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Genetic Testing in Immigration for Family Reunification:  
Ethical, Legal and Social Implications

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**Abstract**

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This body of work addresses the ethical, legal and social implications of using genetic testing as part of US immigration procedures for family reunification. Last year, approximately two-thirds of immigrants who came to the US as legal permanent residents were family petitioned under the family reunification provision. Under this provision, a petitioner, who must be a US citizen or permanent resident, petitions to the US Citizenship and Immigration Services (USCIS) to bring his or her immediate family members (spouse, children, parents or siblings) to the US. As part of the application process, the petitioner is required to show proof of the alleged family relationships claimed in the petition. This is typically done through documentation (e.g. birth certificates). But when documents are lacking or insufficient, or fraud is suspected, US

immigration officials may suggest DNA testing (parentage or sibling testing) as a way to verify family relationships. In the past several years, DNA testing has become more frequent in immigration procedures, but the impact such testing may have on immigrants, their families or their communities is not clear. The objective of this study was to explore the positive and negative effects DNA testing may have on immigrant families, particularly regarding how test results might impact family relationships, social adaptability, and psychological well-being. This study incorporated interviews with immigrant families to (1) understand their experiences with DNA testing, and to (2) learn their opinions about the potential positive and negative effects of using DNA testing to prove alleged family relationships in immigration. Results from this research were used to develop educational materials including (a) an informational brochure for immigrants planning to petition for a family member under family reunification provision, and (b) an ethical "points-to-consider" document to inform policy-makers, immigration lawyers, advocates and immigrant communities about the study findings and the implications of using DNA testing in immigration for family reunification.

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## **Dedication**

To my parents, Angel and Gilda, whom I love deeply

&

To Jon, for his love and support in this journey—let's go fishing!

## Introduction

In September 2007, the headline on the online-newspaper *The Guardian* read, “Immigrant DNA tests plan raises storm for Sarkozy” (Sanford, 2007). The French government had proposed using voluntary DNA testing to verify the family relationships of immigrants petitioning for family members. People were fearful that DNA testing would become frequently used and many spoke out against it (Sanford, 2007). The French government, on the other hand, was surprised by people’s reaction. They could not understand it. They tried to explain their concerns about the increasing amount of documentary fraud in France’s immigration system. They believed DNA testing would help control and decrease fraud. But, some French citizens and residents saw the implementation of a DNA testing policy in France’s immigration system as a violation of immigrants’ human rights and an attack on the integrity of immigrant families.

Seven years prior to France’s implementation of their DNA testing policy, the US had implemented such a policy in immigration for family reunification. Family reunification is the legal process in immigration through which US citizens or legal permanent residents (LPR), also called *petitioners*, can apply to bring their immediate family members, also called *beneficiaries*, to live in the US. As part of the family reunification process, petitioners are required to show proof of their family relationship to beneficiaries. Generally, this is achieved via birth certificates or other secondary documents. But, when documents are missing or fraud is suspected, DNA testing may be used as a tool to uncover the truth about the claimed relationship.

France and the US are not the only countries that have implemented such testing in immigration. In fact, there are 16 other European countries that have embraced the idea of using DNA testing as part of their family reunification policies. As summarized in Table 1, they offer several reasons in support of this approach: (1) to prevent human trafficking, and the exploitation of children by “fake” parents; (2) as a solution to the frequent use of fraudulent documents in some regions of the world, especially certain African and Middle Eastern countries (Assemblée Nationale N. 160, 2007); and (3) to simplify the process of family reunification-based immigration. DNA testing is voluntary in most of these countries. This means that the petitioner either initiates the testing of his or her own accord or an immigration official suggests the test to the petitioner and beneficiary, and they can choose to decline it. Noncompliance does not jeopardize the application process in this circumstance. In Norway and Finland, however, the testing is voluntary, but the application process can be terminated if the petitioner and/or family member declines to be tested.

Table 1. Countries using genetic testing in family reunification and their existing policies

Countries/ Provinces	Testing Status	Rationale for Testing	Financial Responsibility Borne by:	References
Australia	Voluntary	Fraudulent, missing or unreliable documents	Applicants	(DIMA, 2006); (Taitz, 2001, p.13); (Citizenship Policy Section, 2012)
Austria	Voluntary, testing initiated by sponsor	Missing or unreliable documents	Applicants	(The Federal and Residence Act, 2006)
Belgium	Required in some cases	Fraudulent, missing or unreliable documents	Applicants	(Assemblée Nationale N. 160, 2007)

Countries/ Provinces	Testing Status	Rationale for Testing	Financial Responsibility Borne by:	References
Canada	Voluntary	Fraudulent ,missing or unreliable documents	Applicants	(Citizenship and Immigration Canada, Citizenship Manual CP3, 2008, p.14); (Taitz, 2011, p.14)
Denmark	Required in some cases	Human trafficking; fraudulent, missing or unreliable documents	Applicants	(United Nations Human Rights Committee, Seventieth Session, 2000); (Danish Ministry of the Interior, Aliens Act Section 40c, 2001); (Taitz, 2001, p.15)
Finland	Voluntary, yet refusal to submit DNA tests might result in application being rejected	Fraudulent, missing or unreliable documents; simplify reunification process	Government, but if test is negative applicants must reimburse government	(Finnish Ministry of the Interior, the Finnish Aliens Act, Section 18, 2007); (Taitz, 2001, p.16)
France	Voluntary, testing initiated by the sponsor	Fraudulent documents	Applicants	(Assemblée Nationale N160, Article L. 111-6, 2007)
Germany	Voluntary	Missing or unreliable documents	Applicants	(Institute of Legal Medicine, University Clinic of Cologne, 2006); (Roepfer, 1998); (Taitz, 2001, p.17)
Hong Kong	Required in some cases; test used only on Chinese nationals	Fraudulent, missing or unreliable documents	Applicants	(Legislative Council Brief: Immigration Ordinance ,Chpt. 115, 2000)
Italy	Policy under development, considering mandatory testing	Simplify reunification process; fraudulent, missing or unreliable documents	Not decided	(Camera Dei Deputati N. 3181, 2007)

Countries/ Provinces	Testing Status	Rationale for Testing	Financial Responsibility Borne by:	References
Netherlands	Voluntary	Fraudulent, missing or unreliable documents	Government covers most expenses; those paid by applicants are reimbursed if test is positive	(Extra funds for new Aliens Act and more Aliens Chambers, 2000); (Taitz, 2001, p.18)
New Zealand	Voluntary	Fraudulent, missing or unreliable documents	Applicants	( New Zealand Immigration Services, 2004),
Norway	Required in some cases, non-compliance ends application process; sponsor can also initiate testing	Not provided	Applicants	( <i>“Family Reunification”</i> , 2000); (Taitz,2001); (Hansen, 2003)
Sweden	Voluntary	Simplify reunification process; avoid trafficking and exploitation of children;	Applicants	(Svenska Dagbladet p.10, 2006); (Taitz, 2001, p.21)
Switzerland	Voluntary, testing initiated by sponsor	Simplify reunification process; fraudulent, missing or unreliable documents	Applicants	(Swiss Federal Law on the Genetic Testing of Humans, 2004)
United Kingdom	Voluntary	Not provided	Applicants	(Immigration Directorates' Instructions, 2006)
United States	Voluntary	Fraudulent, missing or unreliable documents	Applicants	(Aytes, 2008); (Taitz, 2001, p.21)

There is little evidence that the US and other countries using genetic testing in family reunification have examined the possible consequences that using such testing may have on their immigrant families and communities. Given the influence families can have on the health and acculturation of immigrants, we need a better understanding of the full range of effects of adding

genetic testing to the family reunification process. Empirical studies on this issue are lacking. This study helps fill that gap.

The purpose of this dissertation is to map the several dimensions that are pertinent to the use of DNA testing in immigration for family reunification. Among these are the experiences and perspectives of immigrants with DNA testing, the government's interests to reduce and control fraud, the accuracy of the DNA test, and the cultural, historical and political discourses that weave through the US DNA testing policy. In addition, it examines the positive and negative effects that DNA testing and test results may have on immigrants and their families. This dissertation comprises four chapters, each examining a different aspect of this issue.

**Chapter 1** is a policy analysis that identifies and discusses some of the historical, legal, social, cultural, and economic factors that have influenced the implementation of DNA testing in family reunification in the US. The goal of the chapter is to examine both the policy and its history to understand the factors that contributed to the development of the policy.

**Chapter 2** explains, summarizes and analyses the scientific and genetic concepts behind paternity testing, the type of testing most prevalent in immigration, and the strengths and limitations of this technology. It gives an introduction to how the data are collected and analyzed, how the test is performed, and what assumptions are made in analyzing and interpreting the data. It then focuses on the strengths and weaknesses of the test, and the factors which influence the accuracy of the test.

**Chapter 3** investigates the experiences of immigrants who have undergone DNA testing in their immigration cases. A series of interviews with immigrants were conducted. A thematic description was constructed from their experiences. The impacts, both positive and negative, that were born of their experiences with DNA testing are discussed.

Finally, in **Chapter 4**, these individual components are synthesized into an ethical-points-to-consider document. The suggestions in this chapter are aimed at improving the process of using DNA testing in US immigration so that the benefits of such testing can be had while mitigating the negative outcomes.

## Chapter I – The DNA Testing Policy: History and Discourses

### Introduction

Fourteen years ago, Mr. Ahmed Azikiwe<sup>1</sup> emigrated from his country in Africa to the United States (US), leaving behind his child. Immediately after arriving in the US, Mr. Azikiwe petitioned to the United States Citizenship and Immigration Services to bring his child under the family reunification provision of the Immigration and Nationality Act of 1965 (Hart-Celler Act of 1965, Pub.L 89-236). Because he lacked documents that were lost in his country's civil war, an immigration officer suggested that he take a DNA test to prove he was the biological father of the child, as he claimed in his immigration petition. Test results showed, however, that the child was not his biological son. This revelation left him struggling emotionally and made the prospects of reuniting with his child difficult if not impossible.

Mr. Azikiwe's story is an example of how genetics and genetic technologies may be used in the social context to address policy issues that extend beyond the field of medicine into verifying identity and family relationships for immigration purposes. Although using genetics to prove family relationships in immigration is not new, as this chapter will later discuss, the adoption of DNA testing occurred relatively recently, in 2000 (Cronin, 2000). It was implemented as a tool used to address the issues of suspected fraud, stolen identities, and inadequate documentation in the petitions of relatives in immigration.

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<sup>1</sup> This is an actual case from an interview conducted by the author. The names and other details from the case were changed to protect the identity of the individual and family members.

Like all policies, the DNA testing policy was not created in a vacuum. It has rich historical antecedents that have deeply shaped its content and goals. The policy is a reflection of the history that came before it and the values that shaped it. In this chapter, a fuller picture of how the application of genetic testing to family reunification evolved will be developed. It will be argued that cultural, historical, political, and scientific discourses have influenced the formation of the DNA testing policy in immigration and its implementation. This chapter will trace the development of the policy to explain how and why it was introduced into the immigration system and the discourses that influenced it. This helps to situate the policy text in a social, historical and cultural context to identify the values, beliefs, assumptions and knowledge that may guide the decisions of immigration officials and the interpretation of genetic testing results.

## **DNA Testing Policy**

### **The Family Reunification Provision**

Family reunification is a provision within the Immigration and Nationality Act (INA) of 1965, the law that guides immigration policy (Hart-Celler Act of 1965, Pub.L 89-236, 1965). The provision grants citizens and legal permanent residents the benefit of petitioning for certain relatives to immigrate to the US. It defines family narrowly, giving immigration priority to immediate family members, defined as children, spouses, parents, and siblings. Family reunification is the largest source of immigration in the US. In 2011, 64.8% of immigrants who became legal permanent residents in the US were family petitioned (Monger & Yankey, 2012). 35.2% became legal permanent residents through other admission categories, such as

employment-based preferences, the diversity programs, and refugees and asylum programs (Monger & Yankey, 2012).

The INA allocates an annual quota of visas for family reunification. For example, in 2011, 226,000 visas were allocated for family reunification (Monger & Yankey, 2012). They were distributed among four family preference categories. Children and spouses of legal permanent residents, and siblings and unmarried children ( $\geq 21$  years old) of US citizens are divided into these four preference categories [Table 2]. Each category is assigned a certain number of visas, with the first preference category getting the most (United States Department of State Bureau of Consular Affairs, Visa Bulletin, 2012). Parents, spouses and unmarried children ( $< 21$  years old) of US citizens are granted an unlimited amount of visas.

Table 2. Family members that can be petitioned in each preference category (US Citizenship and Immigration Services, 2012).

Preference categories for family members of US citizens and legal permanent residents
<ul style="list-style-type: none"> <li>• <b>First preference:</b> adult (<math>\geq 21</math> years), unmarried sons and daughters of US citizens</li> <li>• <b>Second preference:</b> spouses and the unmarried sons and daughters (<math>&lt; 21</math> years) of permanent residents; then adult (<math>\geq 21</math> years), unmarried sons and daughters of permanent residents</li> <li>• <b>Third preference:</b> married sons and daughters of United States citizens, their spouses and minor children</li> <li>• <b>Fourth preference:</b> brothers and sisters (<math>\geq 21</math> United States citizens, their spouses and minor children)</li> </ul>

### **Implementation of the DNA Testing Policy**

The DNA testing policy was officially implemented in July 14, 2000 through an administrative memorandum written by Michael D. Cronin, then Executive Associate Commissioner of the United States Citizenship and Immigration Services (USCIS) (Cronin, 2000). The goal of the memorandum was to “provide guidance” to the USCIS field offices about using DNA testing for parentage verification within the family reunification process. Prior to 2000, genetic testing had been used in random cases in immigration.

Because only certain family members are allowed to immigrate, and there are a limited number of visas allocated for family reunification per year, establishing the existence of an authentic relationship between the family member and the petitioner is important in immigration law. Legal documents, such as birth certificates, are used for this purpose. However, when documents are missing, proven insufficient or fraud is suspected, the DNA testing policy authorizes immigration officials to *suggest* DNA testing to petitioners when “forms of evidence have proven inconclusive” (Cronin, 2000). DNA testing acts like a gold standard to validate the authenticity of the claimed relationships. The usefulness of test results is subtly couched in the policy by words like “accurate” and “beyond reasonable doubt” (Cronin, 2000). However, the policy also cautions immigration officers about using DNA testing only when necessary (Cronin 2000).

The policy also states that testing is voluntary, and that it must be paid by the petitioners. Applicants must choose an accredited laboratory from a list provided by immigration officials, contact it directly and schedule the testing (Aytes, 2008). Once test results are received by the

immigration official in charge of the case, the evidence is weighed and a decision is made. To support the claim of a biological relationship, DNA test results have to show a probability of parentage or kinship equal to or more than 99.5% (Cronin, 2000).

If the immigration official does not decide in favor of the petitioner, the petitioner has the right to appeal the decision to an immigration judge. In turn, the decision of an immigration judge can be appealed to the Board of Immigration Appeals (BIA) (USDOJ, 2007), the highest administrative appellate body in the immigration system (8 C.F.R. § 1003.1(b)). If the petitioner decides to appeal the BIA decision, he or she can pursue the case in federal court (USDOJ, 2009).

### **Family and Reunification in the History of US Immigration**

The current DNA testing policy was not created in a vacuum, but was shaped by the history that preceded it and the political, cultural, and scientific discourses embedded in that history. This chapter will trace the history that led to the policy and examine the discourses and factors that influenced its content (LeGreco, 2009).

### **Importance of Family and Reunification in the Development of the US [1600-1900]**

Family and family reunification has a major place in US immigration history and immigration law. Families were the foundation upon which this country was built and progressed to become a nation. Although the US has always been a multiracial, multiethnic country, even during the colonial period, the majority of immigrants who arrived during the 16th-18th centuries were Europeans, who had “a strong orientation toward family and kinship” (Finkler, 2000; Hirschman,

2005). With them, they brought their beliefs about the importance of family in the development of individuals and society (Calhoun, 1917).

In Europe, the family had been an important component of life since medieval times (Finkler, 2000, .p.30-43). The concept of family was based on blood ties which represented a lasting relationship that transcended time, allowed the legitimization of children and assured family members access to an inheritance, especially land to cultivate and live on (Finkler, 2000, p.30-43; Calhoun, 1917). These historical and cultural ties between blood and kinship were brought to North America by European immigrants looking for opportunities to work, and to escape religious and political persecution (Radcliffe-Brown, 1952; Levi-Strauss, 1969; Finkler, 2000, p. 30-43; Hirschman, 2005).

As in Europe, families became the most important social units upon which the US colonies were formed and maintained. They became the backbone of survival, economic progress, morality and order. The family was the school, the bank, the church, and the system of laws that governed the individuals who belonged to it (Calhoun, 1917). It represented the relationships, traditions and memories that were formed in the old world and brought to the new, allowing newcomers to cope with an unknown and unpredictable life (Calhoun, 1917). The harsh environment, lack of food, diseases and living conditions led to a high mortality rate, which was slightly ameliorated by family members pulling together to share chores and care for each other. In addition, family life kept the men who had journeyed first (and often alone) to the colonies, honest, productive and honorable (Calhoun, 1917; Silber, 1996-1997).

Even though family patterns and lifestyles differed between regions in the colonies, reflecting various religious beliefs and different European cultures, there was an unspoken understanding that the family and the reunification of the family in the colonies was indispensable for the survival and well-being of newcomers (Calhoun, 1917). Consequently, it is not surprising that in the 1600s in Massachusetts, “A man or woman....without family ties was almost unthinkable. Such an anomaly could not be tolerated” (Calhoun, 1917).

The reunification of individuals with their family members continued to be an important goal for the different waves of immigrants who came to this country in subsequent years (Silber, 1996-1997). For example, in the late 19<sup>th</sup> century, and throughout the early 20<sup>th</sup> century, many of the immigrants, most of them men, who came to work in the factories and cities came with their families or sent for them later (Kalola, 1996-1997; Calhoun, 1917). Families formed social networks, and provided the capital and emotional support that helped them live in and adapt to their new home.

Although many immigrants tried to bring their immediate and sometimes extended family members to the US, they were not always successful. Even though there was no restriction on immigration, it was not easy to immigrate (Zolberg, 2006). The journey by ship was long, taking many weeks, and survival was not guaranteed; children and women would often succumb to disease and died during the trip (Zolberg, 2006; Calhoun, 1917). Furthermore, the cost of the voyage was expensive and many could not afford it. Some families sold themselves as indentured servants to be able to make the journey. Others simply chose to stay in their homelands (Calhoun, 1917; Zolberg, 2006). Therefore, despite the lack of immigration

restriction, maintaining the integrity of the family was difficult and sometimes impossible. However, attempts at reunification became a bigger challenge as the US immigration system morphed into a regulatory body and Congress passed laws that restricted the immigration of certain groups (Congressional Research Service Library of Congress, 1980).

