

Legal and Religious Determinants of Organ Donation in the United States

By

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A thesis submitted in fulfillment of the requirements for the degree of
Master of Science

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July 2012

iBMG

Erasmus University Rotterdam

Acknowledgements

I would mostly like to express my gratitude to my supervisor Dr. Aurélien Baillon for the support and guidance during the whole research of my thesis.

Secondly, I would like to thank my family who were all present, motivating and supportive during the research.

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1. Introduction

In the United States there are currently 114,810^a people waiting for an organ transplant and 18 people die each day while waiting.¹⁻²

Organ transplantation is a process of removing and transplanting a viable organ from one person, called a donor into another person in need of transplantation, called a recipient. The donor can be a friend, a family member or simply a stranger. This process is often the only treatment for end state organ treatment and is practiced worldwide.³ The donor however, needs to agree to the donation.⁴ Organs that can be donated include the heart, kidneys, bone, small intestine, skin, liver, pancreas, lungs, bone marrow and eyes. It is important to mention that one organ donor can save up to eight lives by donating several organs.²

The major problem worldwide is that the demand for organs exceeds the supply of organs. This “terrible and unnecessary tragedy”⁵ is the result of a high percentage of potential donors that are lost either through absence of consent or through medical failure.⁶ Around two million people die each year in the US and most are not suitable for donation because of age or a disease. It is believed that the number of people whose organs are suitable for donation at time of death is around three times the number of actual donors.⁷ Organs can only be collected from people that died in hospitals because their organs are kept alive and functional by mechanical ventilation until the transplantation can take place. Only about half of the people that die, die in hospitals.⁸ Despite all the medical advances in the last decades, the gap continues to widen.

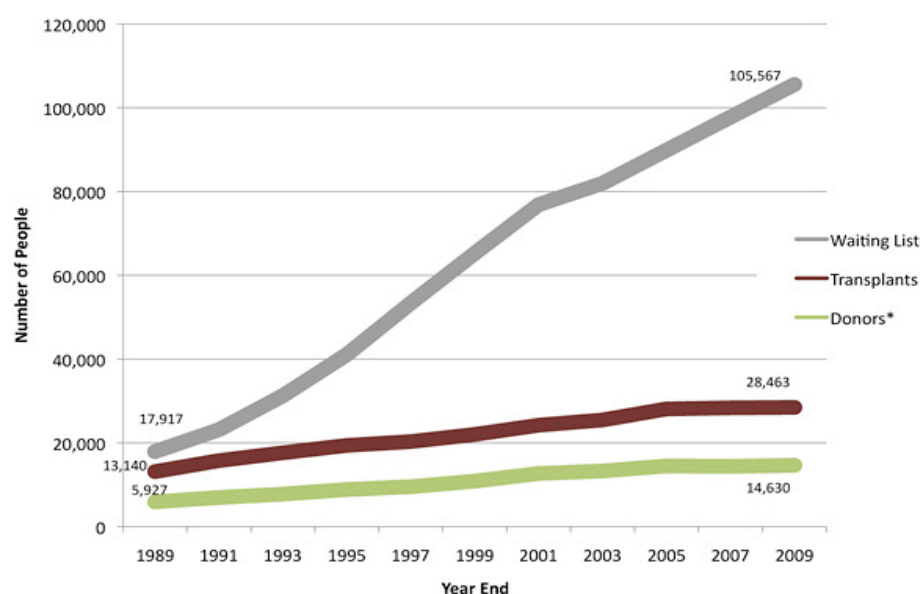
According to a study by Rumsey, Hurford and Cole⁹, three main variables have an effect on people’s attitudes towards living as well as deceased donation. The first variable is education concerning organ donation. The second one are the religious beliefs towards donation and finally it appears that knowing someone who received or donated an organ can have an influence on people’s attitudes toward

^a On the 10th of July 2012

donation.⁹ Another variable that can have an effect on donation is the legislation that is used that deals with organ donation.

Figure 1 shows how the waiting list, which is represented by the grey line, continues to increase. The green line represent both the living and deceased donors.¹⁰

Figure 1: Number of people on waiting lists and number of donors in the United States



In this paper, I will focus on organ donation rather than on organ transplantation because the supply side of organ donation is of main interest. Moreover, the concentration will be on deceased donors rather than on living donors. From 1988 until today, there are a total of 266 743 donors, from which 149 118 are deceased and 117 625 are living donors. In other words, 56% of donors are deceased donors.¹¹ The focus will be on the United States.

An important point is that deceased donors can donate more organs than living donors and as a result one person can save up to eight lives.²

By increasing the number of deceased donors, the number of available organs will increase much more than if the number of living donors increases.

The thesis will try to answer the following questions: *How is organ donation legally organized in the United States and what do the different religions say regarding donation? Moreover, what is the impact of those legal and religious aspects on organ donation?*

As can be read in the research question, the focus will be on the United States. The decision to analyze the United States is because the US is a melting point of a variety of religions and its legal framework regarding organ donation is very interesting.

The two questions will be answered theoretically and empirically respectively. The former will include a general review of the literature regarding law and religion. Moreover, the literature review will also include the most important concepts when dealing with organ donation. The latter will be answered statistically and will be much more specific. In order to answer the question empirically, linear regressions of various variables will be done using SPSS.

Section 2 of the thesis deals with general aspects of organ donation such as the difference between living and deceased donors and the different systems of organ donation that exist worldwide. Section 3 looks at the legal aspects of organ donation, which include the Organ Procurement and Transplantation Network (OPTN) and its consequences as well as the Uniform Anatomical Gift Act (UAGA) of 1968 and its revisions. Section 4 analyzes the attitudes of several religions towards organ donation. Sections 3 and 4 answer the first part of the research question: *How is organ donation legally organized and what do the different religions say regarding donation?*

Sections 5 & 6 consist of an explanation of the variables used in the statistical analysis and its results. This is necessary in order to answer the second part of the research question: *What is the impact of those legal and religious aspects on organ donation?*

Section 7 is a brief discussion of what the limitations of the research are as well as implications for the future. The 8th and final part is the conclusion.

2. General Aspects of Organ Donation

As mentioned in the introduction, this part will consist of general aspects of organ donation. The difference between the two kinds of donors as well as the different systems of organ donation will be explained. Their understanding is of vital importance and will be used to finally give recommendations for the future.

2.1 Living donors vs. deceased donors¹²

As stated in the introduction, the focus will be on deceased donors rather than on living donors. However, it is important to understand the difference between the two.

