The Innovation of Blood Banks= Worldwide People Thanks

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Historical Paper

You may not be reading this paper now if it were not for blood banks. Blood banks have changed your life, my life, and countless other lives since they were developed. Did you know that around the world, more than 81 million units of whole blood are collected each year (WHO 2009)? Blood banks saved millions of lives during World War II and blood banks have improved how people are medically treated (redcross.org). Blood banks now save the lives of people all over the world. The innovation of blood banks has had a significant impact and change on the world (Dr. Earl Lord interview).

Per Judy Sullivan, Manager of Accreditation Programs-AABB, "Medical treatment as we know it today would not be possible without blood banks (interview)." Before blood banks, people let people bleed thinking that it would heal them. In the late 1700s, bloodletting was a universal medical practice (America's Blood Centers, 2009). People thought that if you had too much blood, it would cause you to become sick, especially fevers. Doctors would let their patients bleed instead of giving them surgery. Using human blood to heal disease and trauma began in France in 1667 (America's Blood Centers, 2009). However, these early donor to patient transfusions made many people have horrible reactions, and even die, because the blood types didn't match (Dr. Earl Lord interview). The Rh blood group system was discovered by German scientist Dr. Karl Landsteiner, Alex Wiener, Philip Levine, and R.E. Stenson in 1940 (bloodbook.com). The Rh (Rheus) system is how people's blood types are recognized as either A, B, AB, or O (blackinventor.com). The reason why this discovery was important to the development of blood banks is so that people do not make the mistake of giving you the wrong blood type during transfusions.

The first U.S. blood bank was organized at Chicago's Cook County Hospital in 1936 (americasblood.org). More blood banks were founded in all parts of the country during the next decade. In 1940, England thought it was going to be invaded by Hitler and required a lot of blood for the soldiers and the citizens. To help them out, the Blood Transfusion Betterment Association in New York, sponsored by the American Red Cross, started a massive pilot, or test, project to collect blood for Britain. As a first step, eight New York City hospitals started collecting blood in August of 1940. This became known as the Plasma for Britain Project. Dr. Charles Richard Drew, an African-American medical pioneer, was the man chosen to direct this project.

Although there were eight New York Hospitals participating, the main location of operation was the Presbyterian Hospital. Here, tests were carried out on blood conservation and blood composition. Dr. Drew also assisted to turn laboratory experiments and the blood research done by others into a huge production of blood plasma to be shipped to Britain. Dr. Drew took successful laboratory experiments of many different blood researchers and transformed their test tube methods into mass production techniques.

When Hitler's invasion didn't happen, it was decided to end the Plasma for Britain Project. Dr. Drew, however, had become a leading authority on transfusion and processing methods. By this time it had become apparent that America would be drawn into the war. Military authorities in the United States were worried about the need for blood reserves if hostilities should begin. After discussion with the Red Cross and medical leaders, the government asked the American Red Cross to start a pilot program similar to the Plasma for Britain Project, but on a smaller scale. The pilot center was set up in a Red Cross chapter in New York City. The operation began in February of 1941.

The Presbyterian Hospital was still the site, and because of his special knowledge, Dr. Charles Drew was chosen to be the medical supervisor for the operation during its beginning stages. The final product was dried plasma rather than the liquid plasma that was sent to Britain. When it was dry, plasma could be preserved longer and administered under battle field conditions (redcross.org).

Dr. Drew was asked to organize a blood drive for the U.S. navy and army consisting of 100,000 blood donors. However, when the military gave a directive to the American Red Cross that the blood should be typed according to the race of the donor, and that African-American donors be refused, Dr. Drew was angry with the decision. He said that the order was unscientific, stating that there was no evidence to support the military's claims that blood type differed according to race. Other scientists later agreed with Dr. Drew, and the government eventually allowed African-Americans to donate blood (pbs.org).

Even though African-Americans could now donate blood, the Red Cross instituted a policy to segregate the military donor pool by race. Dr. Drew, now head of surgery at Howard University, was vexed by this decision also. He said, "No difficulties have been shown to exist between the bloods of different races which would in any way counter-indicate the use of the blood from an individual of one race for the purpose of transfusion to an individual of another race providing bloods were of the same group." (S. Love, One Blood, p. 156)

Millions of donations had been received by the Red Cross by the end of the war. These donations saved thousands of U.S. service men's lives that would had been lost in earlier wars when blood banks were unknown (redcross.org).