### **The Emergence of a US Immigration System [1850-1952]**

Before 1864, immigration was overseen by the states which regulated it by levying taxes on vessels that transported newcomers (Congressional Research Service Library of Congress, 1980; Zolberg, 2006). Beyond this, most states kept lax control of immigration. The federal government only intervened to pass legislation that improved the conditions of passenger ships and required ship owners to record the names and demographics of their passengers (Zolberg, 2006; Congressional Research Service Library of Congress, 1980; Silber, 1996-1997; The Immigration and Naturalization Systems of the United States, 1950). This changed in 1864, when the federal government started centralizing the regulation of immigration, slowly taking it away from the states (Congressional Research Service Library of Congress, 1980). Although the federal government does not have specific constitutional authority to regulate immigration, it derived its authority from the principle of national sovereignty which was recognized by the Supreme Court in the case *Ekie v. United States* (142 U.S 651, 1892; Congressional Research Service Library of Congress, 1980, p.5). This recognition was further aided by Supreme Court decisions in the 1870's that declared the immigration laws of some states unconstitutional because they interfered with the federal government's power to regulate foreign commerce (e.g. *Henderson v. Mayor of the City of New York*, 92 US 259; Congressional Research Service

Library of Congress, 1980; Select Commission on Immigration and Refugee Policy, 1981). These cases shifted the power to control immigration from the states to the federal government.

The centralization of immigration under the federal government began when Congress passed the Immigration Act of 1891 (26 Stat. 1084), which created the legal scaffold to develop the immigration laws and infrastructure necessary to regulate immigration. Under the Act, the Bureau of Immigration (BI) was created and placed within the Department of Treasury. Its role was to oversee and manage the implementation and enforcement of immigration laws, as well as to build a system and workforce that could accomplish this job (Congressional Research Service Library of Congress, 1980). In 1933, the Bureau of Immigration merged with the Bureau of Naturalization to create the Immigration and Naturalization Services (INS), the predecessor of the current United States Citizenship and Immigration Services (USCIS). Through the years, the Bureau of Immigration was moved from the Department of Treasury (1891-1903), to the Department of Commerce and Labor (1903-1913), to the Department of Labor (1913-1940), to the Department of Justice (1940-2003) and currently to the Department of Homeland Security (2003-present) (Congressional Research Service Library of Congress, 1980). The moves between departments reflect how immigration was viewed at different times (Congressional Research Service Library of Congress, 1980). It was first treated as a source of income from taxes placed on vessels. Then as a source of labor, especially contract labor, which demanded some type of regulation. Before World War II (WWII) tension built within the US about “the hostilities in the other parts of the world” this led to the passing of legislation in the 1940’s that sought to protect the security of the country through immigration restrictions (Congressional Research Service

Library of Congress, 1980). Consequently, immigration came to be viewed as a national security issue. Its regulation was essential to protect the political stability of the country.

### **Family Reunification in the Midst of Restriction**

The immigration policies that were implemented during the mid 1800's and early 1900's were in response to a weak economy, an increase in immigration, a concern about national security and discourses about racial differences emanating from the rise of social Darwinism and the emerging ideas of eugenics.

At the turn of the 20<sup>th</sup> century, many European countries were confronting economic challenges brought on by political unrest, wars and drought. As a consequence, the number of immigrants coming to the US increased. Immigration waves had rolled in since the mid-1800s as a result of revolutions in Germany, France, Belgium, Italy, the Hapsburg Empire and Poland (Zolberg, 2006). But the number of immigrants who came from 1905-1914 was even greater than in those prior waves. In the span of just nine years, more than one million immigrants came to the US; the highest number in the history of the country (Violet, 1980). Technological progress in navigation also contributed to this increase by shortening the time of the voyage from months to weeks and increasing safety (Zolberg, 2006).

The rapid influx of immigrants sparked fear and anxiety for several reasons. First, many of the immigrants were from Eastern and Southern Europe; their culture was different from Western Europeans and it was believed that they were not assimilating well (Hirschman, 2005; Eckerson, 1966). Second, there was concern that heavy immigration would increase the competition for work and add more economic pressures to the country. This became especially

important during the economic panic of 1907 and the Great Depression (1929-1939). In addition, the involvement of the US in World War I (1914-1918) and World War II (1941-1945) brought a feeling of nativism and an urge to protect the country from the cultural and social changes happening inside and political movements happening outside (Hirschman, 2005). The US and other nations started wanting to control movement across borders and define their specific cultural and political identity in the world. “The development and distribution of various forms of documentary identification helped to constitute people of different countries as mutually exclusive nationals who shared a common interest in the fate of their state -- an interest that might well put them at odds with the nationals of other states” (Torpey, 2000).

Significant immigration policies were passed during and after World War I. During the war, legislation was passed to strengthen the role of the BI, and provide more rules and regulations regarding admission and deportation of immigrants (Congressional Research Service Library of Congress, 1980). By 1919, the war regulations to protect the security of the country waned, and what remained was the passport system.

The passport system was introduced in the US immigration system in 1917, during WWI, to protect the country from “spies and enemy agents” (Congressional Research Service Library of Congress, 1980, p.24; Torpey, 2000). The passport, considered an English invention, was instituted in France by Louis XIV to control the movement of people under his monarchy (Torpey, 2000; Casciani, 2008). After the French Revolution, the passport went into obscurity, but it was reinstated by the French republic to “regulate the movements of émigrés, counterrevolutionary brigands, refractory priests, itinerant mendicants, conscripted soldiers, and

the foreign-born, among others” (Torpey, 2000, p.56). Its use was adopted by various other European nations, and in the 20<sup>th</sup> century, by the US as a means to regulate movement for the purposes of maintaining safety in the country during the war (Congressional Research Service Library of Congress 1980; Torpey, 2000).

After WWI ended, the US government became fearful that a flood of immigrants would arrive from war-torn Europe (Violet, 1980). There were concerns about the economy, housing problems, the availability of labor and the consequences of letting so many immigrants into the country. This led to a series of laws that incrementally restricted the entrance of immigrants including the Immigration Act of 1917 (39 Stat.874), which restricted the immigration of illiterates and persons with, “Constitutional psychopathic inferiority; chronic alcoholics; stowaways; vagrants; and persons who had one previous attack of insanity” (Congressional Research Service Library of Congress, 1980, p. 23). The Quota Act of 1921 (42 Stat.5) further restricted immigration by introducing quotas based on nationality (Congressional Research Service Library of Congress, 1980, p. 27). These restrictions culminated with the Immigration Act of 1924 (43 Stat.153), which established quotas based on national origin, with the purpose of maintaining the ethnic composition that existed in the US in the mid-1800s (Congressional Research Service Library of Congress, 1980, p.34). To accomplish this, they used the 1890 census to calculate immigration quotas for each country. The result was that 86% of the quotas were allotted to countries of northwestern Europe, thus reducing significantly Eastern and Southern European immigration (Eckerson, 1966). These restrictions lasted until 1952.

Further, these immigration policies were influenced by the scientific and eugenics discourses circulating in the early 1920's. The idea that some races were superior to others was a prevalent societal discussion published in journals and newspapers which was led by the work of scientists and intellectuals who were applying Darwinian concepts of evolution to explain physical and mental differences between populations (Corbin, 1921; *Restricting Immigration*, 1890; Rafter, 1988). This started the eugenics movement which used inherited traits to explain not only medical conditions but also social conditions. Mendel's work on heredity was used to support the argument that character flaws, and things like poverty, physical disabilities and alcoholism were inherited traits passed from generation to generation (Silber, 1996-1997, p.4). Eugenicists argued that by excluding immigrants with certain unwanted characteristics, the government was working to create a better society. For example, Dr. Harry N. Laughlin, a eugenics consultant, addressed the House Judiciary Committee on Immigration and Naturalization to argue that moral and mental differences between immigrants were influenced by heredity (Laughlin, 1920). Scientists were making observations that the majority of immigrants who entered the country ended up living in asylums or poor houses; therefore, they must somehow differ from other immigrants who had come before. By letting them enter the country, they introduced undesirable traits that could be passed on to their offspring, and eventually propagate in the US society (Corbin, 1921). Scientific studies were conducted to support these ideas and their results presented as evidence during congressional hearings (Laughlin, 1920). Eugenics became a popular word in journals, newspapers and everyday speech. It was embraced by many politicians and Congressmen who used the scientific

explanations to support the severe immigration restrictions that ensued in the Immigration Act of 1924.

These immigration restrictions made the reunification of family members very difficult. While immigration laws were not specifically directed towards controlling family immigration via quotas, these laws nonetheless separated immediate and distant family members from reunifying with their families in the US (Silber, 1996-1997; Select Commission on Immigration and Refugee Policy, 1981). The restrictions separated children from their parents and wives from their husbands based on national origin and disease status.

*While northern and western European immigrants entered earlier and tended to enter in family groups, millions of southern and eastern Europeans men had migrated alone to the United States in the early twentieth century, had found jobs, and many were ready to bring their wives, children, parents, siblings and other relatives to join them at the time quotas were introduced. Suddenly the door was essentially closed to many of the relatives of earlier immigrants who had compelling reasons to come to the United States. (Select Commission on Immigration and Refugee Policy, 1981, p.361)*

Even though the Immigration Act of 1924 was later revised to introduce numerical quotas for the reunification of immigrant families, the precedent to limit entrance for families had been set (Silber, 1996-1997). The Act of 1924 regulated immigration law until the Immigration and Nationality Act of 1952 was passed.

The Immigration and Nationality Act of 1952 (INA) (Public Law 82-414) was created and passed in an effort to address problems with the immigration system and concerns about the country's national security. These problems were enumerated by a Senate Committee Report on the Judiciary presented to the 81<sup>st</sup> Congress, 2<sup>nd</sup> Session (Committee on the Judiciary, 1950). In

this act, the national origins system and the quota system were kept, but preference categories were added, “for skilled aliens and relatives” (Congressional Research Service Library of Congress, 1980, p.34; Public Law 82-414). The INA of 1952, “Showed more sympathy for divided families than previous acts had done” (Congressional Research Service Library of Congress, 1980, p.62, cited in John, 1956). During this time, there was a world-wide need to reunite refugee families who had been separated by WWII. There was also a world-shared realization of the importance of family and family integrity in the formation and stability of nations. This value was clearly stated in the Universal Declaration of Human Rights: “The family is the natural and fundamental group unit of society and is entitled to protection by society and the State” (Declaration of Human Rights, 1948, Article 16).

The immigrants coming to the US from Europe had been separated from their relatives in the war, and one could argue that there was sensitivity towards the reunification of these families. Certainly WWII had a tremendous impact on the conscience of humanity. It was a wake up moment that emphasized the most important things in the lives of human beings, family being one of those important things.

The INA of 1952 was amended in 1965; other amendments were introduced in subsequent years (Public Law 89-236; 79 Stat. 911). In the amendment of 1965, the national origin quotas were removed and the system of preferences quotas were re-distributed: "In place of nationality and ethnic considerations, the 1965 Act substituted a system based primarily on reunification of families and needed skills” (Congressional Research Service Library of Congress, 1980). In the INA, the definition of family is narrowly construed such that only

immediate family members can immigrate and there is an underlying assumption that there is a biological relationship between them. For example, in defining the terms ‘parents’, ‘father’, or ‘mother’ the INA conditions the definition on the child. A person is a ‘father’ or a ‘mother’ under INA law if their child meets any of the following criteria: (1) s/he is born in wedlock which begs for the presumption of paternity assumption that will be described later; (2) s/he is a stepchild so that the child has a biological connection to at least one parent; (3) s/he is adopted with adoption being a legal representation of biological ties; (4) s/he is a child legitimated under law; or (5) s/he is born out of wedlock but ‘the benefit of immigration is sought by virtue of the relationship of the child to its natural mother or to its natural father if the father has or had a bona fide parent-child relationship with this person’ (Hart-Celler Act of 1965, 1965). A bona-fide relationship describes a relationship where there has been constant communication between father and son, and the father has actively participated in the life of the child. Although the word biological is not mentioned in the INA, the categories stated above imply the existence of some sort of biological connection to either the mother or the father, except in the case of adoptions.

The INA of 1952, with its amendments, remains the law that oversees the current immigration system and the family reunification process in immigration. The law has been divided into different regulations that govern immigration. These regulations are found in Title 8 of the Code of Federal Regulations (8 CFR). Part 204 in the 8 CFR pertains to the regulation of family petitions in immigration.

At the time the INA was being amended in 1965, there were also refugee acts (1975-1980) that were being passed to absorb many of the refugees who were coming from different

parts of the world. The refugee acts that had been passed after WWII were “orphan Acts” that temporarily extended a hand to refugees. They did not provide a permanent immigration quota for them. But, starting with the Refugee Act of 1977, legislation focusing primarily on giving refugees permanent residency in the US was passed, making the refugee immigration and their family reunification another category in immigration law (Congressional Research Service, Library, 1952-1986, p.77).

### **Role of Documents and Biology in Establishing Identities and Relationships**

The progression of immigration laws highlights the shift in how the purpose of immigration was viewed over time, from its origins as economic and labor contributions to building a new society, to the contemporary view as more of a personal benefit to those who come to the US. Those who wished to claim this personal benefit had to show not only that they met the requirements, but also that they were the person whom they claimed to be. Scrutinizing the identity of immigrants, especially during WWI and WWII, was considered important, not only for the safety of the country, but also to uphold the integrity of the immigration laws and system (Zolberg, 2006; Robertson, 2009).

Since the early beginnings of the US immigration system fraud became a systemic problem. Maintaining the integrity of the system required establishing an identification and verification system in which documents stood for a person’s identity (Robertson, 2009). The concept of identity and its representation was transformed. The document with its facts, signatures and seals represented the official truth about a person’s identity and the recognition of that truth by an official. “Proof of identity was no longer the product of an individual’s personal

character and the authenticity of personal claims,” which family members or friends could attest to (Robertson, 2009). It was an institutional creation made from a collection of facts established by evidence. As Robertson describes it, documents functioned as the “memory” of the government allowing what he calls an “impersonal trust” to form between individuals and the government.

This required that particular kinds of evidence be accepted as trustworthy, for example birth certificates, passports and visas. For this to happen, the concept of evidence had to be developed and the authenticity of a documentary system developed and accepted by all nations (Torpey, 2000). Both of these things occurred in the early 20<sup>th</sup> century. Documents became the most important type of evidence to prove identity in immigration. It was the currency of immigrants. But, documents sometimes proved to be unreliable. Therefore, when scientists introduced blood as a type evidence that could speak the truth, it was not long before it was applied to cases in immigration. As a matter of fact, it could be argued that biometrics, the identification of humans via the measurement of body traits, started at the turn of the 20<sup>th</sup> century.

## **From Blood Testing to DNA Testing**

### **Introducing Blood Group Testing in Family Law**

The application of genetic tests to prove family relationships in immigration began at the turn of the 20<sup>th</sup> century when the ABO blood groups and their Mendelian inheritance were discovered (Landsteiner, 1910). A 1921 newspaper article titled, “Blood as Clue to Parentage,” presented a scenario in which blood-grouping tests could be useful not only in blood transfusion, as was the

original intention, but also to solve disputed paternity cases (Waterbury, 1922; Landsteiner, 1910; de Biasi, 1926). Dr. Landsteiner, who discovered the human blood groups, agreed that his work “opened a new field in the establishment of the paternity of children” (Landsteiner Tells of Blood Test Uses, 1930). As the immigration system was being formed and restrictions were being passed, US courts were dealing with their own problems, one of them being the increasing number of illegitimate children who were left at the mercy of the state.

In the early 1900s, the problem of illegitimate children was a policy concern for states and the courts. It was estimated that 32,400 illegitimate children were born in 1915, most of whom ended up living in poverty or became homeless because they lacked family recognition, economic support from their fathers, and the right to an inheritance (Grossberg, 1985). During this time, several changes were occurring in the family structure that were reflected in the modifications of the law. One of them was the revision of bastardy laws to give states the authority to mandate paternal support for illegitimate children (Grossberg, 1985). However, in the absence of convincing evidence other than physical resemblance to show the biological relationship between a father and a child, it was difficult for the state and women to win paternity disputes. “At the heart of paternity hearings, then, was the ancient problem of how to find fathers when men refused to come forward” (Grossberg, 1985).

As early as 1921, courts began admitting blood-grouping tests as evidence in paternity disputes. For example, it was used in the case of Mrs. Rose Vitorri whose former husband denied being the father of her child and consequently refused to pay alimony. The court subjected Mr. Vitorri to a blood test which showed he was the father even though he had denied it many times.

Judge Graham, who presided over the case said, “I consider this (blood grouping test) one of the biggest things established by medical science in years” (Settles Paternity by Test of Blood, 1921). However, there was a “cultural lag” of 10-20 years before the courts completely accepted the validity and reliability of blood group testing as evidence because family law was at its infancy and the use of blood grouping as a medico-legal tool in paternity cases was disputed, primarily because the science had not been well established (Britt, 1937-1938). Also, most courts were following the *Frye* standard, which required that scientific evidence be admitted in the courts only if it had been accepted by the scientific community (Mueller & Kirkpatrick, 2003). There was substantial argumentation in the scientific community about the accuracy and validity of blood grouping tests (Galton, 1937-1938).

Nonetheless, by the late 1940's scientists were supporting the usefulness of blood group tests and several states passed bills in the legislature to introduce testing in the courts (Gov. Lehman Signs Three Blood Test Bills for Use in Paternity Cases and Some Crimes, 1935). The US, however, was a late adopter because by the time blood testing was introduced in the courts, several European courts, with the German courts being the first, had already been accepting blood group testing to resolve cases of paternity (Britt, 1937-1938).

### **Blood Group Testing Spills over to Immigration**

As society and the federal courts accepted blood-group testing as a valuable tool in providing reliable evidence about paternity, the practice spilled over to immigration. Blood testing in immigration was first used in Chinese immigration cases where the China-born sons and daughters of Chinese US citizens claimed US citizenship via their parents residing in the US. In

1952, the US embassy in Hong Kong recommended that immigration officials use blood testing as a tool to solve the immediate problems they were confronting with Chinese family petitions. Prior to that year China was recuperating from the ravages of a civil war which ended in 1949 when the Communist Party of China took over, closing all the US embassies except those at Taipei, Hong Kong and Formosa. Many Chinese people flocked to the US embassy in Hong Kong, desperate to leave the country. In the case *Matter of LKH, LKC, LMW vs. the Department of Justice Board of Immigration Appeals* (1955), an immigration official testified that the use of blood testing in immigration proceedings was the result of “a tremendous need” in verifying the information in the family petitions that were being filed at the Hong Kong embassy. Immigration officials did not have the resources or the ability to track the family connections of individuals, since many of the villages had been destroyed. They could not verify the testimonies or documents of many claiming to have blood relations with US citizens. Most did not even have documents. Lack of documentation, cultural differences and language barriers made it difficult to solve this problem.

