHAPTER FIVE

The Future of Medicine in France and the United States

Education

The United States continues to face significant economic and social challenges within the medical field, issues that only increase as the COVID-19 pandemic persists around the world. These constraints are forcing decision-making bodies to rethink how medicine is taught. As the United States' population ages, primary care physicians are increasingly in demand. Due to the unmet need for generalists, some medical schools provide incentives for pursuing primary care and most have added additional exposure to primary care medicine during medical teaching. The logic behind increasing medical student exposure to the primary care field is that as students see the impact of a primary care physician on a community, they will realize that becoming a generalist provides just as rewarding a career as any other specialty.

As the European Union became more connected, and as countries around the world experienced the whirlwind effects of rapid globalization at the turn of the twenty-first century, the need for a more integrated and transferable medical education became apparent. Introduced in 1998, the Bologna Process facilitated a path for increased interconnectedness within European medical education. Although it has been in the works for over two decades, the adoption of this process has been gradual. The Bologna Process aimed to provide “greater transparency, a general recognition of degrees across

Europe, cooperation with regard to quality assurance, an emphasis on more flexible learning paths and lifelong learning, and the promotion of mobility.”¹¹¹

The main developments between 1998 and 2010 were the implementations of a three-cycle post-secondary system (Bachelor’s, Master’s, and Doctorate), comparable degrees, and greater mobility of students and faculty.¹¹² The duration of each cycle is dictated by the specific region or medical school, not by any higher agent. Despite the existence of a bachelor’s degree in the medical field, it lacks functionality. As a stepping stone, receiving this degree insinuates that students will continue on to get their Master’s degree and finally their Doctorate which will allow them to practice on their own.¹¹³ By assigning courses with a certain number of credits, the transferability of degrees among countries signed on to the Bologna Process increased dramatically.

According to Madalena Patrício and Ronald Harden, the Bologna Process elicited curiosity and interest among medical education professionals in the United States. As people continued to mobilize and travel around the world, increasing importance was given to careers that transferred easily across international borders. For example, if the United States and the European Union coordinated a mutual understanding of medical coursework accepted in every country, physicians would not need to repeat any coursework. By spreading the standards from one advanced country to another, Europe developed increased uniformity between medical education systems. Eventually, these

¹¹¹ Madalena Patrício and Ronald M. Harden, “The Bologna Process – A Global Vision for the Future of Medical Education,” *Medical Teacher* 32, no. 4 (April 2010): 305–15, <https://doi.org/10.3109/01421591003656123>, 305.

¹¹² *Ibid.*, 306.

¹¹³ *Ibid.*, 308.

ideas and educational methods can reach people in less-developed countries with an adequate amount of infrastructure but without sufficient coordination.

Despite the best efforts of the European engineers of the Bologna Process and the visionaries within the United States, Arnould Nicogossian et al. contend that medical education is still “rooted in mid-20th-century principles,” unwilling to shake the status quo.¹¹⁴ Medical technology is progressing at a rapid rate, and while researchers understand more behind the reasons for disease, Nicogossian et al. insist that a subsequent shift in medical education has not occurred.¹¹⁵ Studies performed after the turn of the twenty-first-century on best learning practices for adults allowed the existing system to be tweaked according to the results of the study. Despite this improvement, as technology surpasses medical education, a total overhaul of the educational process can be expected in the future.

The newer curricula at American medical schools involve integrated clinical exposure over the entire four years, a departure from the traditional two years of sciences and physiology plus two years of clinical instruction. This allows the continuation of the successful “apprenticeship model,” one that P. John Rees and Anne E. Stephenson claim should be left intact because of its advantages in exposing new medical professionals to the reality of patient care.¹¹⁶ In addition to the benefits of introducing students to the

¹¹⁴ Arnould Nicogossian et al., “The Future of Medical Education and Practice,” *World Medical & Health Policy* 9, no. 2 (2017): 162–63, <https://doi.org/10.1002/wmh3.229>, 162.