On the one hand we have the living donors who donate either a complete organ or part of an organ. The only organ that can be donated in the former case is the kidney because it is possible to survive with just one. The kidney is also the organ that is the most donated by a living donor.¹³ The other possibility of living donation is donating part of an organ. This is only possible if the donated part of the organ will regenerate. Examples include part of the liver, pancreas, intestine and lobe of a lung.¹⁴

On the other hand we have the deceased donors, which are also called cadaveric donors. The majority of organs for transplantations are taken from people who have died rather than from living donors. Cadaveric donors are people who are declared brain dead. Brain death means that there is an irreversible loss of brain function as a result of not enough blood supply of oxygen.² After a person has been declared brain dead, his/her organs are kept alive and functional by mechanical ventilation until the transplantation can take place.¹⁵ It is important to mention that there is the Dead-Donor Rule, which basically means that no vital organ can be removed for transplantation before a patient has been declared dead.¹⁶

The perfect donors are young, healthy people who are victims of an accident (such as a motor vehicle accident) or injury, and still have good functions of their organs except for the brain.⁷ A donor should be 70 years old or younger. People with a history of certain conditions such as cancer^b, HIV, or disease-causing bacteria in the blood are not suitable for donation.¹⁷ The number of deceased donors has been declining over the years due to people leading healthier lifestyles, decreasing motor vehicle accidents and of course ageing of the population.¹⁸ The least common type of deceased donors are the ones who died a cardiac death because in this case the organs lose their functions fairly quick and as a result they can not be used for transplantation.¹⁹

The problem with deceased donors is that there are some disagreements about when a person is considered dead. To address this issue, the World Medical Association (WMA) declares that *'the determination of death is a clinical matter that should be made according to widely accepted guidelines established by expert medical groups'*²⁰. According to the WMA, the determination of death should be done as outlined in the World Medical Association's Declaration of Sydney on the Determination of Death and the Recovery of Organs.²¹ This statement explains that the determination of death should be done on the basis of the *'Irreversible cessation of all functions of the entire brain or the irreversible cessation of circulatory and respiratory functions'*.²¹ A physician will be the one to determine whether a person is dead or not, based on clinical judgment. If necessary, standard diagnostic procedures may be done. It is very important to point out that the doctor that declares the patient dead should not be involved in the transplantation in order to avoid conflict of (financial) interest.²² However, after death has occurred, in order to preserve organs for transplantation, it is allowed to maintain circulation to the organs of the body mechanically. This may only be done if legal and ethical requirements have been fulfilled.²¹

^b A person that has been cancer-free for at least five years could be an organ donor.
<https://www.donatelifenc.org/content/frequently-asked-questions>

Another Act that also deals with the case of the determination of death, but is only binding in the United States is the Uniform Determination of Death Act (UDODA) from 1981.²³ This Act is actually very similar to the previous one. Section 1 states that: *'An individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions, or (2) irreversible cessation of all functions of the entire brain, including the brain stem, is dead. A determination of death must be made in accordance with accepted medical standards.'*²³ The most prominent causes of deaths among deceased donors are cerebra-vascular diseases and traffic accidents.²⁴ All fifty states have enacted the UDODA. It is of major importance to have legislations that deal with the definition of death otherwise a person can be kept alive for years and families will never agree for a deceased to become a donor (if no prior consent was given).

Organs that are donated by deceased donors are the heart, kidney, lung, pancreas, liver and intestinal organs.²⁵

In the thesis the focus is on deceased donors because they represent the majority of donors and as mentioned in the introduction, one deceased donor can save up to eight lives. Moreover, the point is to see whether the Uniform Anatomical Gift Act has an effect on organ donation. The UAGA only deals with deceased donors, as living donation raises different legal issues and is dealt with by another act.²⁶

2.2 Systems of organ donation

A very important element in the organ donation process is the donation system that is used. There are 3 systems currently used worldwide: the opting-in, the opting-out and last but not least, the mandated choice system.

2.2.1 Opting-in system^{27 28}

This system, also called explicit consent means that anyone who has not registered to be a donor, is not a donor. Simply put, a person needs to register to

be a donor. This technique is used in Germany, the Netherlands, the UK, Israel etc. When a person opts in, he/she receives a donor card, which should be on the person at all times. In more and more countries it is possible to register as a donor online.

This system is used in the United States, together with the mandated choice system^c. The latter system will be explained more into details hereunder. This is done through the Department of Motor Vehicles (DMV). When people renew their driver's license they can indicate whether or not they would like to be a donor. Moreover, a person can also choose what organs he/she would like to donate.²⁹ Countries with the opting-in system try to find ways to motivate people to register as donors. In Israel for example, registered donors and their close relatives are allowed to jump the waiting list for transplants should they need an organ. It is called it "reciprocal altruism".³⁰ It is the only country that uses non-medical criteria regarding waiting lists. Of course, medical necessity is still the main determinant.³¹ Another example is the Netherlands. When the national donor registry was created in 1998, people received letters at home in which they were asked to register as organ donors. Moreover, a lot of educational campaigns were put in place.³²

2.2.2 Opting-out system⁶

This system, also called presumed consent, is much more common. It basically means that it is presumed that a person wants to donate his/her organs - donor by default - unless he/she explicitly objected donation during his/her lifetime. Singapore was the first country to implement this program and a lot of European countries such as Belgium, France, Spain and Sweden have followed. The opting-out system can be divided into two policies.²⁷ The first policy is the weak presumed-consent policy. In this system the organ recovery team has to consult with the family. Family members of the deceased person have the right to

^c Mandated choice in the sense that people are asked whether or not they would like to be organ donors, however there are three options instead of only yes or no

opt-out. The second policy is the strong presumed-consent. In this case, the organ recovery team must not consult with the family. They have to rely on the deceased person's decision.

The American Medical Association (AMA) rejected the opting-out system and argued that: "*A system of presumed consent for organ donation, in which individuals are assumed to consent to be organ donors after death unless they indicate their refusal to consent, raises serious ethical concerns*".³³ In other words, the society has no right to take a decision for the deceased without knowing his/her preferences. Moreover, the system might be religiously or culturally insensitive.

2.2.3 Mandated choice³⁴

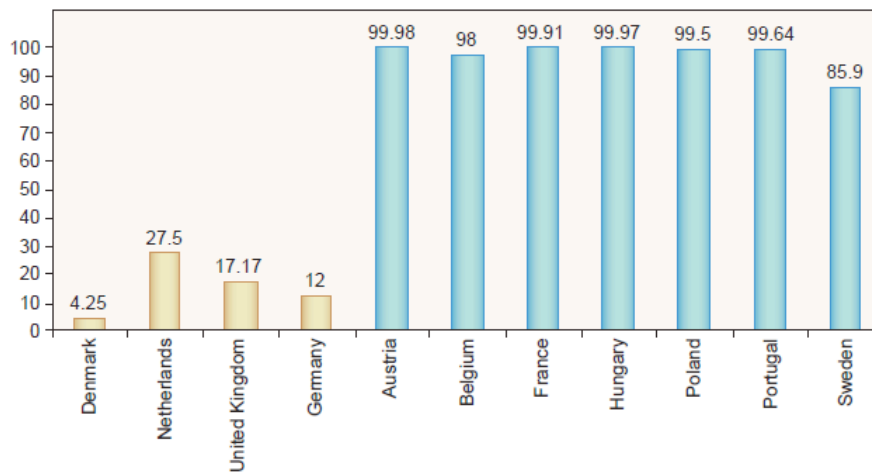
Also known as prompted choice, the system is based on the idea that each individual should have control over his/her body after death.³⁵ Here, people are asked for their preference when they go renew their driver's license or when they complete an income tax return. People are simply asked if they object or consent to donate their organs after death. They should answer by just checking a box stating their organ donation preferences.³⁶ There are three options, namely "yes", "no" and "uncertain" or "let someone else decide".³⁷ In Texas, mandated choice was implemented but with only two options: "yes" and "no". This led to a negative result as 80 percent chose not to donate their organs.³⁸ As a result the law was revoked in 1997 because of the high rate of objection. It is believed that so many people objected to donation due to the lack of education on the subject.