*Applicants from all over China descended upon the Hong Kong consulate claiming to be sons of United States citizens, most of them inadequately documented, and most of them from the interior of that great country. The problem of checking the thousands of claims for authenticity seemed almost unsolvable. Government witnesses testified that the use of blood tests in this emergency by the State Department came to the attention of the immigration authorities in this country when the United States consul at Hong Kong asked the Immigration Service for assistance in securing information regarding blood grouping of persons living in this country and seeking to bring alleged offspring to the United States. The Immigration Service then adopted the method for use in some of its proceedings. The use of a new scientific device must begin somewhere. The fact that blood tests have been used primarily in cases involving applicants of Chinese descent does not mean that the use of such tests in the future will be limited to such persons. Occasionally cases involving persons of other descent come to our attention where there is a question of parentage, and the proof of the relationship is inadequate. Since blood testing has become more widely known to Immigration and State Department personnel*

*we have no doubt that the tests will prove valuable in non-Chinese cases as well. Before blood tests might be used universally in immigration work to assist in the detection of imposition it was necessary to secure their acceptance by the courts. (In the Matter of LKH, LKC, and LMW, 1955)*

Therefore, blood testing became a reasonable solution to a situation nobody knew how to handle.

*Skillful 'coaching' makes detection of fraud difficult and the courts sometimes find records of 'discrepancies' unsatisfactory evidence. We have had to rely also on other unscientific evidence, such as 'family resemblance' and old photographs, which may or may not be authentic. It is inevitable that mistakes have occurred. Some citizens have brought into the United States surprising numbers of their alleged progeny, while other rightful claimants may have been refused admission. The cost in time and money to the claimants, the government and the shipping companies (who, under the law must pay the costs of the applicant in detention and the cost of returning him to his port of departure if he is excluded) has been enormous. We are not justified in refusing to accept a method, proved, scientific and now widely recognized, which will assist in reducing the burden on the government in even a limited number of cases. (In the Matter of LFFs, 1953)*

As it will be discussed later, there were several legal issues that surfaced in the Board of Immigration Appeals (BIA) and district courts as blood testing was implemented in the immigration system. However, as trust in the science increased, blood group testing became more accepted, especially with improvements in the technology that increased the precision of the test. The use of the test was permanently codified in the regulations (8 CFR § 204.2(vi)), giving immigration officials the authority to require blood testing in cases where they could not determine the truth about a claimed relationship.

### **Opening the Gates**

After the 1952 passage of INA, the US re-opened its gates to the world. Waves of refugees and immigrants from non-European countries started coming to the US (Hirschman 2005). After becoming citizens or permanent residents, they also became petitioners for their family members.

Some petitioners lacked the necessary documents because they came from countries where documents were not commonly available or required. Others, who did have the necessary documents, encountered difficulties because sometimes the information in their documents was incomplete. For these reasons proving identity via documents remained difficult. As a result, immigration officials kept using blood testing to prove blood relationships in some cases, but the scientific community started realizing that the test was not as accurate as originally thought (Bryant, 1988). As technology advanced, other scientific techniques to test paternity were developed: serologic testing of the Human Leukocyte Antigen (HLA) in the 1970's, and DNA fingerprinting (Restriction Fragment Length Polymorphism) in 1985 (Jeffreys, Wilson, & Thein, 1985; Ellman & Kaye, 1979).

However, the US was a late adopter of DNA fingerprinting. The technique was discovered in England and used there for the first time to prove the biological relationship between a boy and his mother in an immigration case (Jeffrey, Brookfield, & Semeonoff, 1985). The case was successful. As a result, England and other European countries proceeded to introduce the test in their immigration systems (Barata, 2012). The US hesitated in introducing such testing as a tool in immigration until 2000 (Cronin, 2000).

Some of the reasons that led the US to finally introduce DNA testing were an increase in documentary fraud, lack of documentation from some immigrants, and a concern about national security. The US has seen document fraud increase in the past years in immigration (Wasem, 2007). Documents are fabricated and used to misrepresent relationships, entitling individuals who are otherwise disqualified to receive immigration benefits. Document fraud is a ground for

inadmissibility in immigration law (Cronin, 2000). It compromises the national security of the country and it facilitates the trafficking of humans. Identifying and prosecuting immigration fraud consumes time, money and trained personnel that could be used to solve other immigration issues (Wasem, 2007). A genetic test, which is faster than vetting papers and costless for the government, may serve as a deterrent against fraud in family petitioning. It makes applicants think twice about falsifying documents and misrepresenting their identity to apply for immigration benefits. Especially now, after terrorist attacks that have targeted some countries including the US, the immigration system is vigilant and careful about whom they let in.

### **Blood Typing and DNA Testing in the Courts**

The cultural, political, and scientific discourses that influenced the formation of genetic testing policies in immigration are reflected in the current DNA testing policy and in the legal challenges to use biological tests as evidence of family relationships. To better understand this discourse, I reviewed and analyzed in chronological order, 74 legal cases to characterize the issues that arose during the implementation of genetic testing (both blood typing and DNA testing) in the courts, and how the courts decided on their outcome. The following section will discuss the themes found in these cases and how their precedents are embedded in the US DNA testing policy.

### **Disproportionate Use of Blood Testing in an Ethnicity is not Racial Discrimination**

When immigration started using blood typing in Chinese cases, one of the first questions that arose was whether its use was discriminatory; specifically whether the government had the constitutional right to disproportionately test a specific race. In *Matter of LCS vs. BIA* (1954), the

plaintiffs argued that immigration asked them to provide blood testing to prove their claimed relationships because they were Chinese. The BIA court said that the use of blood grouping tests on Chinese applicants was not based on race but on the circumstances which “Posed such great obstacles to investigation by ordinary means into family history and evidence of parentage.” Therefore, the use of evidence such as blood typing was “an entirely reasonable requirement” and not a matter of racism. In *Margong v McGranery* (1952), *DWO and DWH vs. BIA* (1953), *Ly Shew v. Acheson* (1953) and *Lue Chow Kon vs. Brownell* (1954), the BIA judges elucidated the problems immigration officials were encountering while trying to establish the claimed relationships in Chinese cases. In *Ly Shew v. Acheson* (1953) the BIA court commented that it, “Does not find that the plaintiffs and their witnesses are not telling the truth. But rather cannot tell whether they are or not.” Immigration officials could not evaluate the truth because they did not speak the language and lacked an insufficient understanding of the Chinese culture to evaluate the testimonies.

Truth and evidence are prevalent themes that appear in immigration cases during this time period. Finding the truth was intricately tied to the responsibility that immigration officials and the BIA court had to protect the gift of citizenship. “But as a court, we are guardians and custodians of a precious fund. Every American citizen has the right to demand that we do not dispense the fund except to those who are unequivocally entitled to share it” (*Ly Shew v. Acheson*, 1953). The words ‘*unequivocally entitled*’ refer to the biological family members of petitioners. In the history of the US, and other European nations, biology is deeply connected to the concept of citizenship and nationhood (Torpey, 2000). Citizenship was threatened by fraud,

and blood testing could “absolutely exclude the possibility of paternity in certain cases.” (*Ly Shew v. Acheson, 1953*)

When similar cases were heard by the federal courts, the courts supported the decisions of the BIA judges. The circuit Court of Appeals in New York and California in the cases of *Kon v. Brownell (1955)*, *United States ex rel. Dong Wing Ott (1995)* and *Dong Wing Han v. Shaughnessy (1955)* agreed that blood testing in immigration was not an issue of racial discrimination. It was an issue of immigration officials requiring better evidence to prevent fraudulent claims. The court concluded that the burden of proof was on the appellants to prove their biological relationship to be able to attain the immigration benefit and that blood-grouping was an acceptable way to do this.

Furthermore, the court stated that blood-grouping evidence was already “admissible under the New York Civil Practice Act, section 306 (a),” and “under Rule 35 of the Federal Rules of Civil Procedure” (*In the Matter of LKH, LKC, and LMW, 1955*). Many courts, especially New York courts were already embracing the use of blood evidence for paternity cases in family law. Moreover several states were passing bills so that blood tests could be used as evidence of paternity in courts (*Associated Press, 1935*). Therefore, to a certain extent, federal courts were already conditioned to see this type of evidence as a tool in family law cases and did not object extending it to immigration law. In *Kon v. Brownell (1955)*, the District Court of New York explained that immigration “could use blood tests to prove non-paternity since use of the test is not limited to the male in a matrimonial or bastardy case.” The question then became

whether the presumption of paternity could stand against blood-group testing in immigration as it did in family court.

### **Presumption of Paternity does not Apply in Immigration**

The BIA and federal courts decided that the presumption of paternity did not apply to immigration cases. This presumption had been used by courts for centuries to protect the best interests of the child and the family. It is still used today in many family law cases although there is reason to argue that genetic testing is diminishing the importance of the presumption of paternity in the courts (Rothstein, Murray, Kaebnick, & Majumder, 2005). In the past, this presumption, “Elided the biological facts in an era in which they were unknowable” (Dolgin, 2000, p.527). Through the presumption of paternity, “Courts determined paternity by relying on a presumption about biological facts. Under common law, the husband of a married woman was presumed to be the biological father of her child, and was therein proclaimed that child’s legal father” (Dolgin, 2000, p.527).

Three BIA cases set strong precedents in immigration about this issue. In *Matter of LFF* (1953), *Matter of DWO and DWH* (1953), and *Matter of LCS* (1954), the BIA court decided that “the presumption of paternity has no place in immigration proceedings, where the issue is one, not of legitimacy but of identity” (Matter of LFF, 1954). The district and appellate courts upheld this decision in *United States ex rel. Dong Wing Ott v. Shaughnessy* (220 F.2d 537; 245 F.2d 875).

Here we see the courts separating the purpose for which blood testing was used in immigration from the reason for which it was used in family law. In so doing, the court denied

the precedent that decisions in family law cases could have on immigration cases. The court argued that the central question in immigration is not, *Who is your father?* but *Who are you? Are you the person that the petitioner claims you to be?*

For immigration purposes, identity is what Nordgren (2008, p 259) calls a “unique set of properties” that prove who you are. If the petitioner is claiming the beneficiary to be his son, the identity of the beneficiary is then verified through the properties that the petitioner and beneficiary share, in this case blood. The goal of verifying identity is to make sure that the benefit of immigration and ultimately citizenship is conferred upon the right person. That is not to say that the courts did not take into considerations the relationship between the petitioner and the beneficiary, especially in the cases of children, but it gave more weight to finding the truth about family claims placing a value on the deeply rooted biological connections in families. When documents did not support the identities of individuals who claimed to be part of these connections, blood testing provided a more reliable type of evidence -- a scientific, quantitative type of evidence. Despite the fact that the courts agreed that immigration could use blood testing, the question became how much weight to give the test results.

### **Blood Testing has Weight as Evidence**

Early on, the BIA went through the process of deciding the proper weight that needed to be given to blood tests. The case that set the precedent was the BIA case *In the Matter of LFF* (1953). In this case, the BIA judges considered the weight that blood tests should be assigned as evidence in a case. It concluded, after taking into consideration federal court cases and the scientific literature on the subject, that blood grouping tests, properly performed by competent technicians,

can disprove paternity conclusively in cases where there was incompatibility of blood. This case was cited in many BIA cases during the 1950s, and opened the door for the expanded use of scientific evidence, such as blood group testing, in immigration to prove relationship claims.

While the BIA considered blood-grouping tests admissible as evidence, it did so based on the circumstances of the case, so that the testing was not applied to every case but on a case by case basis, with immigration officials deciding when to ask for testing. The BIA court also said that individuals conducting the blood tests should have a certain amount of expertise, and that tests should be regarded as evidence only when they definitively exclude the relationship. Nonetheless the BIA gave blood-grouping testing a lot of weight compared to other types of evidence.

*Blood tests are standard, scientifically accepted, objective methods for determining non-paternity and their results are unanswerable if they are conducted by a person competent and experienced in making such experiments. However, the test shall be considered to be evidence only where definite exclusion of paternity is established and where the test is taken under approved conditions. By their very nature the theory of them must be accepted without reservation, or it must be rejected in its entirety. To hold that the results of the tests are mere expert opinion or evidence to be weighed with other evidence would be to fail to comprehend their true nature and meaning. (In the Matter of LFFs, 1953)*

Federal court decisions, such as *Ying v. Dulles* (1956), also considered blood testing a conclusive type of evidence to exclude paternity. Although the BIA and federal courts accepted blood testing as evidence, giving it weight, the question of accuracy remained opened. The argument of accuracy prevailed in the BIA. This brought the topics of expertise, training and interpretation under discussion. There were discussions about what training somebody should have to be considered an expert in interpreting blood tests. For example, one expert who was frequently called upon in many cases was Dr. Alexander Wiener. He was considered the expert on blood

testing after getting his Ph.D. in the field of Immunology and extensively publishing reports and papers which helped the BIA and federal courts interpret blood testing results (United States Department of Justice v. NG, 1966). After much discussion, the BIA in New York -- which was the major port of entry during the 1950s -- decided to put together an expert panel that could be called upon to analyze test results and testify about the validity of results in BIA cases. Expert opinions became highly regarded. The value placed on the authority of experts to interpret and determine blood typing reflects the discussions that were taking place at that time concerning the type of evidence that could be admissible in the courts. The court's decision was that blood tests performed and interpreted by capable experts could provide the truth.

#### **Other Issues Decided by the Courts**

There were other issues that had to be decided by the courts which set a precedent for the current use of DNA testing. One of them was whether immigration officials were violating the body of immigrants by taking their blood. In *Kon v. Brownell* (1954) the district court of New York concluded that blood typing fell under a physical examination, which the government gave the BIA the power and authority to do. Therefore, the BIA was not invading the bodies of immigrants, but was merely asking for a blood test that was also taken for physical exams.

Furthermore, blood testing was voluntary. The petitioner was not obliged to do it. The responsibility of meeting the burden of proof, if documents could not prove the relationship, laid with the petitioner. In *Dulles v. Quan Yoke* (1956), the district court of California determined that petitioners and beneficiaries could not be coerced into submitting a blood test. As a matter of

fact, the results of the blood test could become inadmissible as evidence if there were signs of coercion.

### **Decisions from Blood Testing Cases Reflected in the DNA Testing Policy**

Many of the decisions made during the implementation of blood testing in immigration during the 1950's are reflected in the current DNA testing policy. The policy's rationale for testing, the use of experts or independent laboratories to conduct the blood tests, the emphasis on the testing being voluntary, and the petitioner paying for the test result were issues that were decided by the BIA and the federal courts 62 years ago.

The policy also reflects a lot of the cultural values expressed in these early cases, for example, the value of reunifying families and in searching for the truth of their claims so that the benefit of immigration could be justly conferred on those with a right to it. There was also an emphasis placed on the accuracy and importance of scientific technology as evidence. All these themes are seen in the DNA testing policy. Therefore, the current use of DNA testing represents the evolution of a scientific technology applied to circumstances similar to those encountered by the immigration system in the 1950's.

It seems that the blood-grouping cases of the 1950's established so many precedents that it is harder to appeal DNA testing cases to higher courts. In my analysis, I examined which courts over time were involved in hearing immigration cases in which biological testing was used. Of the 74 cases, 38 involved blood group testing, and 15 of those cases were reviewed in higher courts. However, none of the 23 cases involving DNA testing were appealed in higher courts; all stayed within the domain of the BIA.

Many of the DNA cases that were appealed to the BIA represent petitioners who decided not to get a DNA test and were contesting the decisions of immigration officials to terminate their application because of insufficient evidence. The BIA often determined that the petitioner did not have enough evidence of the relationship and, therefore, was left to either choose to submit a DNA test or provide more evidence that would support their claims. All cases emphasized that the burden of proof was on the petitioner to prove the relationship. Some plaintiffs appealed to the BIA to argue the cancellation of their applications because their test results fell under the 99.5% threshold that is required to prove the relationship (Cronin., 2000). In *BIA vs Maria Janice Phillip* (2008) the plaintiff argued that the 99.5% threshold was unjust and unreasonable. The court responded that the threshold is based on the criteria of experts and has a scientific rationale:

*In addition, in response to the petitioner's argument that the 99.5% standard required by the DHS for DNA evidence to establish the claimed relationship is arbitrary and capricious, the DHS should explain why it has adopted the 99.5% standard which this Board notes is the standard adopted by the American Association of Blood Banks, the entity that certifies lab companies engaged in DNA relationship testing. Accordingly, the record is remanded to the district director for further consideration in accord with this decision. (BIA vs. Maria Janice Phillip, 2008)*

## **Conclusion**

The evolution of the current DNA testing policy was molded by the evolving culture, ideas, and values of the United States [ Figure 1]. The progression of immigration laws highlights the shift in how the purpose of immigration was viewed over time, from its origins as economic and labor contributions to building a new society, to the contemporary view as more of a personal

benefit to those who come to the US. The values of wave after wave of immigrants, particularly the value they placed on being with their families lead to an immigration policy that recognizes the need for and benefit of family reunification.

Time and again, the one consistent thread across the waves of immigration was the value that immigrants put on their families, and their desire to be with them in their adopted country. This need was recognized both by society and policy makers. Indeed, family reunification has always been an integral necessity reflected in the immigration policies of the US.

In exercising its right to national sovereignty, the federal government centralized the control of immigration under its domain. Echoing societal and security concerns over immigration, the federal government established and tightened regulations of who would be allowed into the country. With this increase in regulation came the need to establish and verify the identity of those entering the country. At first, the word of family members was considered sufficient. However, as the need for stricter control over the borders increased, the need for more rigorous, document-based proof emerged.