¹¹⁵ Nicogossian et al., “The Future of Medical Education and Practice,” 162.

¹¹⁶ P. John Rees and Anne E. Stephenson, “The Future of Medical Education in the UK,” *The British Journal of General Practice* 60, no. 580 (November 1, 2010): 795–96, <https://doi.org/10.3399/bjgp10X538903>, 795.

environment they can expect as a physician, the emphasis on hands-on training is a well-established component of medical education in France.

The transition to a learning style geared toward adults during medical education and practice are well explained by David Wilkinson. He claims that though “many aspects of being a doctor are the same (clinical encounters, communication, clinical knowledge), much has radically changed (working in teams, leadership, nonclinical roles of the physician, uses of technology) and we do little in medical school to directly address these changes.”¹¹⁷ Team-based learning and problem-based learning are two buzz words for new medical school curricula. Fortunately, it seems as though medical schools are latching on to the idea that students should learn how to work in groups while in medical school because when they transition into a hospital or practice of their own, they will be working with other physicians in a team-based setting. The addition of technology to the learning environment will help prepare students for the digital charting and storage of patient information.

Currently, given COVID-19, social distancing, and other restrictions, the new ways of medical education such as team-based and problem-based learning are encountering unforeseen hurdles. Constraints such as keeping proper social distance between students and the transition of many classes to an online format challenge medical schools to find innovative ways of conveying the same information in the same amount of time. The adaptability of medical schools and students is increasingly important as they prepare to face unusual and unpredictable challenges. The creativity necessary to tackle new and changing circumstances can be found within the minds of

¹¹⁷ David Wilkinson, “The Future of Medical Education: All About Being Connected,” *Ochsner Journal* 12, no. 4 (December 21, 2012): 300–301, 300.

many great medical professionals. For example, as far away as Dubai, in the United Arab Emirates, leaders in the medical field are beginning to reimagine the medical school environment. Dave Davis envisions a medical school “without walls,” one where the distinction between learning and clinical environment is negligible.¹¹⁸

As medical students deal with a global pandemic requiring decreased classroom learning, and new health issues arising that require increased numbers of physicians, perhaps it is time to abandon the traditional methods of instruction and embrace the unknown, the untested. This idea was put into action during the spring of 2020, as medical students in the United States and Europe were given their medical degrees early to help combat the COVID-19 pandemic. For example, fourth-year students at the University of Massachusetts Medical School were permitted to graduate at the end of March instead of waiting until summer.¹¹⁹ The early start to residency allowed extra hands to contribute to fighting the global pandemic.

Even in non-pandemic environments, it makes sense that by allowing students to learn while in a clinical setting, they may be more inclined to maintain their curiosity after their medical training ends, making new connections in their workplace that would not be possible without a shifted mindset. Medical providers will be able to properly care for those around them by being more present in the community and aware of the issues in surrounding areas before the conclusion of medical school.

¹¹⁸ Dave Davis, “The Medical School without Walls: Reflections on the Future of Medical Education,” *Medical Teacher* 40, no. 10 (October 2018): 1004–9, <https://doi.org/10.1080/0142159X.2018.1507263>, 1004.

¹¹⁹ “Meet the Medical Students Becoming Doctors in the Middle of a Pandemic,” *Time*, accessed October 29, 2020, <https://time.com/5820046/medical-students-covid-19/>.

Technology

Some of the exciting new technologies that will change the course of how the world conducts medicine are DNA sequencing and CRISPR-Cas9. DNA sequencing is a technology that allows scientists and genetic counselors to analyze specific patterns of DNA, to distinguish what one's genes are, and to determine what that means for his or her health. CRISPR-Cas9 is a splicing technology that can cut pieces of faulty DNA and allow the cell to self-repair.