In 1947, the American Association of Blood Banks (now the AABB) was organized to encourage continued blood research, develop standards of practice of blood banks, and encourage the exchange of scientific information (americasblood.org). The AABB started as a group of blood banks that realized that the business of blood banking needed standards: rules that everyone agreed on about how to collect blood, test it, and transfuse it. Since 1958, the AABB has been developing standards for blood banking and transfusion services. The accreditation program ensures that blood banks are following these standards by inspecting blood banks every two years. In the 1990s, the AABB introduced the concept of quality into blood banking (something that a lot of manufacturers had been doing for some time, but no one had thought was important for blood banking). The AABB works with the Food and Drug Administration (FDA), the Center for Medicare and Medicaid Services (CMS), and other organizations to ensure that blood is safe, and that it is available for patients who need it (Sullivan interview).

Other improvements have made blood banks better and safer. In 1953, blood banks started using plastic blood bags that were invented by the Fenwal Company (americasblood.org). These were used instead of the old glass bottles that used to be used to store blood when blood was first being collected in the 1940s. Plastic blood bags made it easier to treat specific problems by separating and using the blood's various components (americasblood.org). Per Judy Sullivan: "When blood banks first came about, they reused equipment and needles had to be sharpened periodically. Very little testing of blood for infectious disease was done… When blood banks were first established, they paid donors to donate. If a donor needed money really badly, he might lie about being sick and that blood that was collected could infect other people. Now, only volunteers donate blood. Since the reason they are giving blood is because they want to help someone else, they are less likely to lie about being sick."

During the AIDS epidemic in the 1980s, people realized that not only could blood save, but it could also kill. People initially viewed AIDS as a gay, white male disease. Many people had negative opinions of people with AIDS. In the mid 80s, federal experts at the Centers for Disease Control in Atlanta estimated that 12,000 people living in the United States were infected with the AIDS virus through blood transfusions; many blood banks throughout the country were being sued from people that got AIDS through blood transfusions (pediatrics.aappublications.org). When different types of people (e.g. heterosexuals and children) started getting AIDS from blood transfusions, people started changing

their views about AIDS. People now knew that people who got AIDS weren't just people that made unhealthy decisions and stopped condemning people with AIDS. People wanted blood that was 100% safe and many were nervous about receiving blood transfusions. The impact of these demands for safer blood was increased research to test donated blood. In 1985, the first blood screenings for HIV were started by blood banks; in 1990, the first specific test for hepatitis C was introduced (bloodbook.com) The government has become involved in blood banking by passing laws and regulations about how blood can be collected, processed, tested, and transfused. The FDA and the CMS now regulate laboratory testing.

Even though blood banks are now really safe, some people still do not want other people's blood. During an interview with Dr. Earl Lord, he stated that believers in the Jehovah's Witness religion refuse to receive other people's blood. Dr. Lord shared with me the following alternatives for people who do not want blood transfusions: (1) take pills that will produce more red blood cells three to five weeks before the surgery, (2) drink fluids that have electrolytes that can replace blood, and (3) donate your own blood before the surgery and then receive it during the surgery (autologous blood donation). Surgeons can also recycle their patients' blood during the surgery so that they wouldn't need to get a blood transfusion (bloodbook.com).

During the Civil Rights Movement in the late 1950's, some people objected to receiving blood transfusions from people of different races. In 1959, a paper by Dr. John Scudder, Director of the Blood Bank at Presbyterian Hospital, delivered at the annual meeting of the American Association of Blood Banks in Chicago started a controversy involving civil rights, genetics, and the meaning of race. This paper was called "Sensitising Antigens as Factors in Blood Transfusions" and was about the risk of immune reactions resulting from interracial blood transfusion (Kenny, p.457). The paper proposed that donors be separated by race to lower this risk. This paper caused a big race debate and became a public issue (Kenny, p.457). In response to this paper, New York Times editors published a story from South Africa: "The head of the local Red Cross blood transfusion service, which serves a large African population, today challenged Dr. Scudder's report. Dr. George Smyth, head of the transfusion service, said white blood had been given to blacks in East London ever since the service began twenty years ago and 'no ill effects have ever been seen.'" (New York Times, November 15, 1959) At the1960 meeting of the American Association of Blood Banks, a paper was delivered that dismissed the supposed dangers of interracial blood transfusions through a detailed study of risk cross a large number of blood groups (Kenny, p. 465). Blood banks helped decrease racial conflict because research has proved that if people of different races get each other's blood, there will not be a bad reaction.

Blood banks help save millions of lives around the world. Every day in the U.S., 40,000 units of blood are required in hospitals and emergency treatment facilities for patients with cancer and other diseases, for organ transplant recipients, and to help save the lives of trauma victims. Approximately 9.5 million people donate blood every year (AABB). Globally, more than 81 million units of blood are donated annually (World Health Organization (WHO)). Even though blood banks have impacted countries all over the world, they have impacted developed countries more than developing countries. Per 2009 data from the WHO, the average blood donation rate in developed countries is ten times higher than in developing countries; in seventy nations, less than 1% of the population donates blood -- which isn't sufficient; and 92% of donations in developed countries are from voluntary unpaid donors as compared to 77% in developing countries.