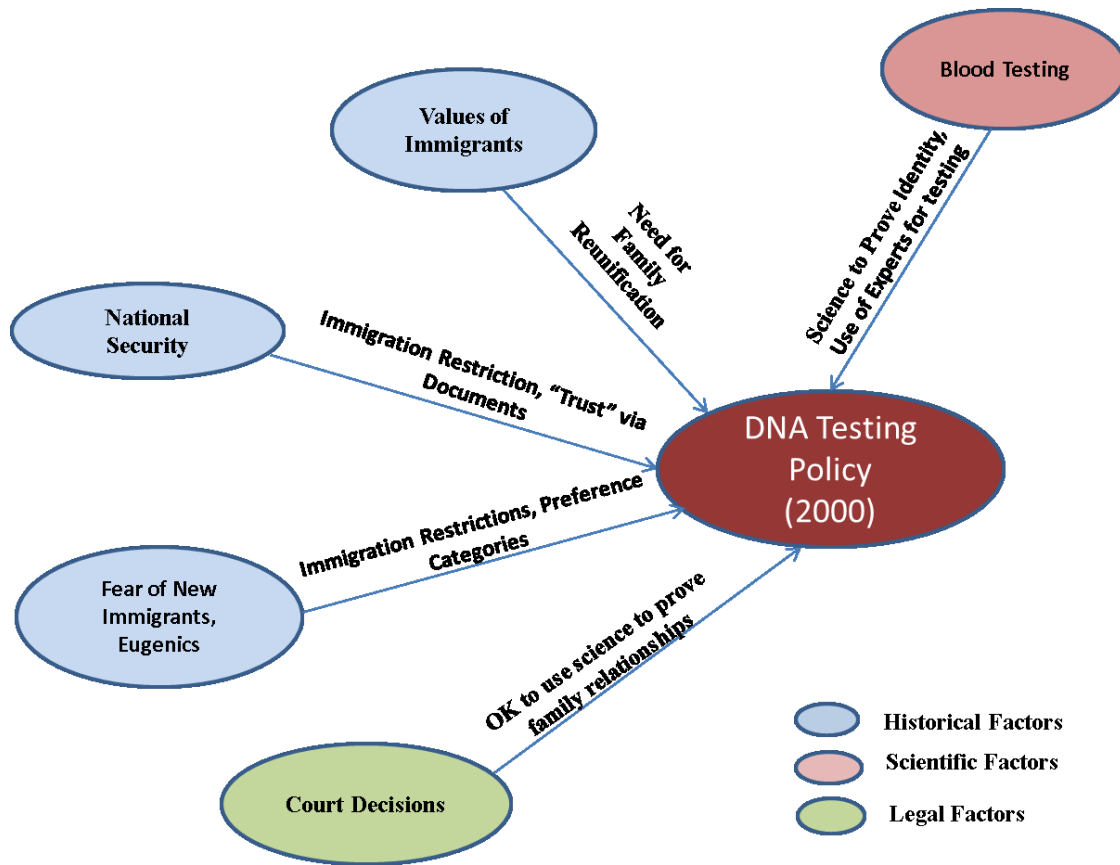


Figure 1. Summary of factors that have contributed to the formation of the DNA Testing Policy

As genetic technologies developed, they too became established as a way to verify identity. The use of blood testing in family law opened the door to its use in immigration cases. Following initial tentative use, it was eventually firmly established by the BIA and federal courts that blood testing could be used to supplement or replace documents as evidence of relatedness.

Blood testing paved the way for other, future scientific tests, including HLA testing and finally DNA testing. Many of the procedures used to implement DNA testing were transferred directly from the way blood testing was implemented in the immigration system.

These include the voluntary nature of the test, reliance on experts to define, conduct, and interpret tests and test results, and the petitioner's responsibility to pay for the test.

In this chapter, the development of the DNA testing policy in family reunification was traced in an attempt to give better understanding of how and why the DNA testing policy was introduced into the immigration system. In tracing the discourses that lead to the current implementation of the DNA testing policy in family reunification, we can clearly see the reflection of the values, thoughts, decisions that came before. In understanding each of the threads of this tapestry, the assumptions and goals of the various components of the policy become clear.

## **Chapter II – The Science of DNA Testing in Immigration**

### **Introduction**

DNA testing is considered a useful tool for family reunification in immigration (Cronin, 2000; US Department of State Foreign Manual, 2011). Indications are that usage of this testing is increasing, as can be inferred from the fact that as of 2005, 97% of parentage testing laboratories in the US conducted DNA testing to prove relationships in immigration (Relationship Testing Program Unit, 2005). Although statistics about the most frequently used testing are not available, in one laboratory 95% of the immigration cases were for parentage testing, and 5% for sibling testing (Wenk, 2012). This chapter addresses the strengths and limitations of the DNA test in the context of immigration. The goal of this chapter is to discuss the factors that may influence the accuracy of the DNA test. First, the general characteristics of the test and its implementation will be examined. Then some of the factors that may affect the test's sensitivity and specificity, and therefore its interpretation, will be discussed. The focus of the discussion will be on parentage testing, since it is the most prevalent in immigration.

### **Overview of the DNA Testing Process**

#### **Use of DNA Testing in Immigration**

DNA testing is used in immigration to verify claimed family relationships within the family reunification process (Cronin, 2000). Through this administrative process, first-degree relatives and half-siblings of US citizens and legal permanent residents (LPR) may be granted the benefit of immigrating permanently to the US (Hart-Celler Act of 1965, 1965). First degree relatives

refer to fathers, mothers, and full-siblings. They are called first degree relatives because these individuals share the most genetic information between them compared to other relatives. That is, they share on average 50% of their genes. Half siblings, who are second degree relatives, share on average 25% of their genes (Blouin, 2003).

US citizens and LPRs (the *petitioners*) who petition for a relative to be granted entrance into the US must have proof of their family relationship with that relative (the *beneficiary*) (Hart-Celler Act, 1965). The assumption is that beneficiaries are biologically related to the petitioner, with the exception of spouses and relatives who have been legally adopted. Proof of relationship is usually accomplished by submitting primary documents such as birth certificates. When primary documents are not available, secondary documents such as affidavits can be used (Hart-Celler Act, 1965; Cronin, 2000). However, immigration may suggest DNA testing in some cases (Cronin, 2000; Aytes, 2008). This usually happens when documents are missing, fraud is suspected, or documentary information is incomplete or suspected of being incorrect (Cronin, 2000).

The United States Citizenship and Immigration Services (USCIS) continues to accept other types of testing such as blood typing to prove parentage. However, they encourage DNA testing over other types of testing because the test is more accurate; the sample collection is easier and less invasive compared to blood drawing; DNA samples are easier to store and transport, and 99.6% of the US laboratories accredited to do parentage testing for immigration are using DNA testing technology (US Department of State Foreign Manual, 2011; Relationship Testing Program Unit, 2008).

When DNA testing is used, the standard threshold for proof of parentage is a probability of 99.5% or above (US Department of State Foreign Manual, 2011; Cronin, 2000). While this threshold marks the standard, the policy also includes room for interpretation: adjudicators are cautioned that DNA testing “does not necessarily yield conclusive results” (Cronin, 2000; US Department of State Foreign Manual, 2011). The DNA testing policy in immigration mentions that not all results above 99.5% are a conclusive proof of parentage and not all results below 99.5% may prove non-parentage (Cronin, 2000; US Department of State Foreign Manual, 2011). The goal of this chapter is to discuss the factors that may influence the accuracy of the DNA test and provide the context for understanding the policy’s cautionary language.

### **Sample Collection**

When a petitioner and beneficiary decide to get a DNA test, the petitioner has to choose a parentage testing laboratory in the US that has been accredited by the American Association of Blood Banks (AABB) (Aytes, 2008; AABB, 2012). Immigration officers only accept test results from these laboratories. Paying for the testing is the responsibility of the petitioner (Cronin, 2000), and may range from \$200 to \$1000, or more, depending on the number of persons tested, and the type of testing (e.g. parentage or sibling). The cost of the test also varies across laboratories (Panke, Donnenfeld, & Wilkins-Haug, 2011).

Laboratory personnel collect DNA samples in person from the petitioner. For the beneficiary, the lab sends a DNA testing kit to the embassy or consular office in the country in which the beneficiary is residing (US Department of State Foreign Manual, 2011). There, an

authorized American official witnesses the sample collection by a designated laboratory technician (US Department of State Foreign Manual, 2011).

DNA samples are collected using buccal swabs, rubbing the inside of the cheek with a piece of cotton to dislodge the cells. This method is preferred over blood drawing because it is easier to do, it is less invasive, the sample does not need immediate refrigeration and is at less risk of degradation (US Department of State Foreign Manual, 2011).

The beneficiary's sample goes through a strict chain of custody to protect its integrity. This includes verifying and confirming the identity of the petitioner and beneficiary (Aytes, 2008; US Department of State Foreign Manual, 2011). The sample is then sent to the same laboratory as the petitioner's for analysis.

### **Analysis of the DNA Sample**

#### **Single Tandem Repeats**

DNA is extracted from the cells that were collected in the buccal swab. Polymerase chain reaction (PCR), a molecular technique, is used to make many copies of specific regions in the DNA: 99.9% of human DNA is the same in all humans; only 0.1% of our DNA varies from individual to individual - these regions contain polymorphisms (Shastry, 2002). A polymorphism is a segment in the DNA sequence that tends to vary between unrelated individuals and within and across populations (Strachan & Read, 2004). It is this variation or polymorphism that is targeted to study relatedness. The principle is that related individuals, compared to unrelated individuals, are more likely to share many of the same polymorphisms due to inheritance.

The most common type of DNA polymorphism examined in relationship testing is called *length polymorphism* (Butler 2005; Panke, Donnenfeld, & Wilkins-Haug, 2011). One type of length polymorphism is called a single tandem repeat (STR). This type of polymorphism is characterized by a single, short DNA sequence (e.g. AGAT) that repeats itself many times in the same location or locus in the DNA. The size and length of the repeating sequence varies, producing different kinds of STRs or *alleles* [Figure 2] (Butler, 2006) Particular STRs are also called *STR markers*. This is the term that will be used in this chapter.

STR markers are commonly used to measure relatedness. These markers are used because they are very *polymorphic*. That is, each marker has many alleles in the population. Good markers have this characteristic, which is important because it makes it less likely that two unrelated individuals in the population will carry the same alleles for any particular marker.

Most laboratories use the same 13 STR markers to test for parentage [Table 3]. The use of these particular markers has become a standard for several reasons. One, they have been well characterized as they have been used for at least 15 years by the FBI's Combined DNA Index System (CODIS) to identify individuals (Butler, 2006). CODIS is the national genetic database system for criminal investigations in the US (Butler, 2005).

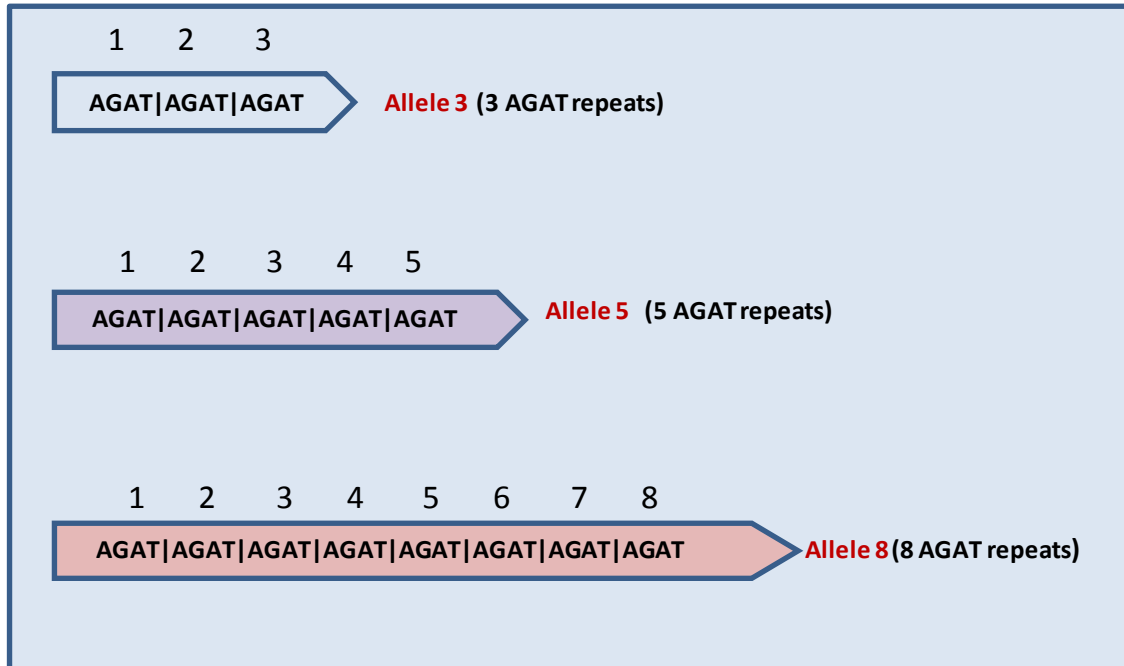


Figure 2. DNA Length Polymorphism. This figure shows three length alleles for STR marker D5S818, which has an AGAT repeat sequence.

Two, companies have developed commercial kits which allow laboratories to PCR all 13 markers at once saving the lab time and trouble. In addition to these markers, laboratories also use other STR markers, such as the amelogenin locus, which tests for gender (Butler, 2005).

Table 3. 13 STR markers commonly used by US laboratories for parentage testing (Butler, 2005)

STR marker name	Repeating Sequence	Allele length ranges
<b>CSF1PO</b>	TAGA	5-16
<b>FGA</b>	CTTT	12.2-51.2
<b>THO1</b>	TCAT	3-14
<b>TPOX</b>	GAAT	4-16
<b>VWA</b>	[TCTG][TCTA]	10-25
<b>D3S1358</b>	[TCTG][TCTA]	8-21
<b>D5S818</b>	AGAT	7-18
<b>D7S820</b>	GATA	5-16
<b>D8S1179</b>	[TCTA][TCTG]	7-20
<b>D13S317</b>	TATC	5-16
<b>D16S539</b>	GATA	5-16
<b>D18S51</b>	AGAA	7-39.2
<b>D21S11</b>	[TCTA][TCTG]	12-41.2

#### Determining Parentage using STR markers

To determine parentage, laboratories look at the alleles of 13-15 markers in the DNA of the alleged father, mother and child. Each child has 2 alleles for each STR marker. This is because, for each marker, the child inherits one allele from the mother and one from the father. If the child inherits the same STR allele from each parent, then the child's genotype is *homozygous*. The *genotype* of a child is the specific allele combination that the child has for each STR marker [Figure 3]. The word *genotype* is also used as a verb to indicate the action of finding, through molecular techniques, the specific allele combinations in an individual. If the child inherits two different alleles, then the child's genotype is *heterozygous* for that marker. The laboratories look at the genotype of the child and try to trace each of the alleles back to the father and mother.

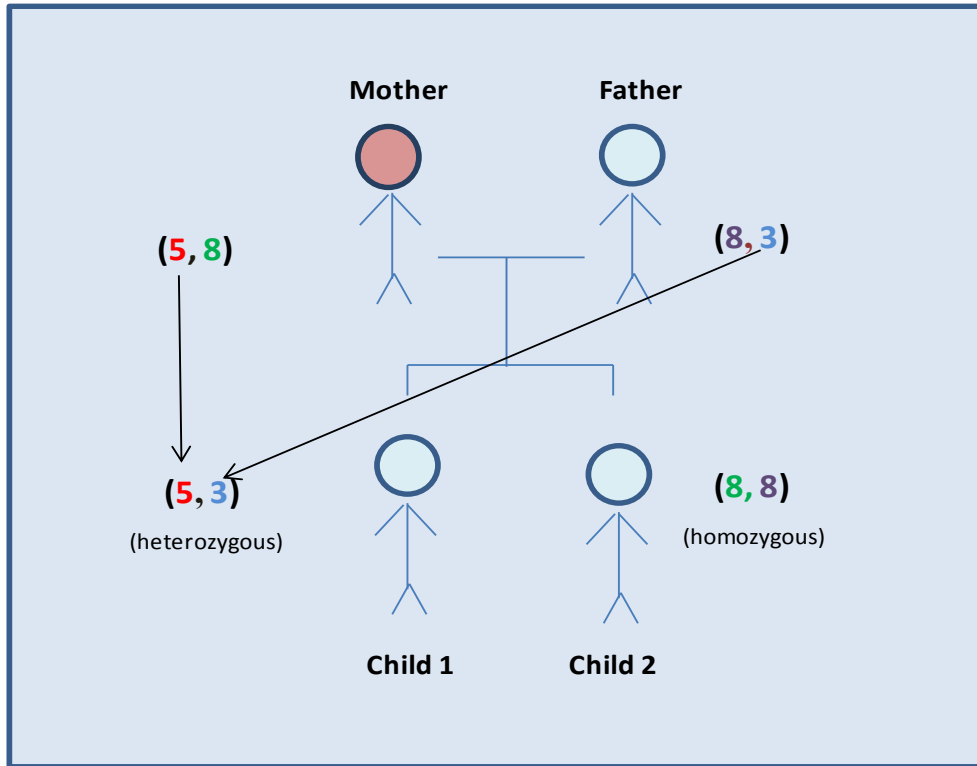


Figure 3. Genotypes for STR marker D5S818. For example, child 1 has inherited allele **5** from his mother and **3** from his father. His genotype is **(5, 3)**.

As an example, in Table 4 we examine Susan's genotype as proof of the alleged biological relationship as the child of Charlie and Mary. We can see that for each STR marker in the table, Susan has one allele in common with Charlie and one with Mary. For this reason we can infer from just looking at the genotypes that Susan might be the daughter of Charlie and Mary. However, just looking at the genotypes is not enough because Susan might also be sharing these alleles with her alleged parents by chance. In the population there will be other women and men who might carry these same alleles. Therefore, even if all of Susan's alleles are consistent with her parents' alleles there is still a possibility that some alleles may be shared by chance. To

determine the likelihood of this happening, a likelihood ratio is calculated (more details in section 2.4 below).

Table 4. Susan's genotype: alleles that Susan inherited from Charlie and Mary

STR Markers	Mary's genotype	Susan's genotype	Charlie's genotype	Genotype consistent/ Inconsistent
CSF1P0	1, 3	7, 3	5, 7	Consistent
D3S1358	5, 8	3, 8	1, 3	Consistent
D7S820	2, 3	7, 2	6, 7	Consistent
D18S51	2, 4	2, 10	9, 3	Inconsistent

Despite rules of inheritance, the data are not always completely consistent. For example, there is one allele inconsistency between Charlie's genotype and Susan's genotype. For marker D18S51, Susan inherited allele **2** from her mother. Allele **10** should have been inherited from Charlie, but Charlie's DNA is not carrying the allele **10** for this marker. Therefore, there is an inconsistency between their genotypes. However, a single inconsistency might be the product of a spontaneous mutation in the marker of the child. A spontaneous mutation refers to a change in the DNA occurring on a random basis<sup>2</sup>. The average rate at which mutations occur in these markers is below 0.1%. However, some STR markers such as D21S11, FGA, D7S820, and D16S539 have mutation rates as high as 0.3% (Butler, 2005). For this reason, the cutoff has been set to three inconsistencies. But, if three or more inconsistencies are observed between the genotype of the

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<sup>2</sup> Mutation rates for the 13 commonly used STR markers have been estimated from different studies and compiled by John M Butler in his book *Forensic DNA Typing: Biology, Technology and Genetics of STR markers*, p. 141. The mutation rates for each of the 13 marker are as follows: CSF1PO (0.16%); FGA (0.30%); TH01 (0.01%); TPOX (0.01%); VWA (0.16%); D3S1358 (0.13%); D5S818 (0.12%); D7S820 (0.10%); D8S1179 (0.13%); D13S317 (0.15%); D16S539 (0.11%); D18S51 (0.25%); D21S11 (0.21%)

child and one or both parents, then it is concluded that the father or mother or both are not the biological parents of the child.