The questions surrounding the use of DNA sequencing and genetic testing range from “how much should a company tell the patient?” to “how will we deal with all the family members who want to get tested when someone finds out they have a genetic abnormality?” and everything in between.¹²⁰ One company, GenomeFIRST, only alerts patients about genetic abnormalities that lead to preventable or treatable conditions, while choosing not to disclose untreatable diseases.¹²¹ Even when patients hear the news about a genetic abnormality that has only a *chance* of turning into a disease, sometimes they are unwilling to accept the facts, and they prefer not to know all of the details. Others digest the information as slowly as they need to but share the results with their families so they can get tested as well.

Many supporters of genetic testing want the service to be provided on a mass scale as a public health implementation rather than as a relatively obscure process employed only by those with concerns and the means to pay for it. Because DNA sequencing technology has the ability to extend the lifespan of many individuals, entire

¹²⁰ Bijal P. Trivedi, “Medicine’s Future?,” *Science* 358, no. 6362 (October 27, 2017): 436–40, <https://doi.org/10.1126/science.358.6362.436>, 437.

¹²¹ *Ibid.*, 438.

populations could live longer with widespread genetic testing and the necessary follow-up treatments for the diseases discovered. Such a high level of testing causes many concerns among insurance companies because the cost may be too great to sustain, especially for patients who require yearly screenings and tests.¹²² Others believe that only sharing partial results is unethical because even if Alzheimer's Disease is untreatable, patients still have a right to know their risk. What is and is not considered treatable, at least treatable enough to share with patients, differs by company, and some physicians think of aggressive yet treatable diseases as information that should be shared with patients.¹²³

Once the results are shared, the risk remains that patients' reactions can cause more problems than they would have if they were unaware. For example, if a woman is told she has the *BRCA2* gene, which is linked to breast cancer, that does not mean she *will* get breast cancer, it just means she is at increased risk for breast cancer. If a patient receives the news that she in fact has the gene and chooses not to do anything about it, the genetic testing may seem in vain. On the other hand, if the results cause the patient to overreact and overdo healthcare consumption, they may undergo procedures not necessary to their personal case.¹²⁴ Ideally, every patient who receives unfortunate news about their DNA would react appropriately, changing their diet and lifestyle while monitoring their condition.

¹²² Trivedi, "Medicine's Future?," 437.

¹²³ Ibid., 439.

¹²⁴ Ibid., 440.

Spurred by the discovery of DNA sequencing, scientists hoped to eliminate the ill-effects of genetic diseases or gene mutations, like the ones mentioned above. This became a possibility when the adaptive immune system of bacteria was understood well enough to transfer bacterial technology to humans, which led to the creation of a new technology called CRISPR-Cas9.¹²⁵ Put simply, when a specific sequence of DNA is known to cause negative outcomes, it can be targeted using a strand of RNA that acts as a locator beacon for the cutting device on a CRISPR-Cas9 complex. CRISPR-Cas9 then enters and splices both strands of DNA at the intended location. The cell's DNA repair system then fixes the broken strands of DNA, replacing the faulty section with the correct sequence.

This technology is revolutionary because it allows scientists to “introduce or correct mutations in cells and organisms with a level of ease and efficiency not previously possible,” which is, according to Jennifer Doudna, a game-changing discovery.¹²⁶ If a cancer is triggered by a protein that over-produces a certain product, CRISPR-Cas9 can inactivate that protein. On the other hand, if a cancer is not stopped by the body because a certain protein fails to do its job, the CRISPR-Cas9 system can repair the nonfunctional protein. As more research is done, these techniques will be able to help many people who previously had no cure for their disease. A considerable amount of research is currently being done only on mice and in the lab, but the results are promising

¹²⁵ Jennifer A. Doudna, “Genomic Engineering and the Future of Medicine,” *JAMA* 313, no. 8 (February 24, 2015): 791–92, <https://doi.org/10.1001/jama.2015.287>, 791.