The task of renewing the driver's license is not considered complete as long as an individual has not responded to the question regarding organ donation. The registered choice will be legally binding upon the individual's death.⁷ Moreover, people can specify which organs they would like to donate after death. As opposed to opt-out system, under mandated choice, individual autonomy will be protected since people's wishes are known.²⁷ This system has been criticized for being coercive, since people are obligated to make a decision. Moreover, people

who do not want to think about death or organ donation are forced to do so. On the other hand, mandated choice makes people more aware of organ donation while preserving individual autonomy.⁷ Also, since there is the option of “uncertain” the system is not completely coercive.

In Figure 2 we can see that the opt-out system yields much higher donation rates than countries using the opting-in system. The green bars represent the opting-out countries while the yellow bars represent opting-in countries.³²

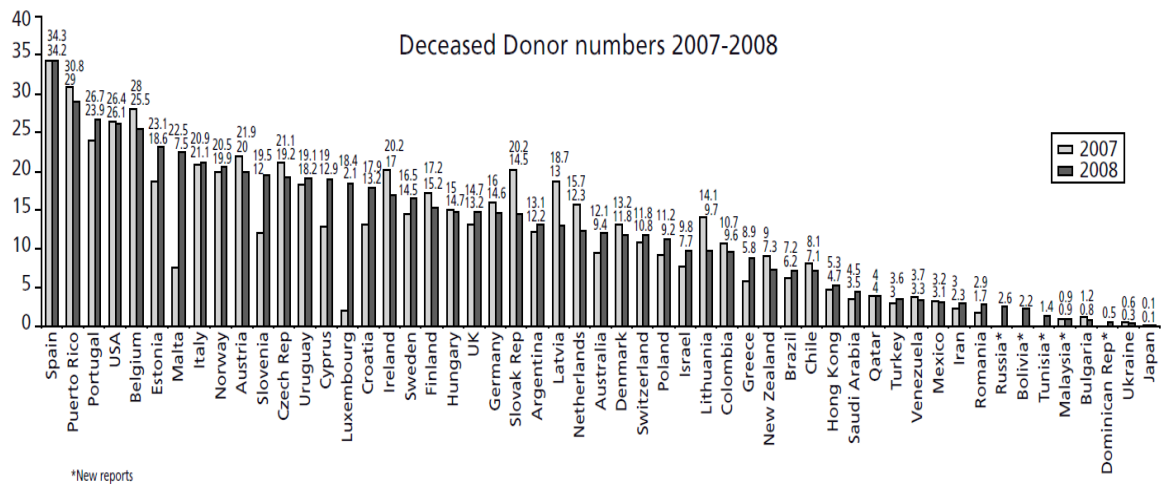
Figure 2: Comparison of opt-in and opt-out countries and their donation rates



The consent rule is not the only determinant of the donation rate. The United States has a donation rate that is higher than some countries that have the opt-out system. The medical system in the United States is superior to other countries thanks to its ability to match donors with recipients, performance of successful transplants and delivery of the organs.³⁶

The next figures show a ranking of countries based on the deceased donors per million population for certain years. This is shown in order to have an idea of where the United States stands.

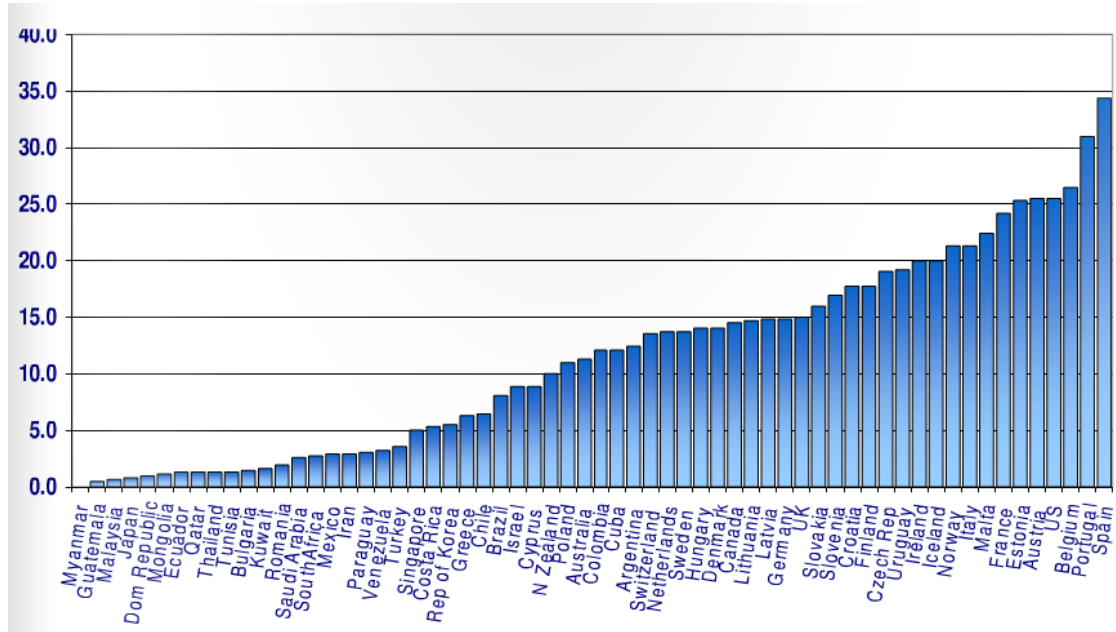
Figure 3: Deceased donors per million population in 2007 and 2008³⁹



The leading country in organ donation in 2008 is Spain with 34.2 deceased donors per million population. Spain has an opt-out system.⁶ The country with the lowest number is Japan with 0.1 deceased donors per million population. This is probably as a result of the dominant religion in Japan, Shintoism, which is against organ donation. We can see that the US is 4th in the rating with 26.1 deceased donors per million population.^d

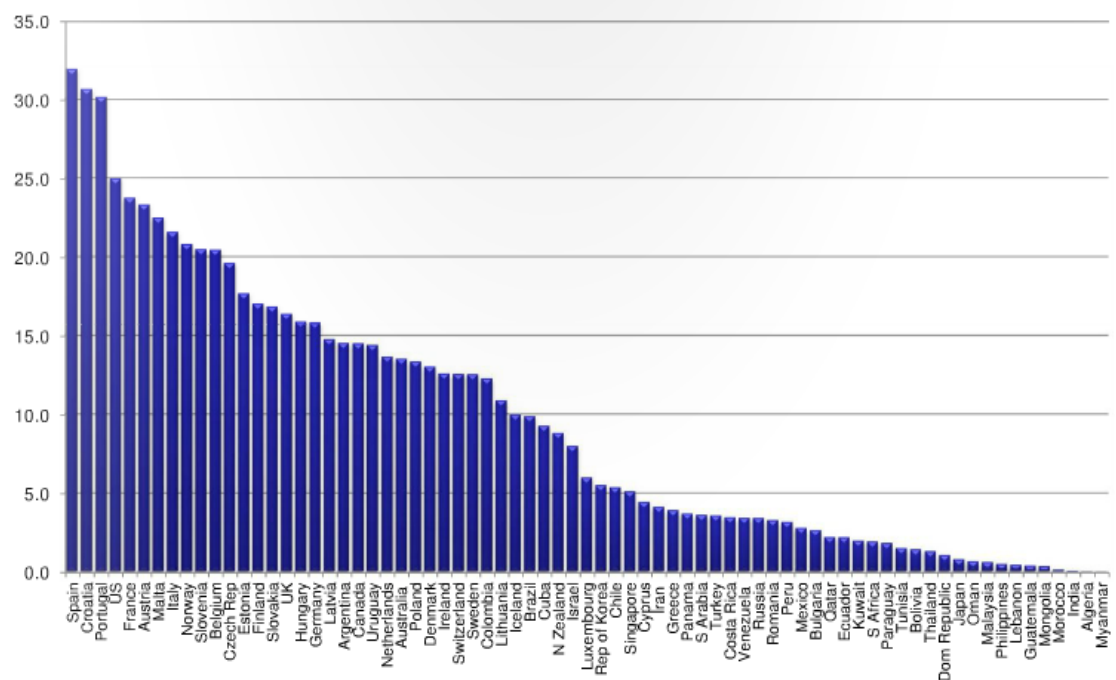
^d My calculation to obtain the number of deceased donors per million population is different than in the report since I did not include all the states while the report did