### **Calculation of the Likelihood Ratio**

The likelihood ratio, also known as the paternity index (abbreviated as PI), is a ratio of two probabilities: **X** and **Y**. **X** is the probability of the observed genotypes given the hypothesis that Charlie and Mary are Susan's parents. **Y** is the probability of the observed genotypes given the hypothesis that a random man and a random woman are Susan's parents (Evetts & Weir, 1998; Maha, Gahn, & Lee, 2009). To calculate these two probabilities the allele frequencies for the marker's alleles within a given population are estimated. The allele frequency is the proportion of a specific allele in the population (Maha, Gahn, & Lee, 2009). It is calculated by using a population database that is representative of the individuals who were genotyped (Maha, Gahn, & Lee, 2009).

The paternity index is calculated for each marker used. The individual PI's are then multiplied and combined into what is called the Combined Paternity Index (CPI). The following example [Table 5] shows how to calculate Susan's CPI with the PI of each marker. The State Department has determined that the CPI must be 200 or greater to prove parentage (Wenk, 2012). This means that it is two hundred times more likely that the man and woman who were genotyped are the biological parents of the child than a random man and woman from the general population (Panke, Donnenfeld, & Wilkins-Haug, 2011; Maha, Gahn, & Lee, 2009).

Table 5. Example Computation of the Combined Paternity Index.

STR markers	CSF1P0	D3S1358	D7S820	D18S51
PI	2.8758	2.5428	3.6914	1.8932
Susan's CPI	$2.8758 \times 2.5428 \times 3.6914 \times 1.8932 = 51.104$			
Interpretation of CPI	It is 51.104 times more likely that Mary and Charlie are the biological parents of Susan than a random man and woman from the general population. Because the CPI is below 200, Susan would be excluded as the daughter of Charlie and Mary.			

The value of the CPI threshold for establishing parentage is set by the entity requiring the test. Many European countries, for example, have set the CPI to 1000 for purposes of immigration (Wenk, 2012). This is 500 times the PI required by the US. One interpretation of this difference may be that European governments have a higher level of trust in the science to correctly determine the relationship. It may also reflect a greater concern with preventing fraud. By setting the PI at 1000, European governments may be willing to err on the side of exclusion over including families that are not biologically related. The US, on the other hand, may be willing to err on the side of inclusion over dividing families. It may also be acknowledging the limitations of the technology. This policy decision may be rooted in the history of parentage testing in the US (Barata, 2012).

### **Posterior Probability**

The posterior probability, which is also called the probability of paternity, is the value that labs report to immigration officials as proof of parentage, and the probability that officials use to make their decisions. The posterior probability is expressed as a percentage, which makes it easier for officials and petitioners to interpret (Wenk, 2012). The posterior probability is calculated by multiplying the CPI by a term called the prior probability.

$$\text{Posterior Probability} = \text{CPI} \times \text{Prior Probability}$$

The prior probability is the probability of paternity determined by examining non-genetic information such as records, testimonies etc. (Evetts & Weir, 1998). However, immigration officials cannot use their subjective judgment to determine the prior probability. Rather, it has been set by the government to be 0.5, a neutral value (Wenk, 2012). A prior probability of 0.5 implies that non-genetic evidence is not informative to calculate the paternity probability. But, the immigration system still uses 0.5 to calculate the paternity probability, a measure of relatedness that is easier to understand than a likelihood ratio (Wenk, 2012).

Based on a CPI of 200 and a prior probability of 50%, the probability of paternity in US immigration has to be 99.5% or above to establish parentage (Cronin, 2000). This cutoff was chosen because the reliability of the DNA test “has advanced to the industry accepted standard of 99.5 percent” (US Department of State Foreign Manual, 2011). In some European countries, it is 99.9%, since a CPI of 1000 and a prior probability of 50% are used (Wenk, 2012).

## Return of Test Results

Following a DNA test, the results are sent to immigration officials. Petitioners will also receive a copy if they request it. Results are usually sent by mail, though some laboratories give the results to petitioners in person. Most of the time laboratories do not verbally explain the results to petitioners unless the petitioners call the laboratory. Test results are written in English. Below is an example of a test result sent to immigration officials and petitioners [Table 6] (Genelex Corporation, 2012).

Table 6. Example of a DNA Test Result (Genelex Corporation, 2012)

	Mother		Child		Father		
STR Locus	Alleles		Alleles		Alleles		PI
D3S1358	15	16	15	15	15	15	<b>2.5428</b>
TH01	6	7	7	7	7	9	<b>1.6521</b>
D18S51	15	16	15	17	14	17	<b>3.1073</b>
Penta_E	7	16	12	16	8	12	<b>3.0248</b>
D5S818	9	12	9	12	9	10	<b>1.4678</b>
D13S317	11	13	10	13	10	13	<b>5.5679</b>
D7S820	12	12	10	12	10	10	<b>3.6914</b>
D16S539	9	10	10	12	11	12	<b>1.8069</b>
CSF1PO	10	11	11	12	12	12	<b>2.8758</b>
Penta_D	10	15	14	15	8	14	<b>7.9719</b>
vWA	16	17	16	19	17	19	<b>7.6383</b>
D8S1179	8	14	8	14	8	14	<b>2.0472</b>
TPOX	12	12	12	12	8	12	<b>2.0472</b>
AMELOGENIN	X	X	X	X	X	Y	not applicable

**Combined Paternity Index (PI)**                    **3,704,277**  
**Probability of Paternity**                        **99.9999%**  
**Prior Probability**                                 **50%**

**Results:** “The observed combination of genetic markers of the involved parties is 3,704,277 times more characteristic of paternity by the father than of paternity by an untested, unrelated Hispanic man. The probability of the stated outcome, assuming a 50% prior chance is 99.999%.”

### **Factors that may Influence the Test's Sensitivity, Specificity and Accuracy**

There are several factors that may influence the sensitivity, specificity and accuracy of the DNA test. The sensitivity of the test is its ability to correctly include a person as the parent of a child (i.e., identify “true positives”). The specificity of the test is its ability to correctly exclude a person as the parent of a child (i.e., identify “true negatives”). The accuracy of the test is dependent on its sensitivity and specificity and on the prevalence of the allele frequencies in the population. It should be mentioned that there is a tradeoff between sensitivity and specificity. When the sensitivity is increased, the specificity decreases, and vice versa. The type of tradeoff that is made may be dependent on the goals of the policy and the interests of the entity using the test.

Following is a discussion of the various factors that may influence the accuracy of DNA test results. These factors are discussed in order of importance to the accuracy of the test.

#### **Differences across laboratories**

Parentage testing laboratories in the US are independent entities that comply with standards established by AABB to be accredited (Maha, Gahn, & Lee, 2009). The accreditation process requires laboratories to follow certain guidelines and internal checks to protect the quality of their services (Maha, Gahn, & Lee, 2009). In addition, laboratories can only conduct DNA testing using processes and procedures that have been validated (Maha, Gahn, & Lee, 2009).

Accreditation, however, does not standardize the entire process by which parentage and other types of relationship testing are carried out in each laboratory. There are differences between laboratories that may affect the accuracy and reliability of the test. This is an important

problem that can influence test results. For example, there is variability in the number of STRs and the brand of commercial kits that the laboratory uses to genotype the STR markers (Butler, 2005). The calculation of the paternity index may vary across laboratories because of the way each lab chooses a different calculation to account for the mutation rates of markers when calculating the paternity index (Relationship Testing Program Unit, 2008). Also, each laboratory calculates their own mutation rate for each marker based on their own data collection and observations (Relationship Testing Program Unit, 2008). In addition, each laboratory constructs and maintains their own reference population databases which they use to estimate the allele frequencies for the paternity index (Butler, 2005; Relationship Testing Program Unit, 2008; Thomsen, Hallenberg, & Simosen, 2009). The years of experience and expertise of the staff in conducting and interpreting parentage and kinship testing may also vary across laboratories. These are different sources of variability that may influence the accuracy and reliability of the DNA test.

Illustrating this point, in 2008 parentage testing laboratories in Europe reported an error rate of 0.08% in calculating paternity. This rate was lower compared to previous years. For example in 2005, the error rate was reported to be 0.30% (Thomsen, Hallenberg, & Simosen, 2009). The error rate included errors in genotyping, clerical and nomenclature errors (Thomsen, Hallenberg, & Simosen, 2009). It is difficult to ascertain the error rates across US laboratories because USCIS does not collect any statistics, nor does it monitor the testing (Khatri, 2006; Panke, Donnenfeld, & Wilkins-Haug, 2011). Labs are also not required to report such statistics to USCIS (Khatri, 2006).

**Lack of genetic information from one parent**

The accuracy of test results may also be affected by the lack of genetic information from one parent (Relationship Testing Program Unit, 2008). In most parentage testing cases in immigration, only the child and one parent are genotyped for several reasons, including the prohibitive cost of genotyping both parents, the second parent is not available or is deceased, or immigration officials do not ask for both parents to be genotyped (Wenk, Houtz & Chiafari, 2006). However, studies have shown that genotyping only one parent may decrease the paternity index by half or more, lowering the sensitivity of the test and making it harder to include or exclude paternity. This results in an increase in false positive and false negative cases.

For example, in a study where the genetic information from mothers was removed to determine paternity, the value of the paternity indices were reduced by 1% (Wenk, Houtz & Chiafari, 2006). “Information lost caused about one-third of cases to no longer meet minimal criteria for paternity inclusion” (Wenk, Houtz & Chiafari, 2006, p. 202). It was also harder to determine inconsistencies and therefore harder to exclude parentage. Overall, when the genetic information of mothers was omitted, the evidence for or against paternity was reduced by 30 to 40 percent (Wenk, Houtz & Chiafari, 2006).

Not taking into consideration both parents’ genetic information makes it more difficult to know which alleles in the child come from the father and which from the mother. This makes solving inconsistencies more difficult such that in some cases paternity remains doubtful. Not collecting a DNA sample from both parents when testing for paternity diminishes the accuracy of

the test and may lead to errors in determining paternity (Relationship Testing Standards and Accreditation Program Units, 2008).

### **Number of Markers Used in DNA Testing**

Studies have shown that the number of markers genotyped can influence the accuracy of the test by increasing or decreasing its sensitivity. When only 13-15 markers are genotyped the test sensitivity is not optimal especially when only one parent has been genotyped. To decrease errors of false inclusion and false exclusion increasing the number of markers makes a difference (Karlsson, Holmlund, Egeland, & Mostad, 2007). Most laboratories use 13-15 markers in their testing (Butler, 2005). However, studies have shown that to increase the sensitivity and specificity of the test when testing only one parent and a child a minimum of 25 markers should be used (Karlsson, Holmlund, Egeland, & Mostad, 2007; Fung, Wong, & Chung, 2003).

### **Allele frequencies and allele databases**

Each laboratory creates and maintains their own population frequency database which it uses to determine the STR allele frequencies needed to calculate the paternity index. The US population is made of many subpopulations across which the allele frequencies of certain markers may not be the same. Therefore, not using the correct allele frequencies may underestimate the paternity index by 100 times or underestimate it by 100,000 times (Toscanini et al, 2010; Karlsson, Holmlund, Egeland, & Mostad, 2007). Although this factor may not influence the accuracy of the test as much as others, it is important to consider it since the use of unrepresentative population databases can make it more difficult to distinguish between related and unrelated individuals (Rohlf, Fullerton, & Weir, 2012). This results in false positives and false negatives

that decrease the accuracy of the test. The false positives also increase in a population that is made from different populations and/or inbred (Butler, 2005; Toscanini & Salas et al, 2010). Hence, the type of reference population that is used to compute allele frequencies is very important.

### **Fraud in DNA Testing**

Despite attempts to protect the integrity of the test, for example by employing a chain of custody for collected samples, fraud can still be committed in DNA testing. One laboratory uncovered that 3% of the DNA samples that they were receiving from beneficiaries in Ghana were fraudulent (Wenk, 2011). Petitioners and close relatives of petitioners were “recycling their genotypes” by giving their blood samples to beneficiaries, who were either unrelated individuals or distant relatives. In some cases, the phlebotomist was bribed to replace the blood. Because laboratories get hundreds of samples, they may not notice that genotypes have been recycled unless they implement standards to look for fraud (Wenk, 2011). “Genotype recycling” and other types of fraud, including the impersonation of two siblings as parent and child, and the impersonation of an uncle as the biologic father of a child, decreases the accuracy of the DNA test by decreasing its specificity, and as a result, increases false inclusions (Wenk, Gjertson, Chiafari, & Houtz, 2005).

### **Conclusion**

DNA testing for parentage can be accurate and reliable; therefore, it may be useful evidence in immigration cases. However, there are factors that may influence the accuracy of the test. Some of the most influential factors include laboratory error, having insufficient genetic information

(e.g. only one parent is genotyped), and using an insufficient number of markers for genotyping. Other factors may include using unrepresentative population databases to estimate allele frequencies, and the potential for fraud in the testing process. For these reasons, it must be recognized that a DNA test may not always provide accurate evidence of parentage as reflected in the cautionary language used in the DNA testing policy to describe the test.

## **Chapter III – What DNA Can and Cannot Say: Perspectives of Immigrant Families about the Use of Genetic Testing in Immigration**

### **Introduction**

Genetic technologies are being implemented in areas that extend beyond the field of medicine to address social problems. An example of this is the implementation of genetic testing in the family petitioning process within immigration. Little is known about how such testing affects, for better or worse, immigrant families and their communities. Although there has been some discussion in the literature, studies have not addressed immigrants' experiences with the testing and their attitudes towards it. This study collected empirical data through family and individuals interviews to understand the lived experience of individuals with genetic testing and the positive and negative consequences that resulted from that experience.

The family petitioning process is a legal procedure by which immigrants living in the US who are citizens or legal permanent residents (*petitioners*), apply to the US Citizenship and Immigration Services (USCIS) for the legal entry of their immediate family members (*beneficiaries*). Immediate family members are children, parents, siblings and spouses. The process requires petitioners to show proof of their familial relationship with the beneficiaries, generally via birth certificates or other secondary documents (Hart-Celler Act, INS Act of 1965, Pub.L). Immigration officials may suggest DNA testing when birth certificates or other secondary documents are missing or are suspected to be fraudulent (Cronin, 2000). The use of

DNA testing to establish family relationships may expand in the future as the technology advances and offers the possibility of diminishing fraud (Khatri, 2006).

However, there is little evidence that the effects of using genetic testing in immigration have been examined. After conducting a literature review, the only study that was found addressing this issue is a report written in 2001 for the International Organization for Migration (Taitz, 2001). It reflects on the ethical concerns related to genetic testing in family reunification. The report discusses the harm that genetic testing could bring to families by invalidating family relationships that are culturally shaped and which may exist in the absence of conventional biological relationships. It points out that children may be particularly hurt by test results. In addition, it argues that DNA testing may be discriminatory because certain groups may be tested more than others. Also, only certain individuals may be able to afford the cost of the test (Taitz, 2001, pp. 22-26). Although the report discusses some of the ethical issues surrounding genetic testing in immigration, it does not address immigrants' attitudes toward testing, their willingness to be tested, their acceptance of the rationale for testing, or the positive and negative consequences that could result from testing. Given the influence families can have on the psychological health and acculturation of immigrants, we need a better understanding of the full range of effects of adding genetic testing to the family reunification process (Nelson & Nelson, 1995). This study addresses this gap.

## **Methods**

This study used the qualitative method of thematic description to understand the experiences of participants who have undergone genetic testing to prove a family relationship in immigration

(Attride-Stirling, 2001). Through an iterative process of discussion, reviewing transcripts and reflection, thematic description aims to elicit rich descriptions of the participants' experiences and organize the central themes that are key to understanding those experiences, given the participants' life circumstances and social, cultural and personal position. This allows for a better understanding of the phenomenon and allows examination of both hidden and taken-for-granted assumptions and knowledge about the experience—in this case, the use of genetic testing for the purposes of proving an assumed biological family relationship to immigration (Attride-Stirling, 2001).

### **Participants**

Participants included men and women who were 18 years of age and older who: (1) were U.S. citizens, legal permanent residents or had an unexpired visa; (2) had or were in the process of petitioning for their mother, father, daughter/son, and/or siblings; (3) had given DNA samples to prove their alleged family relationship to the USCIS or State Department; and (4) were able to participate in an interview conducted in English or Spanish.

### **Recruitment**

Families were recruited through three different types of intermediaries: immigration lawyers, religious institutions, and community organizations serving immigrant communities. Immigration lawyers were identified from State Bar Association websites. Contacts were made with 267 practicing immigration lawyers in Washington State, and 79 lawyers residing in the states of Oregon, California, New York, Minnesota and Florida, who served as intermediaries in telling families about the study. The lawyers were first contacted by telephone and email, and

then sent a detailed written description of the study, including copies of the consent form by mail or as email attachments. After answering their questions, they were asked to disseminate information about this study and contact information to eligible petitioners, beneficiaries and other family members involved in the family petitioning process. Lawyers were not compensated for their role as intermediaries. Petitioners and/or beneficiaries who expressed interest in participating or wanted more information, either gave their lawyers permission to share their contact information or contacted the study office directly.

Families were also recruited via 32 religious institutions and three community organizations in the greater Seattle area. These institutions provide many different services to immigrants including counseling them through the family petitioning process. Religious institutions and community organizations were contacted by phone. Ads about this study were placed in their bulletins or newsletters. Petitioners and/or beneficiaries who expressed interest in participating or wanted more information contacted the study office directly.

After establishing contact with interested participants, the purpose and details of the study were explained to them and their questions were answered. When a petitioner, beneficiary or a family member was interested in participating, a first interview was scheduled, and a copy of the consent form was sent via email or mail. Petitioners were also invited to share information about the study with other family members who were experiencing or had experienced DNA testing within the family petitioning process.

**Data Collection**

Each family participated in two interviews in either English or Spanish. The first interview occurred either alone or with another family member. Participants were asked about their experience with DNA testing, their thoughts about it, and how they define and understand their familial ties to one another. These interviews lasted from 60-90 minutes. The second interview was a follow-up individual interview which usually lasted from 30-60 minutes. This interview provided an opportunity to explore more in depth themes that surfaced from the first interview and ask clarifying questions.

**Ethics**

The study received IRB approval from the University of Washington Human Subjects Division. Participants were consented before the start of the first interview. The consent process involved explaining the following topics: the purpose of the study; the structure of the interviews (with question examples) and their duration; the rights of the participants; potential discomforts and benefits; protection of confidentiality, anonymity and privacy; the participants' freedom to withdraw from the study at anytime and/or not answer any questions; and their participation as voluntary. Participants were also asked permission to record the first and second interviews. Each participant received a \$20.00 gift card after each interview.

**Data management and analysis**

Audio-recorded interviews were transcribed in the language of the interview (Spanish or English) and transferred to Atlas.ti for coding and data management. All interviews were stripped of any identifying information, such as names or specific references to people, places,

events, legal status or other details that may be very specific to the individual or family's story. Transcripts were read several times and coded to identify concepts derived from the interview topics and questions, as well as any new concept that emerged from the interviews. Part of the coding process included writing analytic memos that created an audit trail and documented the evolution of code definitions. Coding patterns were identified within and between participants, and then synthesized into themes to express the key elements of the experience. A thematic network was constructed to explore and interpret the connection between themes. The network was used to analyze and summarize the data (Corbin & Strauss, 2008; Attride-Stirling, 2001).

