

GENEALOGICAL RESEARCH: A GLOBAL IMPACT

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GENEALOGICAL RESEARCH: A GLOBAL IMPACT

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## **ABSTRACT**

The purpose of this paper is to introduce and analyze the progress, and potential, genealogical research has and possibly will accomplish. We will cover the popularity that genealogical research has gained in recent years and why it has gained so much traction. This would include the influence of the internet and the niche market which it was able to fulfill. This paper will also study the advances in genealogical research which include all of the modern benefits of DNA testing, and the influence it is having globally. The last thing we will do is analyze the criticisms of genetic testing in the market today. The results will reveal that with careful supervision the industry of genetic research can make a great contribution to mankind. Also that genetic research has an immensely large market for genealogical research with industries far into the millions, making it extremely difficult to halt or limit their progress, which many countries are quickly realizing.

## INTRODUCTION

During recent years the popularity of Genetic testing and genealogical research has increased tremendously. So much so that according to *USA today* it is considered the second most popular hobby in the United States, right behind gardening. (Family Tree) This is partially due to the access that the internet gave people, which wasn't available in the past. Though active users vary widely it is clear that the popularity of Genealogical research is at its root a desire of individuals to learn more about themselves whether that means learning of their lineage or learning about their genetic makeup. Perhaps one of the best examples of genealogical research's vast popularity is Ancestry.com which now carries more than 16 billion records, and adds an average of 2 million searchable records daily. (Ancestry)

Apart from the typical genealogical research which typically consists of hours of searching through documents and old photographs, which companies like Ancestry.com offer, the second biggest hobby in the United States now also encompasses Genetic testing, which is also offered through sites like Ancestry.com. Genetic testing is very accessible, all that is required is a swab of saliva from the person, which is then sent to a lab where it is tested and the result are later mailed, or emailed back to the client (Identigene). This allows customers to discover their genetic makeup and their ancestor's geographical origins. Due to this a large market, specifically in the United States has been tapped into. The inadvertently tapped market is African Americans, due to the United States' involvement with slavery in the past which allowed deleted any written records of

origins of the people transported to the United States for use in the Slave labor force. This has caused a vacuum in cultural identity which African American's have struggled to fill until recently. DNA testing allows individuals to identify their ancestor's geographical origins, this has given many people the opportunity to reconnect with their ancestral roots and better build their family history trees. DNA testing also allows individuals to see what they are susceptible to, and what they might be more likely to exhibit. For example they can measure the likelihood of an individual to develop certain sicknesses such as cancer, or obesity. On the other hand it can also tell you if you are likely to gain physically from working out more doing one thing or another, it can also tell you the likelihood of addictive tendencies, such as drinking. In countries around the world such as China, prenatal DNA testing has begun to boom. This has happened in no small part due to the one child law that was in place for many years. It has indeed now become a cultural norm to have few children and hope to have a boy, who is of course genetically perfect. With prenatal DNA testing parents no longer have to wait to find out, they have all of the baby's information at the tip of their fingers. Gene editing and the market which could become available from those who wish to give their children the genetic lottery has become a large issue for many people. Apart from the obvious ethical implications of gene editing many scientists and government officials are having a difficult time coming to terms with the concept. Theoretically gene editing could easily rid the next generation of diseases such as diabetes, heart complications, and cancer. (The guardian) But many fear that doing so could open up an entirely different set of problems, such as the passing of genes to the next generation, and possible gaps in immunity. The biggest problem seen however is that in order to do proper testing they must use embryos for testing and many

governments are finding it difficult to balance the moral implications and the societal benefits in order to find a suitable arrangement for ethical advancement.

## **CHAPTER 1: GENEALOGICAL RESEARCH AND POPULARITY**

With genealogical research being such a broad term including nearly everything dealing with genes and ancestry it is difficult to believe that it was ever an unpopular hobby. The internet however has insured with its vast access to information that genealogical research reach the top of the charts in US hobbies, beaten only by gardening.