Figure 4: Deceased donors per million population of different countries in 2009⁴⁰



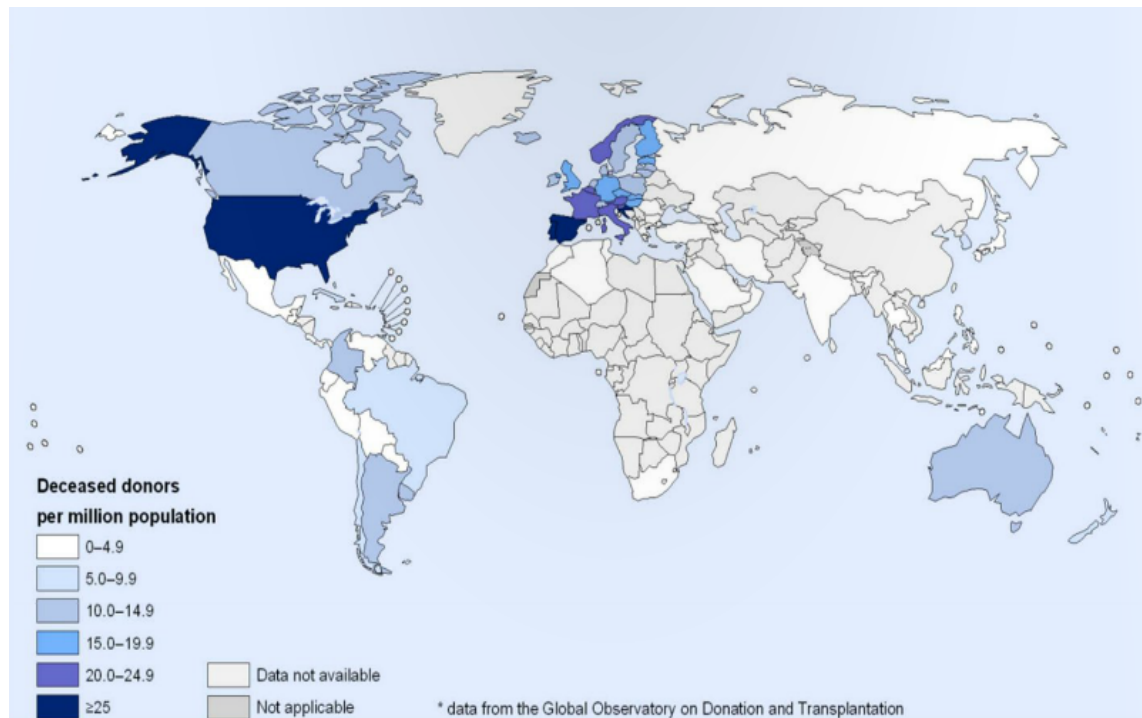
Again, Spain is the leader with about 34.4 deceased donors per million population. The lowest number of deceased donors occurs in Myanmar. Here Japan increased its deceased donors per million population from 0.1 in 2008 to 0.8 in 2009.⁴¹ The country with the lowest number is Myanmar.

Figure 5: Deceased donors per million population of different countries in 2010⁴²



Spain is once again the leader in 2010. The US ranks 4th, which is high since usually opting-out countries rank much higher than opting-in countries.^e

Figure 6: Deceased donors per million population around the world in 2010⁴²



As can be seen on the map above, North America and Europe have the highest rates.

^e Here we see that the US is fourth while opting-out countries such as Belgium have a lower number of deceased donors per million population

3. Legal Aspects of Organ Donation

The two main legislations dealing with organ donation in the United States are the National Organ Transplant Act (NOTA) and the Uniform Anatomical Gift Act (UAGA). The former explains how the whole process of donation is organized. The latter mostly deals with consent and how anatomical gifts are done. UAGA will also be used further, in the statistical analysis in order to answer the research question.

3.1 National Organ Transplant Act^{43 44 45}

The Act was introduced in 1984 by the U.S. Congress. The NOTA has several purposes. Firstly it forbids the buying and selling of human organs; organs should be donated as a gift. This was established out of fear that a commercial market would emerge in which poor people would be the most important source of organs.⁸ Secondly, it established the Organ Procurement and Transplantation Network (OPTN), which is a network for matching organs. Thirdly, it established grants for organ procurement organizations.⁴⁶ Finally, the Task Force on Organ Procurement was established.⁴⁶

3.1.1 Organ Donation as a Gift⁴⁷

It is of great importance to talk about the gift law. A gift is defined as: *“A voluntary transfer of property or of a property interest from one individual to another, made gratuitously to the recipient. The individual who makes the gift is known as the donor, and the individual to whom the gift is made is called the donee.”*⁴⁸ In our case the property is an organ and the donee is the recipient of that organ. Also, a gift is legally recognized if it fulfills three elements: delivery, acceptance and donative intent. Delivery is complete when organ is delivered directly to the recipient or to a third party on behalf of the recipient, which are the people involved in the recovery and transportation of the organ. Second, the acceptance

occurs when the recipient agrees to take the organ. Finally there is the concept of donative intent, which is the most important element.⁴⁷ A gift can't be made without a legal document, called consent. The anatomical gift is made by the donor himself or by his family if his/her wishes are unknown. The consent can be under the form on a donor card, donor registry or a driver's license. The concept of gift is very important because it should be clear that organs can not, in any case be sold for money.