## **Results**

### **Enrolled families**

Fourteen families were contacted after expressing interest in the study, but only ten chose to participate. Participating families volunteered their motivations for participation as a desire to improve the process and make things better for others by sharing their experiences. In total, six males and six females were recruited. Six petitioners were interviewed alone, each representing a family. Two were interviewed with another family member or friend [Table 7].

Table 7. Participants Interviewed (N=10 families; sometimes more than one person was interviewed per family)

Family	Petitioner	Study Participants Interviewed	Beneficiary	Documentation	Reunification	Continent of origin*
1	Father	Petitioner, Friend	1 Child	Yes	Yes	Africa
2	Mother	Petitioner, Husband	2 Children	Yes	Yes	Africa
3	Father	Petitioner	3 Children	No	In process	Africa
4	Son	Petitioner	Mother, sibling	No, No	Yes, no	Asia
5	Mother	Petitioner	6 Children	No	Yes for 4 biological, no for 2 adopted	Africa
6	Mother	Petitioner	1 Child	No	Yes	Africa
7	Father	Petitioner, Cousin	2 Children	Yes	In process	Africa
8	Father	Petitioner	3 Children	No	yes	Africa
9	Father	Petitioner	2 Children	No	Yes for 1 child	Africa
10	Sister	Sister-in-law	Brother	Yes	In process	Latin America

\* Seven African countries were represented in this study.

Most participants were petitioning or had petitioned for their children. One had petitioned for his mother, and sister; another for her brother. Their continents of origin included Africa, Asia, and Latin America. All cases except one immigrated to the US either as refugees or through the diversity lottery system of the Immigration Service. The remaining case came as a student. Some had already brought some family members through the petitioning process. Others had started the process two or three years ago, or in some cases, had been waiting for 10 years or more to reunify with their children.

### **Participants' experiences with genetic testing**

DNA testing for immigration purposes has an inherent duality; it can help some families, but it can also hurt them. The duality of DNA testing was the global theme of the study. This theme

was explained by three main themes that surfaced from within- and across-case comparisons of the interviews: establishing or challenging trust, family, and testing issues. The main themes are formed by different categories that explained them. These categories are: (1) the immigrants' understanding of what DNA testing is; (2) how to interpret results; (3) the cost and time of testing and the implications of this on family reunification; (4) the consequences of uncovering secrets of misattributed paternity, and adoption through DNA testing; (5) lack of documentation; and (6) the concept of family. The interrelationship between these themes is shown in a thematic network [Figure 4]. I elaborate on each of these themes below.

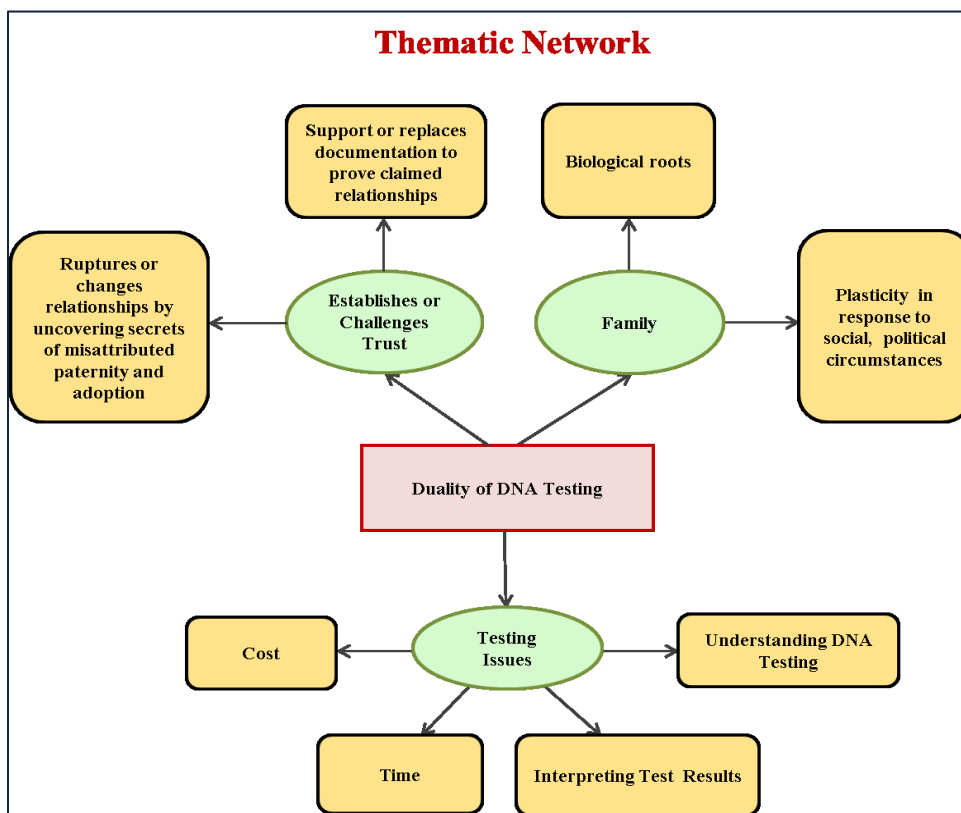


Figure 4. Thematic network showing the interrelationship of themes that surfaced from the interviews

### **Understanding DNA Testing in the Context of Immigration**

Most of the participants were not familiar with the concept of DNA prior to beginning the family reunification immigration process. Their views on DNA were shaped by the experiences of members in their communities, the way the process was presented to them, and their need to provide evidence of relationships.

For many of the participants, learning about DNA occurred in the context of their immigration story, and their experience with leaving the familiar to enter a new physical and cultural space. Most participants first heard about DNA when an immigration official asked them for a DNA test as part of their application to petition for a family member to enter the US. DNA testing is not common in their countries; as one participant said, *“We [came] to know DNA here. But, back home we [did not] know DNA.”* Two participants learned about DNA from attending school in the US; one of these noted that most people he knew did not learn about DNA in school, but rather *“from the communities...they are living in.”* His family living in their country of origin learned the word DNA from other people in the community who went through testing for purposes of immigrating to the US or Europe. He explained the nature of what they learned: *“They don’t know what the DNA [is] scientifically.... But, they understand DNA [is] the investigation between the relationship of the people.”*

In order to learn about DNA and DNA testing, several participants spoke with neighbors or strangers who had also taken the test, or with their lawyers, or called the DNA testing laboratories to ask them. One participant said,

*I didn't have experience [with DNA testing] before [immigrating], but I heard [some] people had [taken] the DNA test. I searched [on] the computer and I found [the DNA testing laboratory], and I went there and I asked them. I even asked my lawyer. My lawyer helped me a lot.*

### **Interpreting results**

The lack of prior knowledge about DNA also made it difficult for some to interpret the results, especially when participants did not know how to read English or because they could not understand the terminology used to explain the results in the report. Test results are typically mailed to petitioners with a convoluted explanation of what the results mean or how they were derived.

One participant tried to read too much into the meaning of the paternity probability, not knowing what to make of it: “*My son...was 99.9999% and my daughter... was 99.9989%. So I said, oh, he is more my kid than her.*” Most participants asked other family members, friends or lawyers to help them understand the results.

Participants views of the DNA test were shaped by the way they were introduced to the test in the immigration process. Despite the fact that the official immigration policy is that DNA testing can only be suggested, not required, most participants felt that getting tested was not a choice. They were worried that if they did not comply, their petitions might be terminated. Some did not understand why they were being asked for a DNA test when they had provided the required documents (e.g. birth certificates, affidavits) to prove their relationship. Illustrating this point, one interviewee stated,

*I showed them the birth [certificate]. They said that's usually not good enough, so they wanted DNA testing to prove [that the beneficiaries were] my biological kids... I [felt]*

*very happy to go take a DNA test because [then the immigration officials] will know they are my children.*

Most participants also said that they believed that the test would tell the truth about their biological ties with beneficiaries, and this could help their application. They had nothing to hide, and DNA would make that clear. One participant stated his belief that if you are telling the truth about your relationship, then *“DNA [tells] the truth. I think you need to trust DNA.”* He said, *“I [wanted to] give government and immigration, proof. If I say that my son will take [a] DNA [test], then that means I have proof. DNA helps immigrants, especially people like me.”* However, at least one participant expressed skepticism for the test’s ability to correctly prove relationships. *“My concern is [about] trusting the DNA. How sure is it to tell you this is not your father?”*

Nonetheless, some felt empowered by DNA testing, especially those who did not have documents. They felt DNA could help them make their relationship claims credible. They saw DNA testing as a powerful way for them to prove their family relationships and establish trust with the immigration official in charge of their case. This was particularly important for petitioners who lacked documents or could not procure official documents from their countries. There were many reasons for this.

### **Testing in the Absence of Documentation and Government Infrastructure**

The infrastructure for birth registration is unavailable or not well developed in many of the participants’ countries of origin. This made birth registration difficult especially for people living in rural areas. This point is made clear by two examples given by participants:

*My mother gave birth at home. My father recorded his son's birth certificate in his Bible.*

*For my Mom there was no record, for me there was no record. The system is not there. I was born at home; there was no government procedure to record it. No registration of any sort -- it is just now that recording is happening; it's not 100%, even today. In the case of my mother [US immigration officials] accepted that there is no record. I think we gave them an affidavit, and gave them the DNA test.*

Even where birth registration is available, birth certificates usually cost money. With standards of living at poverty level for most, paying for a birth certificate is a luxury.

*[When] the child is born, they kick you out [of the hospital], pretty much. And so there's no birth certificate, no nothing. And then, if you [want a birth certificate] the mother would have to go back to the birth hospital, to ask them...it costs money to get it.*

Since birth certificates are not used in their countries for identification or to receive benefits, people do not buy them. Consequently, some petitioners and beneficiaries did not get birth certification from their governments until they needed them for the family reunification petition. To get a birth certificate, some went through months of corrupt bureaucratic processes that were costly and sometimes required the payment of bribes. As one interviewee noted, *"They keep the records, [but] even if you want your record, you have to pay [a] bribe..."* Another participant discussed the problems associated with acquiring a birth certificate:

*You have to file an affidavit with the courts and then they take about a month process to evaluate it, and may give you a birth certificate on the basis of the affidavit. An affidavit, of course, has a lot of legal work, and a bunch of people have to swear that they were there, you know. So suppose you're an older person, people that were there during your birth have passed on. Then you're in trouble. And, even if you're a younger person, then it becomes a government process. They want a proof of this, and a proof of that, and a proof of that. It becomes [an] immediate expense and harassment. ...I know a lot of people who'd just give up...*

Other participants neither had, nor could acquire the necessary documents to support their applications because they had fled from their countries of origin, escaping war and torture. For them, getting a birth certificate was not an option. Especially for refugees who left their country of origin during war time, documents had been burned during the war or were left behind when they fled their homes. In other cases, the interviewees could have never returned to their countries to get documents for their beneficiaries because their lives would have been in danger. In these cases, DNA testing offered a way to provide the evidence they needed to support their alleged family relationships. It replaced the birth certificate and offered them a chance to fight for the reunification of their families.

*I was fighting to bring the children...they wanted me to get the birth certificates and at that time that was impossible, because they escaped from the war. All the government agencies had been broken. They didn't have any [place to obtain a] birth certificate.*

In summary, most of the immigrants interviewed in this study were not familiar with DNA testing prior to their exposure to it in the immigration process. They learned about it where they could, often from members of their community. Their views continued to be shaped during the immigration process. During the process, some families came to think of DNA testing as a truth revealing tool—a third eye that could reveal what immigration officials could not see or doubted. Others just saw it as one more requirement they needed to meet so that their applications could move forward. They were all eager to have the petitioning process finalized so that they could reunite with their families and move on with their lives especially since most of them had been waiting years to do so and generally saw DNA testing as a means to that end. One participant's story demonstrates the utility of the test in the absence of documents: *"I need DNA*

*because I need my son. Now he is almost fourteen years old. Can you imagine? I just see [him when he was] four months.”*

### **Cost and Time**

The cost of the test and the time it took to process it were prevalent themes in the interviews. Most families were taken by surprise at the cost of the DNA test. Many were also surprised when the time it took to process the test became a burden that challenged the reunification process.

DNA testing cost individuals from \$200 to \$1000 depending on the number of family members tested. Petitioners for whom the DNA was not a burden had good jobs and viewed testing as an investment. One participant said, *“I don’t see cost as a big issue, because people spend [a] lot more money to process the immigration [petition].”* However, the cost of the DNA was a burden for seven of the ten families that were interviewed. These families either worked in low paying jobs or could not find a job. They saved for months to be able to pay the DNA testing fees in addition to the application fees. Others borrowed from family members. One interviewee said, *“I worked hard, and then I will eat sometimes two, three days, cheese and rice with oil. [The] money which I have I want to save for my children to see them again.”*

In addition to being costly, the DNA test also increased the processing time of the family petition by three to six months. This was troublesome for many families who thought the DNA testing would speed up the family reunification process, rather than slow it down. DNA testing became a burden especially when families waited anxiously for the tests results to be returned before their petitions expired. If their petitions would have expired, families would have had to start the petitioning process all over again, including paying all the fees. In the case of one

participant, the embassy lost the beneficiary's DNA testing kit three times. For many immigrants who had been waiting several years to reunify, the cost and time it took to process the DNA test added a significant burden. As a participant pointed out, the wait time made the cost of the test seem less acceptable:

*...you have to go find money and then on top of that the process takes longer for them to petition for the family. It took two months just to get the DNA kit over there and then back again. It was all about almost three months, forever to be done. That was just time wasted, putting the process on hold...*

Most of the participants did not understand why immigration officers did not tell them about DNA testing when they started the petitioning process. That way they could have saved the money necessary to pay the fees. They would have also gotten tested early to prevent delays. One participant commented,

*They could have called them ahead of time [and told them that] DNA testing is required, they would have [then] gotten everything they needed including the DNA testing...if there something little, a little piece missing, then they put you back in the bottom of the file.*

In summary, in many cases, though not all, the cost of the test was burdensome, nearly prohibitive, although some families felt the cost was worthwhile. The added time required for DNA testing was also a concern. These concerns could have been mitigated if a better understanding of the availability, cost, and timing of DNA testing had been available at the beginning of the immigration process.

## Uncovering Misattributed Paternity

### Feelings of Loss and Broken Trust

A particularly difficult situation arose from DNA tests results that showed misattributed paternity. Although seven of the families who participated in this study obtained test results that supported their alleged family relationships, three families had to cope with the consequences of the DNA test unexpectedly revealing sensitive information, including misattributed paternity and adoptions that had been kept secret, as was the custom. These cases had major consequences for the petitioners and their family members. Relationships suffered or were redefined. As one participant attested:

*I did it and everything perfectly. I thought, 'these children are mine.' Unfortunately, when I did the DNA [test] and I went to get the results, the package I opened, that day, that tearful day I will never forget. Because she [was] supposed to be [my child] ...[was] not my biological [child].*

Discovering misattributed paternity was very difficult for families who went through the experience. One participant compared it to the overwhelming feeling of hopelessness that sets in when a person you love dies. He felt as if his child had been suddenly taken out of his life as death takes those we love out of ours. In his mind he had lost the person he loved. Grief, depression and emptiness overcame him. He had raised the child since birth and had been sure he was the father. His family had been separated during war and he had gone through extreme lengths to find them, hopeful that they could reunite in the US. Then, unexpectedly, his fatherhood was negated by DNA. The familial bonds that had united the father with the child were severed, and he felt his role as a father had ceased. But he loved her and knew he could not just walk away. The child was living with other siblings in another country waiting for their

father to bring them to the US. He was the only family they had left. He became depressed, and this affected his job. He felt bitter and angry. He did not understand what had happened, he trusted his wife. Out of all the things he had gone through in his life, including being captured and tortured by rebels, he thought the DNA test results had the most impact on his physical health; it made him a high blood pressure patient. He said,

*It was a shock to me. I didn't believe it; I couldn't believe that...I couldn't believe that this would ever happen. So my heart was just...I had started feeling heart palpitations. I started sweating, [getting] sick...because I love her, I love her a lot.... I didn't know what to tell her. So, it was more than a week [that] I wasn't able to go to work because that was very sad... . It is a big loss to me, it's a huge loss, because somebody that I knew [as] my biological [child], and I just have all this kind of love for her....It nearly affected [my relationship with her], but it didn't affect [it] completely because if I deny her, who was going to be the father? ...The DNA [test] cost me a lot of money, time and then tears and even caused me to have problems... . Sometimes I feel like it's unnecessary for them to ask for the DNA. But, also if it's not because of this DNA, my [child] could have been here!*

The child also felt the loss of her father and her identity as his daughter. He said of her:

*She was very bitter, she was not eating, crying a lot of times and then she called me. All the time she used to tell me she wanted to kill herself. I said, 'No, don't kill yourself,' and then I was able to console her. She knew that she [would not] be able to join me here. So I told her... "I want to adopt you." So I was trying to find a way for this adoption. I contacted some adoption groups and they said now she has to go to the orphanage home, a lot of things.*

His other children were reunited with him but, not his daughter. She remained behind. The DNA caused a rupture in the family that affected all the family members. It divided the family, causing pain and despair. The feeling of loss and broken trust that remains is something both the father and his children are coping with. He could not understand why his wife would have done that to

him and went through several scenarios in his mind to explain her actions, these included infidelity and hiding a secret of rape.

However, one participant mentioned that if his test results would have shown that he was not the father, he would trust his wife over the DNA test results. He would talk to her to ask if she had made some mistake, but he would believe her word. But he believed, like other men in the study, that most men would break the relationship, and walk away from the marriage because the trust had been broken. They might also walk away from the bond they have with their children.

#### **Stigma and Identity**

In another case, DNA testing also revealed unexpected attributed paternity, where one petitioner abruptly discovered he was the father of children who had been conceived during his wife's first marriage. *"I was expecting [that] I had one child with my wife.....DNA certified that I [fathered] all [three] children."* This brought tension between him and the children, who questioned the change in the identity of their father. The relationship with his kids was strained after the revelation, because they were angry with their mother when she told them that he was the real father. This revelation not only confused the children but also the community where they lived. Community members started reacting against the children calling them "bastards" and excluding them from social circles. They were stigmatized and rejected by the community. The mother of the child was threatened to be taken to court to be tried for infidelity. The interviewee explained:

*They cannot stay in that community. I was scared [that] my wife [would] get hurt or harmed. That's the one thing it's very hard for us. Also...the other children tease [my children] at school. They say, 'you are bastards.'*

The petitioner said that even though he was glad that the DNA testing showed all the children were his, this unexpected information brought serious consequences for his family. These consequences were exacerbated by the fact that his wife and kids could not immediately immigrate. They lived with these consequences for an extended period of time while waiting for the completion of the family-reunification process. The time lapse involved in having a successful family reunification can take several years; in some cases, reunification is not achieved. This means that family members and children may have to endure the long-term effects of the testing.