### **The Internet Effect**

Much of the traction that genealogical research has gained can be attributed to the growth of the internet, therefore in order to fully appreciate genealogical research in its full capacity we must first understand just how much the internet has grown. The numbers alone are able to explain that the growth has been rapid and exponential. In December of 1995 only 16 million people were using the internet, however by December of 2015 they recorded that 3,366 million people are using the internet, that's 46.4 percent of the world population (Internet World Stats). In 1969 the Internet was created by the U.S. Defense Department for scientist to communicate with each other, in a sort of network of scientists, only 4 computers sites were initially linked at U.S. Universities and research institutes(Internet). With time the internet became public and people began to communicate with more ease. Thanks to computer development from companies like

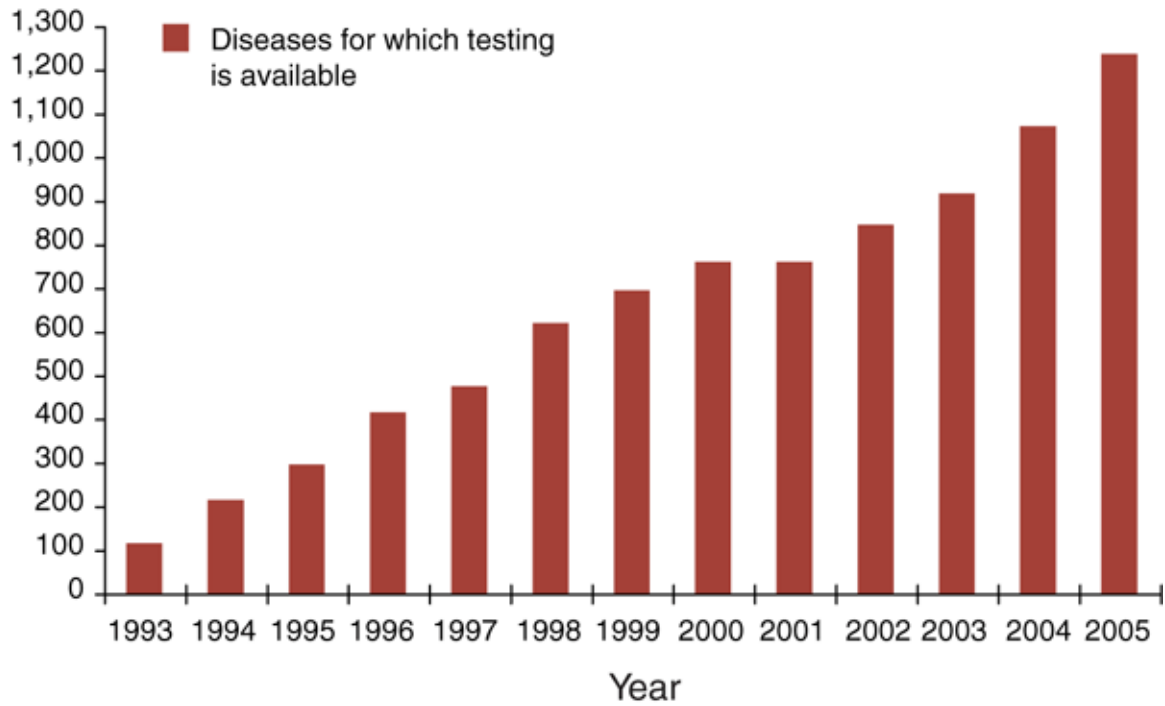


IBM and Apple by the mid 1990's people were purchasing computers exclusively to go online and usage began to grow. When President Bill Clinton first entered office in 1993 there were only 50 sites on the web, however when he left office in 2001 there were 350 million active sites being used (Connected Earth). Essentially what was happening was the facilitation of information being shared and being spread. This cleared the way for information based industries to flourish, primarily genealogical research. Databases of information about people and events from all over the world were able to be found from any computer in the world with access to the internet. This would open the flood gates for companies like *Ancestry.com* who would make million for providing the records of people and events to customers. As the industry progressed there have been other technological advancements that have made accessing this information even easier, primarily cell phone apps which allow people to access their accounts and information from just about anywhere from their phones.