Research in blood banking has led to stem cell (the cells from which all the other cells in the body form) research, and that scientific field is exploding with discoveries. In an interview with Judy Sullivan,

she shared that: "Researchers in immunohematology (the "formal" word for the science of blood banking) developed a piece of equipment called an apheresis machine. With this machine, they could take blood out of a donor, isolate one component (like platelets) and return the rest of the blood (plasma, red cells, white cells) back to the donor. This was a huge development, especially for patients who needed frequent platelet transfusions (like cancer patients who are treated with chemotherapy). So what does apheresis have to do with stem cells? Scientists discovered that the stem cells they wanted so badly could be found, not only in bone marrow, but also in circulating blood. The problem is they are not in the blood in as many numbers as they are in the bone marrow. However, scientists and engineers discovered that they could use those same apheresis machines to concentrate stem cells out of the blood and at the same time return the rest of the blood back to the donor. The procedure is far less painful than removing bone marrow from the donor, so there are a lot more donors that are willing to donate, and more patients can be treated. Many diseases are being successfully treated with stem cells collected from adults and from umbilical cord blood."

The banking of umbilical blood and the freezing of the stem cells shows one of the greatest recycling programs in the history of mankind. Umbilical cord blood used to be considered to be a waste but is now considered a way of saving someone's life. Each year about people are diagnosed with a disease that can be cured with stem cells. Stem cells that are present in umbilical blood have been a source of cells for umbilical cord blood the first case was reported in 1989. Since that time over 10,000 patients have received cord blood transplants. Today there are over 70 diseases that can be treated with cord blood (cordblood.org). In 1991, AABB Standards for Blood Banks and Transfusion Services included for the first time standards for stem cells. As the field of stem cell research grew, more standards for stem cells were needed, and in 1996, AABB published a separate set of standards for HPCs. Then in 2001, it developed standards for cord blood, another source of stem cells. Blood bank innovations and AABB standards have helped develop stem cell research and standards.

My final example of how blood banks have changed the world is the celebration of World Blood Donor Day. This is a world-wide celebration. This is an annual event that happens on the 14th of June. This day creates an awareness of the importance of voluntary blood donation and encourages more people to become regular blood donors. This celebration also thanks all the people who donate blood without any award. The global theme for 2010 will be "Young Donors" with the slogan "New blood for the world" (WHO, 2009). The hopes are that a new generation of idealistic and voluntary donors will provide blood whenever it is needed. World Blood Donor Day is sponsored by the World Health Organization, the International Federation of Red Cross and Red Crescent Societies, the International Federation of Blood Donor Organizations, and the International Society of Blood Transfusion.

When I was born on January 13, 1998, my mom had to get a blood transfusion. If it were not for generous, voluntary blood donors and blood banks, my mom would probably not be here today. Thanks to blood banks, I have a mom right now. My mom is one of the people whose life was changed by the spectacular innovation of blood banks. My mom has helped me to learn about many things and encouraged me to not give up and to make good grades. She also encouraged me to research blood banks and write this paper that highlights blood banks' impact on the world.

WORKS CITED

Primary Sources

"Apherisis Technician Derick Williams." Personal interview. 28 Sept. 2009. In this interview, I learned that the Gulf Coast Regional Blood Center needs 1,000 pints of blood a day. I also learned that blood is tested twice before given to a patient, and how people donate blood.

Gulf Coast Regional Blood Center. Personal visit. 28 Sept. 2009. This visit was helpful because I was able to see people donating blood. I was also able to look at the machines closely and see how they worked.

"OB/GYN Dr. Earl Lord." Personal interview. 3 Oct. 2009. By conducting this interview, I was able to learn that there are other ways of getting blood instead of by a blood transfusion (for example, pills that you can take a couple of weeks before the surgery to increase more red blood cells in the blood or donating your own blood before the surgery).

Love, Spencie. *One Blood: The Death and Resurrection of Charles R. Drew*. Chapel Hill: Chapel Hill: University of North Carolina, 1996. Print. By reading Dr. Drew's quote from this book, I learned what Dr. Drew said directly about the Red Cross segregating blood.

Sullivan, Judy. "Manager of Accreditation Programs, AABB." E-mail interview. 12 Oct. 2009. By conducting this interview I was able to learn how blood banks have improved since they were introduced to the world. I also learned that the AABB is an organization of different blood banks that insures that blood is safe and inspects blood banks every two years. As a result of AABB standards, blood transfusions are safer.

Sullivan, Judy. "Manager of Accreditation Programs, AABB." E-mail interview. 14 Nov. 2009. By conducting this interview I was able to learn how blood bank research led to cord blood research.