### **Adoption: Belonging**

In the case of another participant in the study, an adoption was revealed. Having to reveal secrets of adoption to children was very painful. For one participant it felt as if she was pushing them out of her life. She said, *"I took [the children] since their mother passed away, so they didn't know they [had] another mother....I feel like I killed them when I said [to them] they are not my children."* The children had known her all their lives as their mother and could not understand why they were not her children anymore, why they did not belong with her. They became puzzled. They did not believe her and questioned why she was telling them this. Of her children's reaction, she said, that *"One of my children asked me, 'Mom you think this? [Why do] you want to show people we are not your children, because we are your children'."* The children seemed to have been asserting their belongingness to her, the only mother they knew.

Proving that their children were adopted may be difficult for families. Most families do not have documents to prove they adopted the child, because the legal infrastructure in their countries is underdeveloped. Adoption is not a legal process in many countries. Families simply decide to take in a child and raise them, often without telling the child, and sometimes even the neighbors. Telling children they are adopted is not acceptable in some cultures. Yet in countries that are plagued by war, infectious diseases like HIV, and poverty, adopting a child is common. It is the way the community helps children cope with the loss of their care takers. Also families may raise the children of relatives who have died. Community and family members are expected to never to tell the child. Several participants spoke about this:

*Some people might have a better life, so they'll bring that person to their house to help him. Here you have to be [legally adopted]...but it doesn't have to be legal as long as you're willing to do that, anyone can have anybody, so after a long time living with you that's your family.*

*I heard [about] adoption in United States. [In my country] I never heard [about] adoption because it's [a] small country [and] nobody knows the legal [system].*

*I know, at least in my culture, when the kids are adopted nobody tells the siblings...that this kid is adopted. They think that they are the real siblings, as they should. But open adoption is not a common thing in [my country].*

While talking about adoption, participants also spoke about their concept of family. The family for most of them is an entity that has deep biological roots that tie people to each other. Children are the extension of their lives into the future. But at the same time, they talked about the plasticity of family in their countries which exists partly because of the social conditions in which they live. They have to help each other otherwise they do not survive. Informally adopting a child who needs help because his or her parents have died is an expression of their humanity.

By raising the child and sharing experiences, emotions, and the everyday life with him or her, that child becomes a family member. The identity of family members especially children is not necessarily determined by biology. Although biology is important, family roles and belongingness can be molded by the sharing of life. Therefore, if a non-biological child is raised by a family that child is accepted and passed to be like a biological child.

*Next door we live just a fence away so we see each other every day, we eat together, we share good and bad things so that's [what] we call family, when you share good and bad together that's what family is, right? If you raise a child with no family that's your family too, even though it's not your son or even though he's not related at all to you, but you raised him from the beginning so that's your son, not matter what, that's how we call family.*

The ramifications of a DNA test turning up sensitive information such as misattributed paternity and adoption are deep. The interviews revealed a struggle to cope with the impact of these results. Identities were redefined and relationships were altered. Individuals suffered both emotional and physical health consequences as a result. Yet many families benefitted from the DNA test because they were able to support their applications. This was particularly important for participants who lacked documents to prove their relationships. Nevertheless, most participants were against making DNA testing mandatory in immigration. While they thought that testing could help some families, it could also bring serious ramifications. This is because there are many things that DNA testing cannot say. For example, families spoke about the many social factors that shape the way families are formed in their country. Women pointed to the lack of power and recognition they have in their countries. Women belong only “in the kitchen” and have little say in their societies. Males have the power of decision. There is a dependency of

women on men, and thus if they commit adultery and have a child, they will do everything in their power to pass that child as one of their husband's own. Otherwise, they are afraid of losing their financial support, being driven out of the community, and punished. Women are also victims of rape especially during wars. Although some may tell their husbands about it, most will hide it because they feel shame but also because they want to protect their children. If not, the child may be rejected by their husbands. Being dependent on men for survival, women often do not tell.

## **Discussion**

Six themes about DNA testing in immigration emerged from the family interviews. These were: (1) participants lack of knowledge of about DNA and DNA testing, (2) their struggles to interpret the test results, (3) the way the test helped prove the biological connections of participants without documentation, (4) the burden introduced by the cost of the DNA test and its processing time, (5) the unexpected and hurtful revelation of misattributed paternity, and (6) the difficulty in divulging secrets of adoption. The duality of DNA testing was the overarching theme that summarizes the experiences of participants with DNA testing. As one participant said, DNA testing *"is a good thing and a bad thing at the same time"* and participants experienced it as such. DNA testing helped some families reunify yet divided others. While petitioners took the DNA test to establish trust with immigration officials, in some cases, the test results unexpectedly had another effect; it challenged the trust they had with their beneficiaries. Their lives were transformed, exposing petitioners and beneficiaries to traumatic lived experiences, including family separation. DNA test results also challenged the way familial ties were

understood and defined. Participants became confused and did not know what to do when such results surfaced. Having to discuss the results with their beneficiaries, who were children, was painful and had serious consequences for the children.

This duality of DNA testing is well documented in the medical literature. Frequently, individuals who opt to take a genetic test for various medical reasons may suffer the risk of discovering misattributed parentage that may alter their family relationships and identities (Wolf, 2008). At the same time, the test can provide valuable genetic information that may help the patient and his/her family make better health or lifestyle decisions in the future (Li & Liao, 2008; Schroder, 2009; Lucast, 2007; Turney, 2005). When this occurs, a decision has to be made about whether or not to disclose the information to other family members. Disclosure, especially to children, is a sensitive issue that participants in this study had to grapple with, without any kind of guidance or support (Boddington & Gregory, 2008). Participants felt the need to disclose the information to prevent inconsistencies between their testimonies and that of their beneficiaries during immigration interviews. The difficulties associated with making the disclosure were exacerbated by the separation in distance between family members, and the inability for most petitioners to travel to their country of origin to communicate the information in person.

### **Benefits of Testing**

Despite the fact that DNA testing can have negative consequences on families, it can be very useful for them too. It can help them prove their family connections so that they can reunify in the US. Having their families here was very important for all participants in this study. They called family “life”. Some of them had been trying for more than 10 years to reunite with their

children. Testing provided the evidence they lacked and it facilitated being able to start their lives together in the US. Indeed, for some cases, without DNA testing, it is unlikely that these families would have been able to reunify.

### **Disruption of Relationships**

When participants immigrated to the US, their lives changed abruptly, even if it was for the better. Having to leave their country behind implied that they left their friends, their daily routines, their family members and the culture and things with which they were familiar. Their family relationships were a connection to their past, from where they derived a sense of who they are in the midst of something new. When a DNA test was negative it called into question the family relationship(s) that anchored participants' identities. So, they suffered a double blow—a transformation of their lives through immigration and another transformation as a result of the DNA test results. They had to adapt to a new reality of their family ties. This rupture in their knowledge of self and family caused significant stress.

One of the most difficult things about discovering misattributed paternity or adoption is the disruption of relationships, the erosion of trust, and the transformation of individuals' identities which have an impact not only on the individuals involved but also on the whole community (Bellis, Hughes, Hughes, & Ashton, 2005; Wright, et al., 2002). In the context of immigration, the disruption of relationships is life altering for the petitioner and the beneficiary, especially children. Petitioners can relinquish their ties with their children and leave the family in the country of origin. Although participants in this study did not make that decision, one participant came close to it. The paternity testing literature shows that “duped dads” are likely to

break their bonds with their children because they feel used and deceived by their wives (Grossberg, 2005). This depends on the strength of the bond that exists but, even when there is a strong bond, men may distance themselves from the relationship they have with their children (Smith, 1999). This may bring serious emotional and financial consequences to the child (Taitz, 2001; Scott-Jones, 2005).

A literature review by Bellis et al. (2006) documented the effects that disclosure of misattributed paternity can have on the family. These effects included mental health problems, and stress, with children showing signs of low self esteem, anxiety, and aggression (Bellis, Hughes, Hughes, & Ashton, 2005; Wade & Pevalin, 2005). Even if relationships between the petitioner and beneficiary do not rupture after disclosure, family members must still, “Cope with a child in the family structure who is related to only one parent and sometimes the results of infidelity” (Bellis, Hughes, Hughes, & Ashton, 2005, p. 52). Also, “Fathers spend more time and other resources on their biological children and, at worst, children in families where the father is not their own may be at greater risk of paternal violence” (Bellis, Hughes, Hughes, & Ashton, 2005 p. 52). The observation that some men may feel more connected to their biological children, and therefore, spend more resources and time on them has been documented by other studies (Anderson, 2006).

In the family petitioning process, the disruption of relationships and other stresses are also partly caused by the narrow definition of family. This makes it difficult for adopted children to be recognized as part of the family unless they have legal documents. The emphasis is placed on the biological connection between the parents and the child, but there are other ways to

recognize kinship bonds, as is being done in US family law, especially in cases where this biological connection is absent. In cases where parents have shown a clear intention of raising the child as their own, this intention should be given more weight in immigration law. This could protect against disrupting family relationships where the parent-child bond is social and not biological.

### **Social Stigmas**

In the case of this study, children who are beneficiaries may be left by petitioners in poverty and homelessness especially if the petitioner is the only parent they have. Even when the mother remains in the country of origin, the family may still endure financial problems. This is because in many countries women are “nothing” as one participant commented. They are dependent on men for their survival and that of their children. Participants said this is a reason why some women may hide their secrets of infidelity and rape. Other reasons are fear of violence, stigma, expulsion from the community, and fear that the child would be rejected. Similar reasons were seen in Turney’s (2005) study of women who have hidden secrets of paternity from their partners

The disclosure of misattributed paternity also impacts women emotionally, and may impact their relationship with their children. In this study, one petitioner contemplated suing her mother if she discovered that she was not related to her brother. In addition, women’s privacy is exposed and this can bring severe consequences when they live in communities that punish infidelity or mistreat illegitimate children. Revealing the truth, as participants explained, could cause them to be expelled from the community, punished or killed. Under these circumstances, it

is necessary to keep a secret of misattributed paternity whether it is the outcome of infidelity or rape.

When these secrets are revealed trust is compromised not only between family members but also between the family and the community. As Baier (1986) points out, when trust is compromised its essence transforms and it is difficult to return relationships to their original state. Participants in this study talked about how their trust in their partners would be shattered if they discovered misattributed paternity. The participant who made such a discovery grappled with issues of trust, wondering whether he would be able to trust another spouse again.

### **Revealing Hidden Adoptions**

Revelations of adoption can also be damaging to both the beneficiaries and the petitioners. In this study, children who were told they were adopted could not understand why their parents were telling them that. In one case, children asserted their connections to the petitioner by telling her that she was lying. Their “narrative identity” in the family was challenged. Nordgren (2008) defines narrative identity as an identity constructed by the family and the community that answers the question of “Who am I?”. These children had been raised all their lives being told they were the biological children of the petitioner. The community asserted the narrative, but the DNA told another story.

Changing that narrative may be confusing and painful for the child (Finkler, 2000; Rothstein, Murray, Kaebnick, & Majumder, 2005). He may feel left out of the family, and his relationship with the petitioner and other family members may change. The child may also become angry for being lied to and may go through different emotional stages, one of which is

the search stage where he starts looking for the real parent(s). He may also start asking himself questions about his identity (Finkler, 2000). Moreover, the child will have to cope with the reaction of the community and his friends. One participant in this study commented that in her culture some people think adopted children are evil and bring bad luck.

In immigration, revealing adoption is even more difficult because this may imply that the child will not be able to reunite with his adoptive family. If the petitioner does not own any documents that prove that the child was adopted, the child cannot immigrate. To adopt the child, the petitioner has to begin the adoption process which can take a number of years. Meanwhile, the child has to live in an orphanage to become eligible for adoption. If the beneficiary is more than 16 years old, international adoption is not allowed by law (INA § 101(b)(1)(E)). For these reasons, revealing hidden adoption may have several consequences on the lives of children and their families.

### **DNA and Defining “Family”**

DNA testing must be used with caution because it can reveal information that may jeopardize the integrity of the family and well-being of family members. The number and cultural diversity of the families interviewed in this study was small; therefore participants’ opinions about family may not represent those of immigrants from other cultures. Notwithstanding, the data gathered in this study showed that even though all participants talked about the biological dimension of family, some also saw families as composed of people who lived with them regardless of their biological connection and who shared their everyday lives with them. The social and political environments in which they have lived have molded this view of family. The plasticity of family

and its cultural grounding has been studied and described in several different studies (Barbara & Edwards, 2009; Wiegel, 2008). While protecting the immigration system against fraud is important, it is also important to protect the integrity of families that enter the country and stay to live.

Families provide care, emotional and psychological support. Immigrant families help their family members respond and adjust to the stresses of change that come as a consequence of living in a new country. They can provide a safe and supportive environment where immigrants develop coping skills and resiliency (Nelson & Nelson, 1995). Studies show that separation from family and family conflict are common stressors that negatively influence immigrants and have been associated with the development of depression (Bhugra, 2004; Rodriguez, Mira & Paez, 2007; Caplan, 2007). Although more studies are needed to fully understand the impact that families may have on immigrants' acculturation and health, several qualitative and quantitative studies suggest that there is a relationship between family support and the mental health of immigrants during the acculturation process. Learning genetic information that contradicts the perceptions petitioners and their family members have of themselves and their families provides an additional source of conflict, raises questions of identity, and potentially disrupts relationships within families. As a consequence, this could result in having citizens in our society who cannot fully contribute because they are not emotionally balanced and lack the support and help that their immediate family members can provide.

**Cost**

The cost of the testing and the time it took to process the test counteracted some of the benefit that testing can bring; mostly because the family reunification process was extended for many of these families by a few months. Also some participants were not able to afford the test particularly refugees who are sometimes in most need of taking their families out of the refugee camps.

**Conclusion**

In summary, this study showed that most participants did not know what DNA testing was when immigration officials suggested it as part of their application process. Therefore, their decision to take the test was uninformed. DNA testing was beneficial for some families, but the cost of the test and the time it took to process it became a burden for some families extending their application process by a few months. For other families, the genetic test results proved to be detrimental. They revealed misattributed paternity and forced one petitioner to divulge a secret of adoption causing stress and rupture in family relationships. Children were the most affected.

In these families, a range of cultural and social factors influenced how they constructed their families and their understanding of family relationships. Cultural beliefs about whom and through what types of connections people are recognized as family members included but were not limited to a strict molecular or biological definition. War, poverty, religion, diseases, gender discrimination, infidelity, rape and other factors lead familial units to be constructed in ways that could not be verified through genetics.

For these reasons, it is important that DNA testing is used with caution in immigration. Alternatives for family reunification should be provided for petitioners who lack a biological connection with their children either because of misattributed paternity or social adoption.

### **Limitations and Strengths**

One limitation in this study was that recruitment proved difficult. Statistics about the number of immigrants who choose to get tested are not available. Therefore, recruitment difficulties may reflect that DNA testing in immigration is still a new practice, or it may suggest that people are reluctant to talk about their experiences with it. Moreover, most participants were refugees. Therefore, it is unknown how their experiences might relate to the experiences of immigrants who come under other immigration categories. Also the views and knowledge of participants regarding this topic may have differed depending on how long they have lived in the US. Furthermore, the experiences and opinions of the petitioners who were interviewed may differ from those of their beneficiaries. Petitioners' interpretation of how beneficiaries experienced DNA testing might be biased or limited by the distance between them.

The strengths of this study lie in the fact that similar themes were identified across all of the interviews, supporting common experiences between all the participants who came from different parts of the world. Also, the experiences of immigrants who have been through DNA testing highlighted the benefits and problems that testing can create for immigrant families. This information can be a compass for policy makers to help them implement DNA testing in a way that helps immigrant families and does not discourage their legitimate reunification.

## **Chapter IV - Genetic Testing to Prove Family Relationships in Immigration: Ethical Points-to-Consider**

### **Introduction**

This points-to-consider chapter discusses some of the ethical and regulatory issues regarding the use of genetic testing in immigration that were identified through this study. The points discussed here may be of interest to many stakeholders but are primarily intended to inform policymakers, immigration lawyers and the United States Citizenship Immigration Services (USCIS). These points are made in an effort to help prevent the unintended consequences of DNA technology and at the same time to protect the interests of the government and the dignity of immigrant families.

In 2011, 66% of immigrants who came to the United States (US) as legal permanent residents were family petitioned (Jefferys & Monger, 2012). The family petitioning process, under the family reunification provision in the Immigration and Nationality Act of 1965, has enabled the reunification of immigrant families for more than 50 years (Hart-Celler Act, 1965). Reunification is the process by which petitioners, immigrants who are citizens or permanent residents, apply to bring their family members (e.g., spouses, children, parents or siblings) to the US. The reunification provision is an important component of US immigration policy that benefits both the immigrant population living in the US and the US as a whole (U.S. Select Committee on Immigration and Refugee Policy, 1981).

Under the current family reunification process, individuals petition to the US Citizenship and Immigration Services (USCIS) for their family member(s) to enter the US as lawful permanent residents. Petitioners and family members carry the burden of proof to provide evidence of their familial relationship, generally via birth certificates or other secondary documents (Hart-Celler Act of 1965, Pub.L 89-236, 1965). When fraud is suspected or birth certificates and other secondary documents are missing or proven insufficient, immigration officials may suggest that petitioners and their family members (children, parents or siblings) prove their alleged family relationship (parentage, and sibling) via genetic testing (Aytes, 2008).

Although the USCIS officers can suggest genetic testing, they lack the authority to require it. But, there are indications that this may change in the near future. The implementation of DNA testing in immigration may parallel that of blood testing in the early 1950s. In the 1950's blood testing was first used sporadically in immigration cases and eventually became a rule authorizing immigration officials to require it (8 CFR § 202.2(vi)). Moreover, in February 2008, the State Department launched a pilot study to use voluntary genetic testing as part of a family reunification resettlement program for East African refugees (Jordan, 2008). Test results were used to verify alleged family relationships between refugees and US petitioners. More than 86% of the applications were found to be fraudulent (Jordan, 2008). This might provide a reason for the government to require genetic testing not only in the refugee setting but in all family reunification.

The possibility of fraud is a major USCIS concern in the current, document-based system for validating family relationships. Fraud occurs when “a person, knowingly uses, attempts to

use, possesses, obtains, accepts, receives or provides any forged, counterfeit, altered or falsely made documents for the purpose of satisfying a requirement or obtaining a benefit,” under immigration law (Garcia, 2005). Immigration fraud raises concerns about national security and human trafficking. Both are issues that have drawn increasing attention in recent years. Genetic testing is perceived as an effective way to screen-out fraud while making the process of family reunification less strenuous for immigration officials and immigrant families (Khatri 2006). These benefits, however, could be negated if testing is implemented without adequate understanding of immigrants’ views and preferences, or the political and social circumstances in which genuine kinship relationships are formed in the absence of biological ties. A lack of understanding and accounting for these issues could discourage legitimate family reunification or harm the health and welfare of immigrant families.