## The Growth of the Industry

Unlike many businesses or markets genealogical research can say that over the past decade it has grown by 14 times what it was (Press Release). It is reasonable to believe that this is because the internet removed the barriers which stood in the way of people researching their ancestry, those being time, money, and access. Currently the top 100 genealogy websites account for 0.43 percent of internet traffic, this means that uses of genealogy are more prevalent than ever, it also tells us that 1 out of every 200 searches on the web are for genealogy (*GIT Magazine*). Thanks to advancements in technology another faction of genealogical research has been allowed to prosper. This being DNA testing, which is now more available than ever. Before if you wanted to get a DNA test you would have to go to a hospital where a long and expensive test would take place. Today however DNA testing is largely done by private companies which are capable of performing the test from the comfort of the client's home. The DNA test typically only requires for the client to swab some of his/her saliva and place it in a specified container then mail it back to get tested in the labs. What really helped this faction of genealogical research is the price, before when performed by a hospital the test could cost thousands of dollars but now it can be done by independent companies for as little as 80 dollars. And at hospitals genetic testing individuals to screen them for diseases, such as cancers and blood clotting diseases is becoming more and more common. The number of diseases or

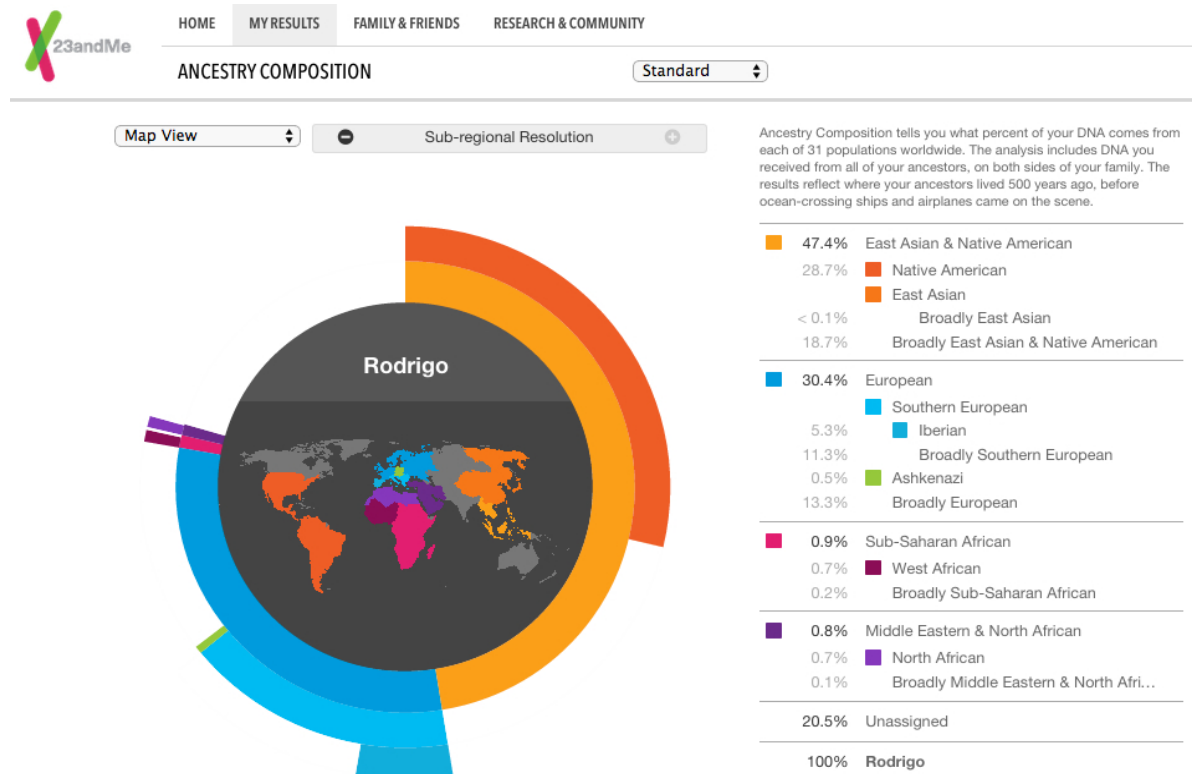
illnesses that are testable through DNA testing is increasing with every year (Scitable)



The chart above was provided by *Scitable by nature Education* to visually represent the advances in detection of diseases through genetic testing and its exponential growth over the years.