Thurston, W. L. "New Procedure Advocated for Selection of Blood Types in Transfusions." *New York Times* 15 Nov. 1959. Print. By looking at this news paper article, I learned that in Africa black people were receiving white people's blood, yet there were no negative reactions.

Secondary Sources

"Autologous Blood Donation Basics." *Bloodbook.com*. Bloodbook.com, 10 Feb. 2006. Web. 10 Oct. 2009. <http://www.bloodbook.com/autolog-1.html>. By visiting this web site, I learned that some people who didn't want anyone else's blood could donate their own blood and then have it transfused back to them when they needed it during the surgery.

"Blood Banks Facing Hundreds of AIDS Suits." *Pediatrics*. Web. 14 Nov. 2009. <http://pediatrics.aappublications.org/cgi/content/abstract/84/4/A24>. I learned a lot about the AIDS epidemic by visiting this website. I also learned that people started suiting blood banks when they were diagnosed with AIDS.

"Blood FAQ." *AABB*. AABB, 14 Sept. 2009. Web. 10 Oct. 2009. <http://www.aabb.org/content/about_blood/FAQ/bloodFAQ.htm>. From this source, I learned how many units of blood are required ~~every day~~ in the U.S. each day. I also learned that approximately 9.5 million volunteers donate blood each year.

"Blood Safety and Donation." *WHO.int*. World Health Organization, June 2008. Web. 10 Oct. 2009. <http://www.who.int/mediacentre/factsheets/fs279/en/index.html>. By visiting this website, I learned many statistics of blood donations. I learned how many countries were donating what percent of blood, the average blood donation rate, what blood banks did when they screened blood, and how many pints of blood are collected each year globally.

"Charles Drew." *Black Inventor On-Line Museum*. Adscape International, LLC. Web. 28 Sept. 2009. <http://www.blackinventor.com/pages/charlesdrew.html>. This ~~web site~~ was important because I learned that an African-American man named Charles Drew invented blood plasma which led to the development of the blood bank.

"Charles Drew." *Red Gold*. PBS. Web. 28 Sept. 2009. <http://www.pbs.org/wnet/redgold/innovators/bio_drew.html>. This web site taught me that when people first donated blood, their blood went into a glass bottle. Now people use plastic bags. I also learned the initial reaction of the military who thought that skin color mattered when giving blood transfusions.

"Cord Blood Banking." *International Cord Blood Society*. International Cord Blood Society. Web. 14 Nov. 2009. <http://www.cordblood.org>. By visiting this website, I learned about ~~that there was even such thing as~~ the existance of corn blood. I also learned that cord blood can treat over 70 different diseases.

"Dr. Charles Drew Medical Pioneer." *American Red Cross Museum*. American Red Cross. Web. 28 Sept. 209. <http://www.redcross.org/museum/history/charlesdrew.asp>. This article was helpful because it shows the huge impact of blood banks during World War II. By the end of the war millions of blood donations had been received by the Red Cross, which saved thousands of lives of wounded soldiers who would have otherwise died before blood banks were created.

Gulf Coast Regional Blood Center. *Common Questions About Blood Donor Eligibility*. Houston: Gulf Coast Regional Blood Center, 2008. Print. This brochure was helpful because I learned how many people benefit daily from blood banks, all the types of people that benefit from blood banks, and how this innovation has impacted the shelf life of blood. On any given day in Houston as many as 2,000 pints of blood are used. Blood donor recipients that benefit from blood banks are trauma patients, cancer patients, and anyone who has anemia.

Primary source?

"History of Blood Banking." *America's Blood Centers - It's About Life*. America's Blood Centers. Web. Sept.-Oct. 2009. <http://www.americasblood.org/go.cfm?do=Page.View&pid=30>. This website was helpful because I learned how people were treated before blood banks. I also learned when and where the first blood bank was organized.

"The History of Blood Transfusion Medicine." *Bloodbook.com*. Bloodbook.com, 9 Oct. 2005. Web. 10 Oct. 2009. <http://www.bloodbook.com/trans-history.html>. This source provided a detailed timeline of blood banks and blood transfusions.

Kenny, Michael. "A Question of Blood, Race, and Politics." *Journal of the History of Medicine and Allied Sciences* 61.4 (2006): 456-91. Print. By reading part of this journal, I was able to learn about the paper that was passed during the annual meeting of the American Red Cross.

↑ what paper?

"World Blood Donor Day 2010." *WHO.int*. World Health Organization, 2009. Web. 14 Oct. 2009. <http://www.who.int/worldblooddonorday/en/>. By visiting this web site, I learned ~~that there is such thing as~~ about the establishment of World Blood Donor Day. I also learned that the theme for 2010 is Young Donors with the slogan "New blood for the world", and that this day is sponsored by four international organizations.