Interestingly, the only country in the world that allows buying and selling of organs is Iran, where a working and legal payment system for organ donation was put in place. This was legalized in 1988 and is called *Living-non-related Donation*. This system however is only for living kidney donation. The legislation led to elimination of the renal transplant waiting list.⁴⁹

3.1.2 Organ Procurement and Transplantation Network (OPTN)

The Organ Procurement and Transplantation Network is a system that matches the available organs with potential donor recipients. The OPTN has been operated by the United Network for Organ Sharing (UNOS) under contract with the U.S. Department of Health and Human Services since 1986. The UNOS is a nonprofit corporation that has a tax-exempt charitable status, as it is a scientific and educative organization.⁴⁶ A board of directors leads the UNOS, which is the same board as the OPTN. The board consists of a group of 41 members that are unpaid volunteers and comprises of voluntary health organizations, transplant coordinators, transplant physicians, transplant surgeons, regional councilor, donor families, members of the general public etc.^{44 50}

The OPTN operates a database called the Organ Center, that actually tries to find matches between donors and recipients through a national computer network that is accessible 24 hours a day, 365 days a year.⁴⁴ The database continuously changes as new names are added to the waiting lists and new organs become available.⁴³ Members of the OPTN that enter data in the software are Organ Procurement Organizations, transplant centers and histocompatibility laboratories.⁵¹ Several elements are taken into account such as blood type,

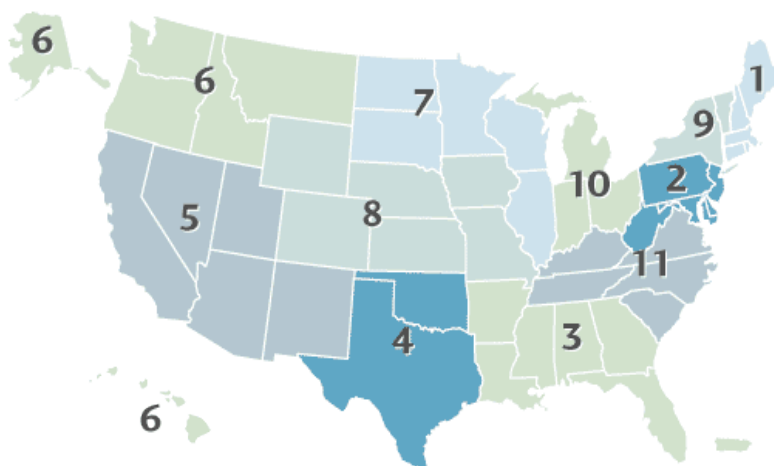
genetic characteristics, size and tissue match with the donor. The two most important factors taken into account are the geographic area of both the available organs and the potential recipient, and the medical urgency. Medical urgency is especially important for transplantation of thoracic organs such as the heart and the lung. They are mostly allocated first regionally and then nationally.⁴⁶

The United States is divided into 62 local areas grouped into 11 regions (which is shown in Figure 3 hereunder). Each region has its own organizations that coordinate the organ donations. These organizations are called organ procurement organizations, generally known as OPOs (which will be explained into details on the next page). The element of location exists because the time between recipient and donor is very important. The longer the time to get an organ from a donor to a recipient, the less the chance of success of the transplantation. When organs become available they are firstly offered locally, then regionally and finally if there is still no match, countrywide.⁴⁶

The OPTN has to assist organ procurement organizations in the distribution of organs that could not be used in the OPOs geographical area.

Every region meets at least twice a year with the purpose of exchanging information, discussing and commenting on issues. Also, each region has to vote for regional councilors and associate regional councilors.⁵²

Figure 7: The 11 regions of the United States⁵³



3.1.3 Organ Procurement Organizations (OPOs)

OPOs are private non-profit organizations that try to increase the donor registrations and coordinate the organ donation process.⁵⁴ Each OPO has to be a member of the OPTN and is staffed by a healthcare professional. Moreover, each OPO is supervised by a medical director.⁵⁵ There are 58 OPOs, which provide all the organs of deceased donors within a designated service area (DSA) for a total of 287 transplant centers. OPOs can be hospital-based or independent organizations.⁵⁵ They try to motivate people to register as donors by organizing activities such as sponsoring programs in schools and advertising campaigns.⁵⁴

Organ Procurement Organizations deal with the whole process of donation. When a hospital in their area notifies them of a possible donor, they have to deal with the consent, check if the person is suitable to be a donor, obtain a list of potential recipients from the OPTN and finally deal with the transportation of the organs.⁵⁶ The OPOs receive money grants if they show that they are a nonprofit organization.^{8 46} The money is given in order to promote awareness of the organ donation process, evaluate suitability of potential donors and of course coordinate hospitals through the whole process of organ donation.^{8 57}

The national representative of the 58 OPOs is called the Association of Organ Procurement Organizations (AOPO).⁵⁸

3.1.4 Task Force on Organ Procurement and Transplantation⁵⁹

The Task Force on Organ Procurement and Transplantation was established by the NOTA. Its responsibility is to put in place standards and processes for evaluating policy issues of organ transplants. In other words, the Task Force has to address issues such as the financing of the transplantations, assurance of equality of access, the criteria used to select patients, and legal issues regarding consent for organ donation. Moreover, they should give recommendations regarding these issues. The Task Force also recommended that all the hospitals implement routine inquiry.⁸ This means that when a person dies, the hospital

staff must ask the families whether or not they would like to donate organs of the deceased. Hospitals that do not do that could lose Medicare or Medicaid funds. The Task Force comprises of 25 members including healthcare professionals, representatives of religious groups, public officials and members of insurance company.⁵⁹

In 2000, the UNOS implemented the Final Rule.⁶⁰ This was done in order to increase the supply of organs and to ensure that the donations are allocated equitably to those with the greatest medical urgency because there was inconsistency among the states.⁶⁰ The idea is that each person in need of a transplant should be seen as a potential recipient and should have the same chance of receiving an organ as someone else who lives closer to the organ donor. In other words, allocation should not be on the basis of geographical area but on the basis of medical need.⁶¹

Despite the Final Rule, states still give priority to the local patients because they are afraid that willingness to donate would decline. As a result the organs are donated locally or regionally and if there is no match, the organs are offered nationwide.⁶²

3.2 Uniform Anatomical Gift Act (UAGA)

3.2.1 UAGA of 1968

The Uniform Anatomical Gift Act is the first Act dealing with organ donation and was promulgated in 1968 by the National Conference of Commissioners on Uniform State Laws (NCCUSL).⁶³ Before its enactment, organ donation was dealt with on a state-to-state base and was very different among the different states.⁶⁴ The UAGA was introduced shortly after a successful heart transplant in 1967.⁶⁵ It was introduced in order to increase the supply of organs, facilitate the process of making anatomical gifts and to have uniformity among the states. Moreover, it was introduced in order to prevent the enactment of the presumed consent.⁶⁶ The

^f Their function is to make laws more uniform among the different states

UAGA deals with issues such as: who can make a gift during his lifetime; what is the right of the next of kin to make an anatomical gift from the dead body; who may legally become a donor; how should a gift be made; how may a gift be revoked etc.⁶⁷ The Act was passed by all 50 states by 1973.⁶⁸

3.2.2 UAGA of 1987

In 1987, the UAGA was revised because the version of 1968 version did not address important advances in transplantation that developed over time nor did it address the sale of organs. The Act was revised in a few ways.⁶⁹ Firstly, family of the (potential) donor does not need to give consent, the decision of the donor before death is enough. Secondly, in the case that a deceased person did not declare whether or not he/she wants to be a donor after death, the family makes the decision. Also the UAGA 1987 introduced the prohibition of the sale of human organs. Another goal of the revision was to strengthen the donor's decision. The 1987 Act was adopted by 26 states, which led to non-uniformity of the state laws.²⁶

3.2.3 UAGA of 2006

The third and final revision of the Act was in 2006.²⁶ This time, it strengthened the decision of an individual to donate his/her organs by barring others from changing his/her decision after death. The individual should simply sign the document of gift and witnesses are no longer necessary. In the case the donor is physically unable to sign a document of gift, another person may do it for him/her. In this case it should be witnessed by at least two persons.²⁶ The person deciding for the individual must be the one in charge of making decisions regarding health care during the individual's lifetime. People with that power are mostly parents and health care agents with power of attorney.⁶⁵ ²⁶ When dealing with a minor, parents are asked to make a decision regarding the donation unless the deceased was old enough to apply for a driver's license. In this case the

decision of the individual is legally binding and parents are not allowed to change it.²⁶