## Genetic Testing

With the expansion of genetic testing different types of techniques have been developed over the years. The three most popular types of DNA tests examine DNA in different ways, one examines the paternally inherited Y chromosome, while another checks the maternally inherited mitochondrial DNA, and the third one called autosomal DNA which examines DNA from both parents. (McAndrew) Genetic testing is fascinating because it compares DNA results of a client to those of different regions of the planet. When a match is found it is concluded that part of the client's origin coincides with that of those who live in a certain region today. Many companies such as *23andme* offer a pie chart of the makings of the client and a corresponding map which shows each match the client had with its corresponding percentage to the region. (Brady)



Above is an example of the charts provided by *23andme* which illustrate the genetic break down for their clients which corresponds to their genetic markers and what geographic locations they match up with (Abel). This allows genetic testing to be much more consumer friendly than in the past. Companies have begun to tailor genetic testing to what American's are interested in, such as their geographic origins. Another feature which is typically showcased by companies like 23andme is individual's likelihood to develop certain diseases and illnesses. Amongst these are certain types of cancers and heart conditions. The growth of the industry can be explained by the extraction of barriers to business that the internet was able to eliminate, but the popularity is thanks to the tailoring which companies like 23andme have done in order to attract a broad spectrum of customers.

## CHAPTER 2: GLOBAL EFFECT

### Identity

Many of the clients which are attracted to Genetic testing do so because of a lack of physical records of their lineage. Among them are many African American's whose ancestors were transported during the days of the slave trade. (Than) During the days of slavery many African Americans were taken from tribes in Africa and forced onto ships which took them to the Americas. Once in the American Continent they were sold into slavery and given new names which slave owners many times got to pick. After generations of slavery, slaves were released and allowed to legally change their name and obtain a last name. Many of the ex-slaves either adopted the last name of the slave owner who owned them, or picked a name which they found had historical significance. This is partially what led to many African Americans beginning to name their children with Muslim names, mainly during the times of the Black Panthers. (Fryer) It was a call for identity, many whom were simply seeking to identify culturally with something other than an ex-slave. Most of the African American's with this background are simply trying to get an information about where their lineage is from. A simple search of the internet can easily reveal the large market that has been created from the misfortune of the African American community to help uncover geographical origins. There is after all an allure to the hidden treasures that our DNA holds. In the year 2012, family research alone was said to be worth 2 billion dollars (British). In the United States alone enthusiast are

known to spend anywhere from 1,000 to 18,000 dollars a year to find their ancestors. Currently 65 of the top 100 websites for genealogical research are based in the United States. The biggest and most popular genealogical research website remains *Ancestry.com* and is considered a complete powerhouse. Four of the top ten genealogy websites are owned by *Ancestry.com* and further growth is still predicted. (British). The top free sites for genealogical research are *familysearch.org*, *findagrave.com*, *geneanet.org*, *wikitree.com*, *Usgwarchives.net*

Another connection with identity and DNA testing is that many genetic markers are similar for example those of Native Americans and certain Asian regions. This could lead to a mismatching of a client's DNA chart and lead a person to believe he has a certain percentage of lineage from Asian when its actually native American. (McAndrew) This can be harmful because for many people these DNA test are desired due to their lack of knowledge of their ancestral lineage. Mistaking DNA markers could cause a confusion of identity for many people. Though it should be understood that genetic markers do not distinguish racial or cultural distinction, only patterns and similarities. Many scientist have found links between those of Asian descent and Native Americans descent. Even going as far as saying that Native Americans might have simply been trapped in American after crossing a frozen land bridge that disappeared with time. This might lead to conflicting Asian DNA markers with those of Native Americans. However the fear is not that people will not know an accurate DNA make up but that it will shock their perceptions of themselves. After all the cultures of the Native Americans heavily differ from those that many Asian countries enjoy.