To better guide policymakers, immigration lawyers, and families, the ethical and regulatory issues regarding the use of genetic testing in immigration that were identified through this study are presented in summary here. These ‘ethical points to consider’ are offered to help inform the development of policy to prevent the unintended consequences of using DNA technology in immigration, and its potential misuse, while at the same time protecting the interests of the government and the dignity of immigrant families.

### **DNA Testing Should Not Be Made Mandatory for Family Reunification**

Genetic testing is a tool currently available to US immigration officials, but only in a limited way (Cronin, 2000). Immigration officials cannot require genetic testing to establish a claimed biological relationship but, “in situations where credible evidence is insufficient to prove the

claimed biological relationship, officers may suggest and consider genetic testing results” (Aytes, 2008). This implies that applicants ultimately decide whether or not to follow the official’s suggestion, and take the DNA test. The DNA testing policy stresses the voluntariness of the test. However, some study participants perceived testing as mandatory, not voluntary. They saw it as one more requirement in the family reunification petitioning process.

There are many reasons for this, as exemplified in this study. One is the power differential that exists between immigration officials, and petitioners, who fear that their applications will be terminated if they decide not to comply with testing. A second reason is that petitioners cannot make a voluntary choice if they lack information about testing. Most participants in the study did not receive any information from USCIS about DNA testing, the reason for testing, the fact that is voluntary, the consequences of choosing and not choosing the test, and the potential positive and negative impacts of testing. Furthermore, sometimes petitioners may not know the alternatives they have, other than DNA testing, to prove a family relationship. For these reasons, although the DNA testing policy states that testing is voluntary, the way it has been implemented may lead petitioners to believe that it is mandatory. It is important that the test remains voluntary and that more emphasis be placed in communicating and effectively implementing its voluntariness.

Currently, testing is used on a case by case basis. As demonstrated by this study, this is the best way to use this technology in family reunification-based immigration. DNA testing can help families who cannot procure documents show convincing evidence of their relationship. Sometimes obtaining the necessary documents can take a significant amount of time and

resources. This may extend the time to complete the family reunification process by months to years. For some, particularly refugees, it may be impossible to get documents because they often cannot return to their countries of origin especially if they were politically persecuted there. As was illustrated by some of the immigrant perspectives gathered in this study, DNA testing applied to these cases can be useful and may help some families attain reunification.

However, DNA testing can also be devastating for other families, compromising their integrity and challenging the identities of their family members. As was seen in the cases presented in this study, children often bear the brunt of the consequences. They may be permanently separated from one or both of their parents. It was seen that children generally do not comprehend DNA test results and may be affected emotionally and psychologically when the petitioner has to reveal test results that show a lack of biological relationship between the child and parent. Revealing an adoption can also be traumatic for children, especially if the culture encourages keeping adoption a secret. In addition, the community in the country of origin may also be impacted by the DNA test results. This study shows they may react unfavorably towards the beneficiaries by stigmatizing them or ostracizing them if the test results reveal sensitive information like misattributed paternity. DNA testing can uncover information that can permanently transform the lives of individuals. Therefore, this type of technology should only be used when it is necessary, as the current USCIS DNA testing policy states. It should also be voluntary (Cronin, 2000; Aytes, 2008).

### **Provide Information about DNA Testing at the Beginning of Immigration Process**

Many petitioners and beneficiaries do not know what DNA or DNA testing is at the beginning of the immigration process. Currently, USCIS does not provide accessible information about the test, the testing process, the reason for testing, the possibility of the results negating relatedness, the way the results will be returned, and who to go to if counseling is necessary. Consequently petitioners sometimes make an uninformed decision when getting the DNA test. Though the US Department of State has created a website to explain DNA Relationship Testing, the website is not easily accessible and does not clearly explain DNA and many of the other topics mentioned above. The website is written more for an audience of lawyers than petitioners and beneficiaries (US Citizenship and Immigration Services, 2012). Although many petitioners use a lawyer to navigate the petitioning process, not all petitioners can afford one. Therefore, it is important that information about DNA testing is accessible to everyone. To make this information accessible, the pamphlet should be translated into different languages. Because not all petitioners may be literate, it would be useful to provide a telephone number that they could call to receive information about the test, and ask questions about it.

It is also important to make sure that petitioners understand that taking a DNA test is voluntary. This study clearly showed that petitioners sometimes feel as though the test is required, or they sometimes think that if they comply with the testing their applications are guaranteed acceptance. The truth, though, is that even with a positive result, other factors may play a role in whether the application is approved. All of this information should be provided to petitioners as early as possible in the process. It can be written in a pamphlet that can be sent to

the petitioners with the letter suggesting a DNA test. This is done in other countries. For example, the New Zealand Immigration Service has developed such a pamphlet that talks about what DNA is and explains the process of the testing and the fact that it is voluntary (Immigration New Zealand, 2012). The pamphlet also asks for the consent of the petitioners to the testing to make sure they have understood everything before they make the choice of getting tested. The consent reads as follows, “If you have read and understood the information in this leaflet, and wish to give a sample of your DNA for testing, sign the declaration contained in the accompanying letter” (Immigration New Zealand, 2012). Providing something similar to petitioners may help them make an informed decision when choosing whether or not to pursue a DNA test. It may also help them prepare for the consequences of unexpected results from such tests.

As this study shows, assistance need not come solely from government sources. Immigration lawyers may help guide their clients with a DNA testing decision. If USCIS suggests DNA testing to a client, lawyers should help their clients by taking the time to explain to them DNA and the DNA testing process in a simple way. This should be made standard practice. When discussing DNA testing, immigration lawyers should inform their clients about the test by explaining the possibility that the test could reveal sensitive information. They should assess with their clients if DNA testing will be helpful for them. By speaking with their clients and making sure they understand what DNA testing is, immigration lawyers can better assess whether the testing is appropriate for their clients.

Explaining the implications of DNA-based testing is often complex. In the clinical setting, protocols and strategies have been developed to support individuals facing testing decisions. These could be modified, potentially with the help of genetic counseling experts, and implemented in the immigration setting to develop an effective approach to help petitioners in their decision-making process.

### **Protect Children Against Disclosure of Misattributed Paternity and Adoption**

As this study shows, children often suffer the brunt of the consequences that occur after misattributed paternity or adoption is revealed as a result of DNA testing. They may become confused, scared and depressed when learning unexpected genetic information about their biological relationships with their parents or family members. In cases of misattributed paternity, they may have to endure the response of the community, the father and the father's family members. They may also suffer the risk of losing the recognition and financial help of the petitioner, and of staying behind in the country of origin with only one parent, or no parent at all. As a consequence, it is important to safeguard the vulnerability of children against the disclosure of sensitive information, and the consequences such disclosure might bring to them. Although this may sometimes be difficult because of the nature of the immigration process, it might be possible to put some safeguards in place.

The first safeguard might be to provide information to petitioners about the impact testing can have on children if it reveals secrets of misattributed paternity or adoption. Guidelines can be provided to help petitioners protect children from learning this information or learning how to disclose it in a way that children can grasp it without feeling scared, rejected or afraid that their

relationship with the petitioner has changed. Having this information allows petitioners to make a better decision on whether or not DNA testing will be useful for their case. It also gives them the opportunity to prepare and plan with their spouses and other family members regarding how they will approach non-disclosure or disclosure.

Safeguarding some children against learning misattributed paternity might be accomplished by encouraging mothers, instead of fathers, to be the petitioners in the family reunification process. This would only be possible if both parents are in the US. But, sometimes this is the case. Unless an adoption has occurred or the child was exchanged in the hospital, maternity is easier to be sure of than paternity. This would prevent any disclosure of misattributed paternity that can protect the best interests of the child.

In cases where adoption is disclosed, the safeguard could be to establish another process by which these children can be legally adopted while living in the US with their social parent. There are precedents from US family law and other social services agencies that use evidence of parenting social relationships to establish kinship ties, such as the use of school records or other documents that show that there has been a nurturing, long relationship between the child and the petitioner. Other methods include using interviews, as I explain in more detail below, that can be conducted to assess the truthfulness of the established relationship and the welfare of the child. This is important to protect children from wrongful claims of social parenting which may make them prey to human trafficking and sexual exploitation.

**Make the DNA Test More Affordable for Families and Decrease its Processing Time**

Another issue revealed by this study is that the cost of the DNA test is often a burden for petitioners and beneficiaries. The cost for the test and other expenses must be paid by the petitioner with prices ranging from \$200 to more than \$1000 depending on the laboratory and number of beneficiaries. Although some petitioners may be able to pay the testing in addition to the petition fees, many families cannot afford it and have to save for months or years to be able to pay for the test. Often petitioners are immigrants who have recently come to the US. They often work in low paying jobs that only provide enough to live on. Some countries such as Finland pay for the DNA test if it proves the relationship. Although this is very helpful, it may not be economically feasible for the US to do this because when compared to Finland and other Western countries, including Canada, the US gets the largest number of immigrants per year (NationMaster, 2012).

One way to help petitioners with the cost of testing may be to allow them to set up payment plans with the government or the laboratories. These payment plans could consist of monthly payments through an installment agreement over a fixed period of a year or two. If the petitioner does not follow through with the payment plan, he would be asked to pay everything in full or the beneficiaries' legal permanent residency would be revoked.

Another significant issue with testing shown in this study is the amount of time laboratories take to process the DNA samples. Some families waited three months or more before obtaining the DNA results. This significantly sets back the review of their petitions and extends the reunification period. Most of the time the delay period occurs when the laboratory

sends the DNA testing kit to the US embassies and waits for it to be sent back for analysis. In some cases delays result from a lack of coordination between the laboratories and the US embassies around the world. Setting up a system that would allow effective and efficient communication between US labs and the embassies may facilitate the process of a quick sample turnover. Also, labs need to communicate more with petitioners who often get impatient waiting for the results. Setting up a tracking system for the petitioners to check may save the lab from answering calls and give the petitioner the ability to know the progress of the testing.

### **Explain Test Results**

Most laboratories send DNA test results to beneficiaries by mail. Some petitioners who participated in this study thought the scientific language used to convey the test results was confusing. They were not familiar with terms such as *probability*, *allele*, *kinship analysis* and other technical terms used in reporting the results. For example, this is the language used to explain results:

*We have completed a kinship analysis on samples from the individuals listed below. Based on the scientific evidence we conclude that Jules Rondend cannot be excluded as the biological mother of James Rondend. The observed combination of genetic markers of the involved parties is 98,000 times more characteristic of maternity by Jules Rondend than of maternity by an untested, unrelated Caucasian woman. The probability of the stated outcome, assuming a 50% prior chance is 99.99888%. (Genelex Corporation, 2012)*

Although it may be important for laboratories to provide the above information to immigration officials to inform their decisions, for petitioners the technical wording and content may be confusing and frustrating to read. It does not provide a simple answer to their central question: does the test show that we are related, or not? Studies have shown that a significant

portion of the US population cannot understand probabilities or are not comfortable interpreting their meaning (Nelson et al, 2008; Kutner, Greenberg & Baer, 2005). This is particularly the case for many petitioners, who come from different cultural and socioeconomic backgrounds; were taught by different educational systems, and have different abilities to read and understand English. Laboratories should consider including a clearly and simply written summary of the test results. This may prevent misunderstandings and will make the test results more accessible for the petitioners.

### **Provide Avenues of Support to Cope with Unexpected DNA Test Results**

When DNA test results reveal sensitive information, such as misattributed paternity, it was seen in this study that usually petitioners do not know what to do. They do not know how to convey such information to their beneficiaries especially if beneficiaries are children. This can cause tremendous stress, depression and may affect their ability to go to work. They often do not know whom to turn to for questions and guidance. Providing petitioners with ideas about where to go to get support may help mitigate some of these consequences. For example, petitioners may be referred to community organizations or support groups equip to help them cope with life changing events. Many of these groups provide free services. Also, there are online websites such as HelpGuide, which provide written guidance on how to recognize and overcome depression, how to accept and mend broken relationships and how to cope with the process of grieving to start healing (HELPGUIDE, 2012). Moreover, crisis hotlines exist that are free of charge and provide quick access to temporary support. Since many petitioners may not yet

understand the US culture or what services are at their disposal in the community, providing a guide to available services may be helpful.

Other countries have taken this approach. For example, the Australian Government's Department of Immigration and Citizenship has a section about counseling in their form 1259i which explains DNA and the DNA testing process to petitioners. It simply informs the petitioner where they may go for counseling if the need arises:

*You can seek counseling (advice) from a health professional or Panel doctor before you decide to do DNA testing. You can also seek counseling after the DNA test results are known. You will be responsible for paying for any counseling you undertake.*  
(Australian Government; Form #1259i, 2012)

As mentioned earlier, this information need not only come from government sources. Immigration lawyers should also be prepared to provide information and guidance to their clients before and after the DNA testing process. For example, some countries do not have a legal process for adoption. Families informally adopt children and do not tell them about it because of their cultural believes and values. Clients may use the word 'children' to refer to both their biological children and their adopted children. These cultural differences cannot come to light unless clients have a clear understanding about the purpose of DNA testing. Informing the client about the test, the procedures and the possible outcomes will not only psychologically prepare the client, but it will help the lawyer assess whether investing money and time in DNA testing will help the client.

### **Have Alternative Means of Establishing Relationships Available**

Although DNA results can reveal fraudulent or false claims of biological family relationships, it is also possible that in some cases petitioners made familial claims in good faith, and only through testing discovered the lack of biological ties. Some individuals may have started the reunification process, not having prior knowledge of misassigned paternity or missing biological ties among siblings. A range of cultural and social factors may influence how people construct their families and understand their family relationships. Cultural beliefs about what types of connections define individuals as family can include but are not limited to strict molecular or biological definitions. War, poverty, religion, diseases and other factors can lead familial units to be constructed in ways that cannot be verified through genetics (Taitz, 2002).

In some cases, a low paternity probability could be the result of laboratory mistakes or testing error. Other variables may influence the probability such as the mutation rate of the markers used for the test, the prevalence of different alleles in the local population, the number of family members tested, and the number of markers used (Wenk, 2004; Poetsch, Ludcke, Repenning, & Fischer, 2006; Butler, 2006). In the case of paternity testing, a 99.5% probability is required to prove parentage in immigration (Cronin, 2000). Error rates and other statistics for DNA-based tests used in family reunification are not reported to USCIS or in public sources and may vary between different laboratories (Khatri, 2006). USCIS or the American Association of Blood Banks (AABB), which accredits the parentage testing laboratories, may consider collecting and publishing these statistics so that laboratories, USCIS and potentially other

interested stakeholders can assess and resolve scientific issues that may compromise the accuracy of the test, and therefore its reliability.

When test results show unexpected low paternity probabilities, petitioners should be given the opportunity to explain their situation and be allowed to use another type of evidence that may prove their relationship with the beneficiary. A parent-child relationship could legitimately be established by social history when documents are missing and DNA “disproves” the parent relationship. A trail of this history can be made and proved by conducting interviews in the community or through records (eg. medical, school, and church records) that show that there has been a constant, nurturing relationship between the petitioner and the beneficiary. For example, Villiers (2010) has suggested a procedure similar to the Stokes interviews, which are conducted by USCIS to identify sham marriages between US citizens and their spouse. The alleged husband and wife are interviewed separately and asked questions about their lives together. Strong inconsistencies between interview responses may suggest that there has not been a true marital relationship between the couple, suggesting the marriage may have been contrived for immigration purposes. “Similarly in family-based cases when the DNA results are inconclusive or show no familial relationship and the parties make an equitable claim of social fatherhood, procedures like the Stokes interview could be implemented to combat fraud and yet allow for a more thorough determination of the case” (Villiers, 2010 p 11). When a parent has intentionally acted as the caregiver of a child for all of his life, denying that relationship because the DNA disproves parentage is morally wrong. A harm is being done to the family which goes against the aim of the family reunification policy.

When a DNA test shows lack of relationship, petitioners may also have the option to adopt the beneficiaries, if they are children. However, when children are older than 16, international adoption is not allowed by law, unless there are younger siblings of the beneficiary who are also being adopted; then an exception is made (INA101§ (b)(1)(E); INA101§ (b)(1)(F)). Therefore, children older than 16 years have to stay behind when their siblings and other family members have immigrated. This is often devastating for the child and the family especially if immigration occurred as a consequence of war and political persecution. In such cases family members may not be able to return to their countries to see their children or to live with them.

Even if the child is under 16 years of age, and adoption is possible, it is usually a long, expensive process that may separate the child from the parent(s) for years. In addition, the child has to move to a foster home for the adoption process to take place introducing more stress and uncertainty in the life of the child. Therefore, providing other means of assessing the true nature of the non-biological family relationship, in cases where negative test results were unexpected, may help protect the integrity of the family and the interests and welfare of children.

### **Protect the Privacy and Confidentiality of Petitioners and Beneficiaries**

Genetic privacy is defined as the right of individuals, families and communities to protect their genetic information from being disclosed to the public or used for other purposes (Lunshof et al, 2008). In general, privacy controls are in place in DNA testing process for family reunification. For example, USCIS has clearly stated that they do not store any genetic information other than the petitioners' test results, and that they only use the information for immigration purposes. As

revealed during the interviews conducted in this study, most petitioners are not aware of this. Information about the privacy measures taken should be supplied to petitioners.

Another way that information is revealed is by allowing it to leak to the communities where the beneficiaries live. This is often done by petitioners, beneficiaries or their family members, who do not initially grasp the sensitive and personal nature of the information that they are divulging. As happened to participants in this study, revealing this information may have serious consequences later, particularly if the DNA test results show a lack of biological relationship. Petitioners and beneficiaries should be advised to be discreet while waiting for the test results.

## **Conclusion**

The use of genetic testing in immigration may help some families but harm others. Therefore, it is important that testing is used only when necessary and with the consent of the petitioners. There are many cultural, social and political factors that may influence how families are formed. Therefore, not all negative test results indicate fraudulent cases. Testing may reveal sensitive information such as misattributed paternity. Learning such information can rupture relationships and divide the family. Therefore, it is important for petitioners to assess whether DNA testing will help their case. This can only be achieved if petitioners are well informed about the test, and the positive and negative consequences that can result from it. In addition, the cost of the test may be a burden for petitioners and beneficiaries. Providing different payment alternatives may allow more immigrants to have access to the testing. Also, developing a better tracking system for the samples sent overseas may help facilitate the testing process. DNA testing should not be

made mandatory, and efforts should be made to address the ethical considerations discussed above to avoid or minimize unintended harms. With such precautions in place, the test can serve as a useful tool for families who lack evidence of a family relationship.

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