Most importantly, the 2006 Act simplifies the document of gift by expanding the list of individuals allowed to take a decision for the deceased - in the case that the deceased did not sign a document of gift. The people included in the list should be reasonably available - they should be easily contacted by the organ procurement organization and should be able to make a decision in the time needed to make the anatomical gift. The list was expanded in order to facilitate the donation.⁷⁰ The list is cited hereunder in order of priority.²⁶

- 1. Healthcare agent or power of attorney if he was given the responsibility to make an anatomical gift by the deceased*
- 2. the spouse of the decedent*
- 3. adult children of the decedent*
- 4. parents of the decedent*
- 5. adult siblings of the decedent*
- 6. adult grandchildren of the decedent*
- 7. grandparents of the decedent*
- 8. an adult who exhibited special care and concern for the decedent*
- 9. the persons who were acting as the [guardians] of the person of the decedent at the time of death; and*
- 10. any other person with the responsibility to dispose of the body*

Another important goal of the 2006 Act was to accelerate the time to determine whether an individual is a donor. The way to do that is to increase the access of organ procurement organizations to documents of gift in medical records and donor registries.⁷¹ The Act states that medical examiners and coroners are forbidden to make anatomical gifts in the case that a body is unclaimed for a

certain period of time or if the deceased has no family.⁶⁶

Despite what the UAGA says regarding the registration of a person to be a donor, namely that the person's decision is legally binding, some hospitals still ask for the consent of the next of kin. If the family objects to donation, no organs will be donated. As a result, the First-Person Consent⁷² was put in place. This law states that hospitals have to donate the organs of the deceased without asking the family's permission as long as the deceased had a valid donor card, is in the donor registry or he designated his willingness to be a donor after death in his driver's license.⁶⁸ In other words, no person can change the individual's decision regarding organ donation after death. The First Person Consent removes the burden of the family of deciding whether a deceased should be a donor or not. Moreover, it also prevents the issue of family members disagreeing about the subject.⁷³

In May 2012, the UAGA of 2006 was enacted in all US states except for Delaware, Florida, Illinois, New York and Pennsylvania.⁷⁴

The purpose of the paper is to see whether the legislation influenced organ donation in the United States. In the statistical analysis, the Uniform Anatomical Gift Act of 2006 is used. This is done because this version of the Act is the most up to date and has the most expanded definitions and clearest rules about who can donate and in which cases, who can decide when no consent was given etc.

Hereunder are two tables. The first one shows all the states with its current UAGA version and the second table demonstrates when each of them introduced the different Uniform Anatomical Gift Acts.⁷⁵

Table 1: Current UAGA versions

	UAGA version		UAGA version
Alabama	2006	Montana	2006
Alaska	2006	Nebraska	2006
Arizona	2006	Nevada	2006
Arkansas	2006	New Hampshire	2006
California	2006	New Jersey	2006
Colorado	2006	New Mexico	2006
Connecticut	2006	New York	1987
Delaware	1968	North Carolina	2006
Florida	1987	North Dakota	2006
Georgia	2006	Ohio	2006
Hawaii	2006	Oklahoma	2006
Idaho	2006	Oregon	2006
Illinois	1968	Pennsylvania	1987
Indiana	2006	Rhode Island	2006
Iowa	2006	South Carolina	2006
Kansas	2006	South Dakota	2006
Kentucky	2006	Tennessee	2006
Louisiana	2006	Texas	2006
Maine	2006	Utah	2006
Maryland	2006	Vermont	2006
Massachusetts	2006	Virginia	2006
Michigan	2006	Washington	2006
Minnesota	2006	West Virginia	2006
Mississippi	2006	Wisconsin	2006
Missouri	2006	Wyoming	2006

Table 2: Years of UAGA enactments^{g-h}

	UAGA 1968	UAGA 1987	UAGA 2006
Alabama	1970	2003	2008
Alaska	<i>N/A</i>		2008

^g An empty case means that the UAGA was not enacted

^h It was found that 26 states enacted the UAGA of 1987, however after thorough research I only found 25 out of 26 states that enacted that version

Arizona	<i>N/A</i>	1996	2007
Arkansas	1970	1989	2007
California	<i>N/A</i>	1989	2008
Colorado	1970		2007
Connecticut	1970	1989	2010
Delaware	<i>N/A</i>		
Florida	1970	N/A	
Georgia	1970		2008
Hawaii	1970	1988	2008
Idaho	1970	1989	2007
Illinois	1970		
Indiana	1970	1996	2007
Iowa	1970	1995	2007
Kansas	1970		2007
Kentucky	<i>N/A</i>		2010
Louisiana	<i>N/A</i>		2010
Maine	1970		2008
Maryland	1970		2011
Massachusetts	1971	N/A	2012
Michigan	1970		2008
Minnesota	1970	1991	2007
Mississippi	<i>N/A</i>		2008
Missouri	1970		2008
Montana	1970	1989	2007
Nebraska	1971		2010
Nevada	1970	1989	2007
New Hampshire	<i>N/A</i>	1997	2010
New Jersey	1970		2008
New Mexico	1970	1995	2007
New York	<i>N/A</i>	N/A	
North Carolina	1970		2007
North Dakota	1970	1989	2007
Ohio	1970		2009
Oklahoma	1970		2009
Oregon	1970	1995	2007
Pennsylvania	<i>N/A</i>	1995	
Rhode Island	1970	1989	2007
South Carolina	1970		2009
South Dakota	1970		2007
Tennessee	1970		2007
Texas	1970		2009
Utah	1970	1990	2007
Vermont	1970		2010
Virginia	<i>N/A</i>	1990	2007
Washington	1970	1993	2008
West Virginia	<i>N/A</i>		2008
Wisconsin	1970	1990	2008
Wyoming	1970		2009

3.3 Efforts to increase organ donation

3.3.1 Organ Donation Breakthrough Collaborative (ODBC)⁷⁶

In order to increase the organ supply, national leadersⁱ and practitioners introduced the Collaborative in 2003. The idea of the Collaborative was to considerably increase the access to organs in the whole country.^j In other words, it is a quality improvement initiative, which was funded and managed by the Division of Transplantation in the Health Resources and Services Administration.⁷⁷ In order to reach that goal, the hospital staff (nurses, physicians) needed to participate much more in the donation process. Before that, the OPO that was serving a hospital was the only party responsible for the performance of a donation.

Organ procurement organizations had to report for every hospital the number of eligible donors and the number of actual donors in order for the government to calculate the conversion rate (actual donors/eligible donors). The average conversion rate in 2002 was around 52% and ranged between 0% and 100%. The objectives were to understand these variations and how to improve this number by analyzing the best performing organizations. The goal of the Collaborative was to reach a conversion rate of 75%.

95 large hospitals and 43 organ procurement organizations sent teams of nurses and hospital staff to collaborative learning sessions in order for them to optimize the organ donation process in the hospitals.