## **China and Prenatal Testing**

Technology in prenatal DNA testing has increased exponentially over the last couple of years. Because of this the popularity of DNA tests have increased tremendously in China. Though China no longer enforces the one child rule many couples are still limiting themselves to having only one child. The one child rule was put in place in an effort to reduce over population many years ago. This caused many parents to desire to only have males and to abandon girls when born or simply abort if they were expecting a little girl. Because of this many couples wish to know everything from the gender, to a baby's likeliness to develop certain diseases. Prenatal DNA testing allows parents to do all of that and more. Like testing children for Down syndrome and congenital disorders. This can be very helpful when parents are only trying to have one child, preferably a male. And of course a male that is healthy and genetically perfect.

The Chinese government however did not appreciate that the industry for DNA testing was growing so rapidly. Or better said growing so rapidly without being carefully watched. In China prenatal DNA testing was already available for commercial use. The most advanced machine was able to screen a mother's blood and give the probabilities of the child in the womb having Down syndrome. The Chinese government has ordered all DNA testing and sequencing to cease, it wishes only for companies who have the proper certifications and evaluations to offer these services. Of course all of this is being done with seemingly good intentions, as they state that prenatal DNA testing is fairly new and should still be in its pioneering stages, as they wish to oversee its price, quality, and effectiveness. (Chen)



## Development of new technologies

One thing which is commonly overlooked but also making a global impact is the medical benefits of DNA testing. Through DNA testing it is possible to do many things ranging from diagnostic testing to predictive testing. It is possible to see the probabilities of an individual to develop a disease or to accurately identify what is wrong with a patient. Many of these tests can be performed prenatally to identify abnormalities in DNA makeup (Mayo Clinic). Meaning that before children are even born we have the capabilities to identify if anything is wrong, and if so to identify what abnormality is being observed. The applications for DNA testing are fairly broad. Among the many uses are medication customization, genetic susceptibility, and lastly we even have the ability to see how effective exercise can be for a particular individual.

In a world filled with gadgets and innovations it is interesting that so many people have taken an interest in genealogical research. Of course it is easy to understand man's desire to identify with his lineage and to want to know the story behind his family, or legacy. But many fail to look at the global impact that this phenomenon is having. We live in a world that is more connected now than it has ever been thanks to the internet. This has facilitated the flow of information and access of information to many people. Which has allowed genealogical research to expand in the way it has, so much so in fact that it is considered the second most popular hobby in the United States. This has allowed multimillion dollar industries to develop and prosper. As well as driven the industry to find better and more affordable ways to do DNA testing. Where before it would cost individuals thousands of dollars to get a DNA test done, which would not provide

anywhere near what they do today. Today's DNA tests are able to deliver a good level of accuracy and not only tell you what your genetic makeup is but your percentage of markers drawn out on a map with the areas with which they coincide. They also include the effectiveness of working out according to your DNA and whether or not you are likely to develop addictive habits and diseases.

## CHAPTER 3: CRITICISMS OF GENEALOGICAL RESEARCH

### Lifestyle Changes

Though businesses have found a large market within the African American community experts warn that it is dangerous to assign too much reliance on DNA testing. This is because though DNA testing is accurate it does not by any means represent race, or the cultural alignments which a client's ancestors may have held. For example it is difficult for a person of African descent to determine what tribe his ancestors belonged to, or what they stood for. The truth is that this type of connections are nearly impossible to uncover without some sort of written record, which for many can be found but unfortunately most African Americans won't be able so lucky. One big criticism is that African Americans will adopt cultural philosophies which never belonged to their ancestors. Another criticism and fear is that many individuals who are getting screened for diseases or the chances of them developing certain illnesses may succumb to the fear of possibly having those illnesses. There are already many individuals who have learned that they may be susceptible to certain illnesses and who have decided to undergo certain preventative surgeries. Many critics fear that individuals will learn of their genetic predisposition and seek surgeries or medication that is unnecessary for them. Another criticism that is perhaps even worse than seeking help for an illness they do not have is the fear that individuals will develop depression or anxiety because of realizing that they

may be susceptible to developing a certain kind of cancer or illness. Which could in turn make clients develop an entirely different set of illnesses which were unrelated to those which they were screened for. (ABC News)

### **Job Market Discrimination**

With the ability to test individuals for their chances of developing diseases if exposed to certain substances many companies have begun to screen potential employees prior to hiring. This has led many critics to fear that the job market will become too competitive in certain fields. Where it might be reasonable to assume an employer would want an individual who is immune to the effects of many substances, not just one.

