Research Assessment Annotations 3

Article #1

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# [Becoming a Cardiologist](http://www.healthcareadministration.com/becoming-a-cardiologist/)

While health care remains an integral part of people’s lives in today’s fast changing world, the heart ailments have become very common among the adults. The task of diagnosing the heart conditions and other cardiopulmonary problems, lies with the Cardiologist, who handles the most sensitive part of the human body. He does his best to let the heart beating and help people lead a healthy life.

**Educational Requirements:**

* Bachelor’s Degree – A Medical Doctorate degree is must to become Cardiologist. After earning a bachelor’s degree by attending four years of undergraduate school, the graduate is required to get into medical school based on merit for post-graduation courses. You will also need to prepare for the [Medical College Admission Test (MCAT)](https://www.aamc.org/students/applying/mcat/)and try to get strong letters of recommendation from your professors.
* Graduation from Medical School – After getting the Bachelor’s Degree, you need to get Medical Doctor (M.D.) degree or Doctor of Osteopathic Medicine (D.O.) degree. The total tenure will be of four years. After spending first two years in courses such as biochemistry, pathology, pharmacology, microbiology, anatomy and physiology, you will spend the remaining two years in clinical rotations.
* Earning a Medical License – It is mandatory for the Cardiologists in the United States to obtain a medical license. The standard examination for medical licensing is known as the [U.S. Medical Licensing Examination (USMLE)](http://www.usmle.org/).
* Residency in Internal Medicine – The 3-year post-graduate training will begin with three-year residency in internal medicine. It will help the trainees to interview patients, diagnose their problems and study the medical history properly. The internal medicine research will include respiratory medicine, cardiology, oncology, endocrinology and gastroenterology.
* Obtaining a Fellowship – Getting a fellowship in Cardiology may take up to 3-4 years. The most part will be spent in gaining clinical skills in cardiology rotations. Rest of the time will be devoted to conducting basic or clinical research. After completing the fellowship, it becomes easier to get a sub-specialty certification from an [ABMS](http://www.abms.org/) or [AOA](http://www.osteopathic.org/Pages/default.aspx)approved specialty-certifying board.

**Key Responsibilities:**

* Review the medical history of patients
* Examine the patients using expertise as well as knowledge
* Recommend proper diagnostic testing
* Examine the test results and plan course of treatment
* Prescribe proper medication and give requisite advice to patients
* Guide the patients on the need of leading a healthy life and improving the health standards
* Plan follow-up meetings with the patients.

**Salary & Wages:** The annual salary for a Cardiologist who does not perform invasive surgery is approximately $420,000 per year. Similarly, the average salary for Cardiologists who perform invasive surgeries is around $550,000. The [Bureau of Labor Statistics (BLS)](http://www.bls.gov/)had predicted faster job growth for Cardiologists during the period of 2010-20.

Undoubtedly, the education and training one needs to become a Cardiologist, is very extensive. But, one must understand that the profession is related to heart, which serves as the lifeline in the human body. The heart and circulatory system are required for life and cardiovascular diseases often lead to death.

Article #2

Cardiac catheterization, medical procedure by which a flexible plastic tube ([catheter](http://school.eb.com/levels/high/article/471985)) is inserted into an [artery](http://school.eb.com/levels/high/article/1571) or [vein](http://school.eb.com/levels/high/article/74959). It is used for injecting drugs for therapy or diagnosis, for measuring blood flow and pressure in the [heart](http://school.eb.com/levels/high/article/39718) and central blood vessels, in performing procedures such as [angiography](http://school.eb.com/levels/high/article/7564) (X-ray examination of the arteries and veins) and [angioplasty](http://school.eb.com/levels/high/article/471748) (a procedure used to dilate obstructed arteries), and as a means of passing electrodes into the heart to study, restore, or regulate the heartbeat. Catheterization is central to the diagnosis, therapy, and surgical management of many forms of [cardiovascular disease](http://school.eb.com/levels/high/article/106245).

The term *cardiac catheterization* was coined in 1844 by French physiologist [Claude Bernard](http://school.eb.com/levels/high/article/78837), who inserted a glass catheter into the heart of a horse. The procedure was first performed in a human by German physician [Werner Forssmann](http://school.eb.com/levels/high/article/34917), who in 1929 opened a vein in his own arm, inserted a urethral catheter about 3.2 mm (0.125 inch) in diameter and 76 cm (2.5 feet) long, and passed it to the right side of his heart while photographing his accomplishment with an X-ray machine. In the United States, physiologists [André Cournand](http://school.eb.com/levels/high/article/26599) and [Dickinson Richards](http://school.eb.com/levels/high/article/63557) developed clinical applications of Forssmann’s technique, and in 1956 the three shared a [Nobel Prize](http://school.eb.com/levels/high/article/56008) for their achievements.