The Collaborative was a big success. By April 2005, 46 of the 95 participating hospitals achieved a conversion rate of 75%. Donations from deceased donors increased both in the participating hospitals as well as in the non-participating hospitals, by 16% and 9% respectively.⁷⁶ The conversion rate continued to increase until 2008 but in since that year, there was no improvement and the

ⁱ It includes the President of the AOPD, the executive director of the UNOS and the chairman of the board of the Institute for Healthcare Improvement (IHI)

^j Some Canadian hospitals participated as well

majority of OPOs still do not meet the goal of 75%.⁷⁸

3.3.2 Donor Designation Collaborative (DDC)⁷⁹

DDC was launched in 2006 by Donate Life America with the purpose to increase the donation rates and ensure that all the states have an effective system for individuals to register themselves as donors. The idea was to develop donor registries where there were none, improve the ones that did exist at the time and increase the enrollment in the registries nationwide.⁸⁰ The DDC goals were firstly, achieving a rate of more than 50% of registry enrollments of persons issuing a driver's license or identity card and secondly, having more than 100 million registrants.⁸⁰

Every year, a National Donor Designation Report Card is published and gives an overview of the registry systems of the majority of states. The states that have considerably improved are used as examples to those who have not. Table 3 shows the states with the highest Actionable Donor Designations^k (ADD) for 2010⁸¹.

Table 3: States with the highest ADD of 18+

State	ADD +18
Alaska	76%
Montana	76%
Utah	72%
Washington	72%
Oregon	71%

^k ADD18+ = the number of designated donors/all residents of the state older than 18

4. Religious Aspects of Organ Donation

A very important barrier to organ donation is the religious beliefs and the common misconception that certain religions do not allow it.⁸² Many religions consider the human body as a gift of God. Moreover, they all deal with the notion of altruism and donating an organ in order to save or enhance a human life is viewed as an act of generosity. However, a lot of people assume that their respective religion do not allow organ donation, even though most religions allow it and in most cases even promote it.¹ When talking about living donation, it is allowed as long as the donor consents to the donation and the transplantation does not involve any risk to the donor.⁸³ Hereunder are brief explanations of the main religions regarding organ donation.

4.1 Religion in the United States

As the thesis is about the United States, it is important to know what the religions are in the US. In the US the number of religious groups is greater than in any other country.⁸⁴ In 2008, 76% of the population identified themselves as Christians, 25.1% as Catholic and 50.9% as other Christians. Moreover, 1.2% identified themselves as Jewish, 0.6% as Muslims, 0.9% from Eastern religions, 1.2% identified themselves as New Religious Movements^m and the rest either identified themselves as having no religion or did not want to answer the question.⁸⁵ Interestingly, the number of Catholics grew by 0.6% from 2001 to 2008 while the number of Other Christians declined by 1.3%.⁸⁵

¹ Personally, before writing this thesis, I was sure that my religion, which is Judaism, did not allow organ donation

^m New Religious Movements include Jehovah's Witnesses, Scientology, Hare Krishnas etc. They are often considered cults by the public. Paul J. Olson, "The Public Perception of "Cults" and "New Religious Movements" *Journal for the Scientific Study of Religion*, 45(1);97-106 (2006)

4.2 Religion & Organ Donation⁸³

4.2.1 Christianity

The two largest groups in the Christian religion are the Protestants and the Catholics. The former can be subdivided into several denominations while the latter is a single denomination. The main difference between both is that Protestantism denies the universal authority of the Pope and encourages individual interpretation of the scriptures while the Catholics believe in the authority of the Pope and have one interpretation of the scriptures.⁸⁶ As a result of the individual interpretations by the Protestants, different groups were formed. The largest Protestant denomination is the Baptists. Other denominations include Evangelicals, Lutheranism, Presbyterianism, Reformed, Methodists, Amish etc.⁸⁷

The different Christian groups are all in favor of organ donation and view donation to a person who needs it as a last good deed, an act of generosity.⁸³

For example, the Presbyterian Church encourages since 1995 all its members to have a universal donor card. Moreover, the Lutheran Church announced that organ donation is considered as “*expressions of sacrificial love for a neighbor in need*”. Even the Amish, who are against adoption of modern technology, are in favor of donation if it can help the recipient.⁸⁸

The way in which organ donation was promoted to the Catholics, was with the announcement of Pope Benedict XVI in 1991 at the first International Congress of the Society for Organ Sharing, in which he said that he is registered as an organ donor.⁸⁹ ⁹⁰ Before becoming the current Pope, Cardinal Joseph Ratzinger also announced in 1999 that he is registered as a donor.⁹⁰ He said “To donate one’s organs is an act of love that is morally licit, as long as it is free and spontaneous”.⁹¹

Jehovah's Witnesses see themselves as Christians while traditional Christian Churches do not because they reject the Christian doctrine of Trinityⁿ. A lot of people view Jehovah's Witnesses as a cult.⁹² As Jehovah's Witnesses are against blood transfusion, many people believe that they oppose to organ donation as well. Organ donation is allowed only when all the blood was drained from the organ before the transplantation.⁹³

4.2.2 Islam

Islam thinks of life as an important gift of God that should be preserved and respected. In other words, violating the human body is forbidden. However, altruism is a very important element. Transplantation is based on a few principles; Firstly, if it is not written that it is forbidden than it is allowed. Second, everything belongs to God and thirdly, organ donation is based on good intentions. However, organ transplantation should only be done if the physician says that this is the best treatment.^{83 89}

4.2.3 Judaism

In Judaism, a few problems arise when talking about organ donation. Firstly, when a Jewish person is buried, it should be a full burial. This means that all parts of the body should be buried. Secondly, a dead body should be respected and dignified. Thirdly, immediate burial should take place. Fourth, it is not allowed to benefit from a corpse.^{83 94} However, despite these principles, there is one element in Judaism that is more important than all of the above, which is the element of saving and enhancing life. This is called *pikuah nefesh*.⁸⁹ Organ donation is allowed if the donor's life is not destroyed in order to save another life. Despite this, some Orthodox Jews still object to organ donation.⁹⁰ Another issue in Judaism is when is a person considered dead. Some say it is the case when the heart stops beating and others say that death occurs when the whole brain dies.

ⁿ This doctrine views God as three great persons: the Father, the Son and the Holy Spirit. This view is rejected by Jehovah's witnesses as they believe that Jehovah is the only God, Jesus Christ is his son and the Holy Spirit is not a person but a force

Some Orthodox Jews think brain death is not sufficient. As a result, people can request a donor card from the Halachic Organ Donor Society (HODS) in which they can indicate in what case they give their consent for organ donation, when the heart stops beating on the one hand or in the case of brain death on the other hand.⁸⁹ HODS is a non-profit organization that promotes organ donation by explaining how organ donation is allowed according to Judaism.⁹⁵ Living donation is allowed as long as the risk to the donor is considerably smaller than saving the life of another person.⁹

4.2.4 Hinduism

Hinduism, which is followed by 1 billion people around the world, believes in reincarnation and karma. How a person acts during his/her lifetime will determine what his/her fate will be in the next one. It is important to help those that are suffering, and thus organ donation is very important. The mythology includes stories in which body parts of one person were used to save other persons.^{83 89 94}

4.2.5 Buddhism

The Buddhist religion is divided in two groups. The problem here is that some Buddhists believe that the consciousness of a person remains in the body days after a person has died. As a result, like in Judaism, there is the issue of when a person is considered dead. Some are opposed to deceased organ donation and some think that it is decision that should be left to the individual.^{83 89}

4.2.6 Shintoism

Finally, Shintoism, which is the religion in Japan, believes that a person is born pure and becomes more and more pure while living. A dead body is considered impure and it is also believed that any interference with a dead body will bring bad luck. As a result, deceased donation in Japan is one of the lowest worldwide.⁸³
⁹⁴ Living donation however it completely permitted since a living person is pure.