¹²⁶ *Ibid.*, 791.

and there will undoubtedly be additional applications for CRISPR-Cas9 as its mechanism is understood in greater detail.¹²⁷

In terms of ethical questions raised by this technology, Doudna puts it best:

The era of genome editing raises ethical questions that will need to be addressed by scientists and society at large. How should such a powerful tool be used to ensure maximum benefit while minimizing risks? It will be imperative that nonscientists understand the basics of this technology to facilitate rational public discourse. Regulatory agencies will also need to consider how best to foster responsible use of CRISPR-Cas9 technology without inhibiting appropriate research and development.¹²⁸

As this technology becomes more available, who will decide which diseases get treated with CRISPR-Cas9? What will be the possible repercussions of using it in humans, and will there be long-term effects? Is it safe for children? Will it be affordable enough for the entire population to use, or will it only be for the elite few who can afford an expensive treatment? These are but a few of the many questions this new technology leaves unanswered, and I am sure scientists with more intricate knowledge of the system have many more. As these groundbreaking technologies emerge, who decides what is right and what is wrong?

Conclusion

While DNA sequencing, genetic testing, and CRISPR-Cas9 are only the tip of the iceberg when it comes to new scientific technologies, they give a good idea of the changes that will occur within the medical field as medical technology continues to progress. Once one country allows affordable genetic testing for all individuals, citizens have a precedent on which to base a demand to know what their DNA says about their

¹²⁷ Doudna, “Genomic Engineering and the Future of Medicine,” 791.

¹²⁸ Ibid., 792.

likelihood of disease. The introduction of such revolutionary techniques into the mainstream medical community will drastically alter how medical care is provided, requiring a subsequent alteration of medical education. Currently, the impact of COVID-19 on the entire world requires the best and brightest in the medical field but also in technology. Doctors must adapt to the new situations posed by the coronavirus pandemic, so medical students are currently experiencing what it means to modify medical practice to address emerging health threats. The world has adapted to new technologies before, and because we live in a world that strives toward progress, we will not give up trying to improve the lives of citizens everywhere, the United States and France included.

CONCLUSION

Looking Ahead

Reflecting on France and the United States' medical systems allows a deeper understanding of the various roles of medicine in society. The main difference between French and American medicine is the role of the state in healthcare provision. Where the United States utilizes more of a laissez-faire, market-based medical system, the French government provides healthcare as a universal right to its citizens.

Medicine as a secular and scientific enterprise has its foundations in the French Revolution, as do the sanitary conditions of modern hospitals. Instability in France caused by the socio-political struggles in the late eighteenth century created enough space for physicians and political officials to establish a functional medical system. While modern medicine may have its origins in France, present-day changes to the field are just as likely to arise out of either France or the United States, especially considering the coronavirus pandemic.

When comparing the differences between contemporary French and American medicine, the distinctive characteristics involve more than just the health of each country's citizens. Because the medical systems in France and the United States are entirely different, from secondary education through graduate medical education, the implementation of medicine as a field is distinctive from one country to the other. Culturally, there is a significant value attached to the medical field in both countries. However, the ultimate goal of many American doctors can be to make a lot of money.

The American motivation for becoming a doctor is different from those in France. In France, doctors may live comfortably, but it is unlikely they will join the top earners in their country.

As the medical field continues to advance and grapple with the new challenges posed by a global pandemic, medical technology and education are destined to evolve into more efficient disciplines. In France, there is a more significant medical capacity for an increased focus on preventative medicine. Despite this capability, the French medical system does not take advantage of its universal health coverage as it could.

There are benefits and drawbacks inherent in both of these medical systems. As the ideas in this thesis elucidated in many forms, both the United States and France have convoluted yet highly functional healthcare systems. Each country would benefit from studying the others' medical design but implementing new policies at the state level would require a monumental undertaking. The necessity of such an endeavor is not yet at critical mass, but considering the state of the world in the year 2020, the world may need to start the process sooner than anticipated.

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