Catheter materials and construction are very sophisticated, permitting an enormous range of diagnostic and therapeutic techniques to be applied to almost every organ and blood vessel in the body—but especially to the heart. By the 1940s catheters were being placed safely in the right chambers of the heart through veins, and by the 1950s they were being placed in the left chambers through arteries. As these techniques were developed, it became possible to monitor blood pressure and flow in medical and surgical intensive-care units. Through the ability to place one or more catheters inside the heart chambers, all types of heart abnormalities were opened to study.

Today [iodine](http://school.eb.com/levels/high/article/42681#280158.toc) [contrast medium](http://school.eb.com/levels/high/article/26076) can be injected through the catheter into veins or directly into the heart chambers ([angiography](http://school.eb.com/levels/high/article/7564)). This makes it possible to diagnose and surgically correct many heart conditions, including congenital heart abnormalities. In addition, visualization with a contrast agent enables the identification and replacement or repair of damaged heart valves and blood vessels and even the complete replacement of the heart through transplantation. The injection of contrast medium is particularly valuable in evaluating coronary artery narrowing and is usually performed to quantify the severity of disease present and to establish whether the person is a candidate for surgical intervention with balloon angioplasty or [coronary bypass surgery](http://school.eb.com/levels/high/article/26379). It is also used to evaluate patients with [angina pectoris](http://school.eb.com/levels/high/article/7561) who do not respond to treatment.

Special catheterization techniques now permit a cardiologist to study the function and pathology of arterial walls. One notable technique is intravascular ultrasound, in which a tiny ultrasound transducer mounted on the tip of a cardiac catheter is used to generate images of the interior walls of coronary arteries.

William L. Winters

Article #3

Cardiology, medical specialty dealing with the diagnosis and treatment of diseases and abnormalities involving the [heart](http://school.eb.com/levels/high/article/39718) and [blood vessels](http://school.eb.com/levels/high/article/15707). Cardiology is a medical, not surgical, discipline. Cardiologists provide the continuing care of patients with [cardiovascular disease](http://school.eb.com/levels/high/article/106245), performing basic studies of heart function and supervising all aspects of therapy, including the administration of drugs to modify heart functions.

The foundation of the field of cardiology was laid in 1628, when English physician [William Harvey](http://school.eb.com/levels/high/article/106277) published his observations on the anatomy and physiology of the heart and [circulation](http://school.eb.com/levels/high/article/106243). From that period, knowledge grew steadily as physicians relied on scientific observation, rejecting the prejudices and superstitions of previous eras, and conducted fastidious and keen studies of the physiology, anatomy, and pathology of the heart and blood vessels. During the 18th and 19th centuries physicians acquired a deeper understanding of the vagaries of [pulse](http://school.eb.com/levels/high/article/61888) and [blood pressure](http://school.eb.com/levels/high/article/15702), of heart sounds and heart murmurs (through the practice of [auscultation](http://school.eb.com/levels/high/article/11297), aided by the invention of the [stethoscope](http://school.eb.com/levels/high/article/69644) by French physician [René Laënnec](http://school.eb.com/levels/high/article/46808)), of respiration and exchange of blood gases in the lungs, of heart muscle structure and function, of congenital heart defects, of electrical activity in the heart muscle, and of irregular heart rhythms ([arrhythmias](http://school.eb.com/levels/high/article/20287)). Dozens of clinical observations conducted in those centuries live on today in the vernacular of cardiology—for example, Adams-Stokes syndrome, a type of heart block named for Irish physicians [Robert Adams](http://school.eb.com/levels/high/article/3673) and [William Stokes](http://school.eb.com/levels/high/article/69778); [Austin Flint](http://school.eb.com/levels/high/article/34586) murmur, named for the American physician who discovered the disorder; and [tetralogy of Fallot](http://school.eb.com/levels/high/article/33649), a combination of congenital heart defects named for French physician Étienne-Louis-Arthur Fallot.