(Workplace) This would mean that only a select few would even stand a chance of obtaining this job, by genetic predisposition alone. Some critics fear that because of the technology to screen some workers' rights might be violated, they also fear that racial and ethnic discrimination may increase in the workplace. There others however that argue that genetic screening could greatly benefit society. One study found that 390,000 workers get some sort of disabling diseases at work each year, 100,000 of them die.

Those in support argue that with screening employers can help families avoid work environments that could harm their loved ones and even lead to a death in the family.

Businesses would also gain greatly from screening, in 1981 the Bureau of labor statistics reported that occupational illness was responsible for 850,000 lost work days. By reducing the number of lost work days and injured employees businesses save on litigation over illness, loss of production due to illness, and reduce the cost associated with workers compensation payments. (Workplace)

## Regulations

Sadly the advances in technology have pushed countries towards regulation. In china due to the huge popularity of prenatal testing restriction which don't allow any provider to service a costumer without government approval have already began. These restrictions are estimated to have some pretty big impacts. Analysts believe the market to be worth around 8 billion dollars which is certain to be lowered with the new restrictions. Also due to the ban on prenatal testing it is estimated that somewhere around 11,000 babies will be born with congenital disorders.(Chen) This should slowly decline once companies are able to obtain the proper certification and pass the evaluations. However no one is truly certain about how much research and development Chine is intending on preforming before giving the thumbs up to companies to continue with prenatal testing. Another theory for why china has established regulations to prevent prenatal testing is because of their problem with having too many young men in their society. Due to prenatal testing and an easy access to abortion a large lack of women has developed in china. It is estimated that by 2020 they will have 30 million more men than women entering the dating market. (Brooks) It is easy then to understand why a country like china might want to step in on genetic testing to try to fix their current problem and preventing from creating an even larger issue.

## CHAPTER 4: RECOMMENDATIONS

### Advice

Overall the large umbrella that is Genealogical Research is causing a huge impact in our modern world. Many are benefiting from the simple access to information and records saved all over the world without the need to travel. While others are learning of their origins from modern DNA testing. And lastly there are those who are benefiting from the scientific leaps and bounds which DNA testing has achieved. The advancement of DNA testing allows us to test for disease, susceptibilities, probabilities of developing diseases, and effectiveness of exercise. With all of this people have an opportunity to know themselves better and to perhaps find cures to certain diseases, or find a way to prevent them. There are many people who fear that testing for these diseases or screening for susceptibilities will hurt individuals in the job market or in their mental health. However the truth is that it is a small risk compared to the number of lives which can be saved. Screen can help prevent workers from developing certain cancers and diseases which in turn could save lives, money, sick days, and heart ache to the families of the workers. Another concern that many critics have is that many individuals may seek treatment for conditions that they may have not developed yet, just because they have a high risk of developing the disease. The best way to face this is to consider the peace of mind the individual taking preventative measure has gained, that kind of peace of mind cannot simply be obtained. Many countries such as China and the United States are looking to limit and restrict certain aspects of Genealogical Research however I believe it

to be truly impossible to halt this kind of advancement. Instead I recommend to regulate and invest in the advancement, the possibilities for advancement of the human race are tremendous with the technology we are developing. Perhaps most importantly all of these valuable services which are offered all over the world are generating millions if not billions of dollars and affecting the world in ways which we could only dream of in the past. It is opening doors to history, and medicine which can only lead us to greater scientific discovery and a better in-depth looks at ourselves.

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