Much of the progress in cardiology during the 20th century was made possible by improved diagnostic tools. [Electrocardiography](http://school.eb.com/levels/high/article/32295), the measurement of electrical activity in the heart, evolved from research by Dutch physiologist [Willem Einthoven](http://school.eb.com/levels/high/article/32154) in 1903, and radiological evaluation of the heart grew out of German physicist [Wilhelm Conrad Röntgen](http://school.eb.com/levels/high/article/83885)’s experiments with X-rays in 1895. [Echocardiography](http://school.eb.com/levels/high/article/31901), the generation of images of the heart by directing ultrasound waves through the chest wall, was introduced in the early 1950s. [Cardiac catheterization](http://school.eb.com/levels/high/article/20288), invented in 1929 by German surgeon [Werner Forssmann](http://school.eb.com/levels/high/article/34917) and refined soon after by American physiologists [André Cournand](http://school.eb.com/levels/high/article/26599) and [Dickinson Richards](http://school.eb.com/levels/high/article/63557), opened the way for measuring pressure inside the heart, studying normal and abnormal electrical activity, and directly visualizing the heart chambers and blood vessels ([angiography](http://school.eb.com/levels/high/article/7564)). Today the discipline of nuclear cardiology provides a means of measuring blood flow and contraction in heart muscle through the use of radioisotopes.

As diagnostic capabilities have grown, so have treatment options. Drugs have been developed by the pharmaceutical industry to treat [heart failure](http://school.eb.com/levels/high/article/39721), [angina pectoris](http://school.eb.com/levels/high/article/7561), [coronary heart disease](http://school.eb.com/levels/high/article/26381), [hypertension](http://school.eb.com/levels/high/article/41808) (high blood pressure), [arrhythmia](http://school.eb.com/levels/high/article/20287), and infections such as [endocarditis](http://school.eb.com/levels/high/article/32612). In parallel with advances in cardiac catheterization and angiography, surgeons developed techniques for allowing the blood circulation to bypass the heart through heart-lung machines, thereby permitting surgical correction of all manner of acquired and congenital heart diseases. Other advances in cardiology include electrocardiographic monitors, [pacemakers](http://school.eb.com/levels/high/article/57900) and defibrillators for detecting and treating arrhythmias, radio-frequency ablation of certain abnormal rhythms, and balloon angioplasty and other nonsurgical treatments of blood vessel obstruction. It is expected that discoveries in genetics and molecular biology will further aid cardiologists in their understanding of cardiovascular disease.

William L. Winters

**Research Assessment #3**

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**Assessment:**

 The incredible study of cardiology dealing with the central organ obviously makes sense that it entails a great amount of knowledge that needs to be understood and applied. I must know basics to be able to actually practice the skills I need with a good foundation whether it be with my ISM mentor or in my clinic in the future. In my web research, I discovered specifics of what I should actually do in the many years of schooling, the significance of catheterization in cardiology, and some of the terminology used on a daily basis.

In the first article, “Becoming a Cardiologist”, I learned that as a Cardiologist, I will have a great amount of pressure to save a human's heart as it is very important for survival. This information is relevant in that it I must work extremely hard in school and study a lot to complete the many number of years required for my education. The key parts of the information is that I will get a lot of practice or hands-on experience in my schooling, and I must spend a lot of time gaining more knowledge about my chosen topic in medical school to be easily certified in something I wish to pursue. From my prior knowledge, nothing changed other than the fact that now I know that there is a giant amount of effort that I need to exert. The article extensively expresses what exactly I must do to reach my end goal of being a cardiologist regarding my education. I plan on completing my education through the different steps using my hard work. Obstacles I see is the need to give myself, and to this I will need to understand the need to achieve my goals and push further in my journey. The author’s purpose of writing the article may be to overwhelm students, but to me, I found this simply surprising due to the workload.

In the second document, I learned that the treatment of catheterization is something I must know to be a successful cardiologist because it examines or dilates the arteries for blood flow. This procedure had been discovered a very long time ago, having room to be altered for the best results. “All types of heart abnormalities were opened to study” in the treatment of catheterization. This is encouraging in that I will be able to treat all types of patients. This article taught me about catheterization as I had not known much about it. I can see that I will have the ability to solve any patient's problems. In today's world, it is obvious that new medical techniques are used, so I can be able to easily identify damages in a patient's heart and treat it directly. Practice is very important as it ensures success.

From the final article, I learned that the occupation of cardiology from the 17th century, meaning that the field has a great amount of experience to perfect itself. There are examples of syndromes that are here today and in the past, such as “Adams-Stokes syndrome, Austin Flint murmur, and tetralogy of Fallot”. This is exhilarating as I get to treat patients of the same diseases but in many ways. This entails me to have problem solving skills to find the technique that is right for the patient. Overall, from the document I have gathered that cardiology is still a working in progress even though it is around 400 years old, which means I must be aware of the different discoveries that are happening around me.

The information I have collected is ultimately explaining that I must be prepared that I have many challenging years of schooling ahead and that I must understand the different terminologies and procedures done by cardiologists. As a result of this new knowledge of cardiology, I can have a background on the treatments and procedures my future mentor will be demonstrating at mentor visits in my ISM journey.