In 2007, 83% of all renal transplants were from living donors.⁹⁶

4.3 Catholicism & Organ Donation

In the empirical analysis, Catholicism will be taken into account in order to answer the research question. As mentioned above, the Catholic group is actually the biggest group since Protestantism is divided into different denominations. Moreover, Catholicism is the only religion that follows the universal authority of one person, which is the Pope and since he promotes organ donation, it is interesting to see whether it has an effect on donation.

5. Data and Analysis

5.1 Data

The dataset used in the linear regression consist of several variables, which will be explained hereunder. Linear regressions were done in order to answer the research question empirically.

Most importantly, there is the dependent variable. This variable, called *Deceased_donors*, represents the deceased donors for a certain year. In the analysis, the number of donors per state per year was used. The total number of deceased donors was divided by the population for that year for that specific state. Subsequently, this number was multiplied by 1,000,000 in order to have the number per million population. This last step is done with almost all the variables in order to have the numbers per million population. The population of each state for each year can be found on the governmental website of United Sates Census Bureau.⁹⁷ The number of deceased donors was found on the website of the Organ Procurement and Transplantation Network. On the website an advanced data report can be build.⁹⁸ The states for which information regarding the deceased donors was not available are Alaska, Delaware, Idaho, Maine, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota, Vermont, West Virginia and Wyoming.

Secondly, there is the variable of *UAGA*. This represents the Uniform Anatomical Gift Act of 2006. This Act was not implemented by all the states and those which did enact it, did it in different years.

The name of the variable was adapted to each year. This means that for the year 2008 it was named *UAGA_2008*, for 2009 it was named *UAGA_2009* etc. For a clearer explanation of what the variable really represents, let us take *UAGA_2008*. In SPSS, the value of "1" was given to the states that implemented the Uniform Anatomical Gift Act before 2008. The value of "0" was given otherwise. These include the states that implemented the Act in 2008 or later and the states that

did not implement the Act at all. This was done for the different years. Information about whether or not states implemented the UAGA of 2006 and in what year was found on a governmental website of the United States.⁹⁹

The variable *Deaths* represents the total number of people that died per state in the specific year. This number was then divided by the total population in the same year and then multiplied by 1,000,000. Data about the number of deaths was found on the governmental website of the Centers for Disease Control and Prevention. Each year, they publish a report called the *National Vital Statistics Report*.¹⁰⁰

The next variable used is *Catholics*. As mentioned in the theoretical framework, I wanted to include religion as an independent variable because I believed that it was forbidden by several religions. As it turned out, when researching, it was found that the vast majority consider donating an organ as an act of generosity. Despite this, I decided to include one religion, which is Catholicism. However, the only data that I found per state was for the year 2008. This is why this variable was not included in any other year.¹⁰¹ There was no need to divide by the population because the information found was already in percentage. Data about the percentage of Catholics was available for all the states except for Alaska and Hawaii.

GDP_per_capita was introduced simply to see if a higher GDP an effect on the number of deceased donors. Information was found on the website of US Department of Commerce Bureau of Economic Analysis.¹⁰²

The next variable that was used for the years 2008 and 2009 is the *Educational_Attainment*. These numbers represent the percentage of people aged 25 and older who have a high school education or more. It was interesting to include this variable in order to see whether states with more educated people have higher donation rates. In other words, whether education has an effect on donation.¹⁰³

Another variable used is *Motor_vehicle_fatalities*. Data was only available for the years 2008, 2009 and 2010. It represents the number of people that died as a

result of motor vehicle fatalities. Since a lot of these deceased people are suitable for organ donation, because brain death is usually the result of such an accident, I wanted to see if this had an effect on deceased donor rate. Here again, the number found was divided by the population of that year and then multiplied by 1,000,000 in order to obtain a percentage. Information was found on the website of the US Department of Transportation.¹⁰⁴

Last but not least is the variable *Potential_Donors*. It actually represents a more accurate number of people that could be donors. In other words, it is more specific than simply the total number of deaths. The variable was found using a calculation: (Total number of deaths) – (number of deaths of people older than 70) – (total number of deaths due to HIV) – (total number of deaths due to cancer). The reason I decided to calculate this was simply because firstly, the maximum age of a deceased donor is 70 years, so all those older are not taken into account. Secondly, if organs are donated from people with the Human Immunodeficiency Virus (HIV) or with malignant neoplasms (cancer), the recipient can also become sick. The total number of deaths due to HIV and cancer were only for those under the age of 70 (since the deaths of those over the age of 70 were already subtracted). The data on detailed mortality can be found on the website of Centers for Disease Control and Prevention.¹⁰⁵ Here again, the final number found after subtraction was divided by the population of a particular state in a particular year and afterwards multiplied by 1,000,000. Data was only available for 2008 & 2009.

5.2 Statistical Analysis

Linear regressions were made using SPSS version 17 for the years 2008, 2009, 2010 and 2011. As mentioned, the goal is to see what the impact of the Uniform Anatomical Gift Act of 2006 is on organ donations in these years. Moreover, the impact of religion on organ donation is also of interest. Each additional regression includes an additional variable. The explanation of each variable is in the section above.

The last table (table 13) will include all the data of 2008, 2009 and 2010. Some data was unavailable for certain years. In order to pool all the data and make the linear regressions, I filled in the cases for data that was unavailable. For *Catholics*, I used the percentage of 2008 for 2009 and 2010. This could be done as the number of Catholics per state changes very slowly anyways. For *Educational_Attainment*, I took the values of 2009 and plugged them in for 2010 as well (since no information was available for that year). Finally, *Potential_Donors* was not taken into account since I did not want to use information of a different year. The reason for this is because the numbers change quite a lot and the real number is important here.

6. Results

6.1 Descriptive

Table 4 gives an overview of all the deceased donors per million population from all the states included from 2008 to 2011 for which data regarding the number of deceased donors was available.⁹⁸ The four tables thereafter show the minimum, maximum and mean of the variables. Here, I did the same by only including the states that are taken into account in the regressions. This means that Alaska, Delaware, Idaho, Maine, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota, Vermont, West Virginia and Wyoming were not included since no data regarding the deceased donors was available for these states.^o As a result, 38 states were taken into account in all the tables except for the variable Catholics where 37 states were taken into account.^p This was done in order to better observe whether or not there are relationships between the different variables and deceased donors.^q

Table 4: Deceased donors per million population for 2008, 2009, 2010 and 2011

	2008	2009	2010	2011	Average
Alabama	28.01	25.91	28.84	22.90	26.41
Arizona	19.08	17.28	18.56	25.92	20.21
Arkansas	19.88	23.88	19.85	22.80	21.60
California	22.50	21.59	21.02	23.06	22.04
Colorado	23.30	22.89	25.75	26.19	24.53
Connecticut	11.70	10.23	13.15	9.50	11.14
Florida	29.42	27.62	28.98	29.86	28.97
Georgia	26.71	25.64	29.24	25.88	26.87
Hawaii	28.74	23.93	24.94	34.19	27.95
Illinois	21.33	22.08	20.17	22.30	21.47

^o Deceased donors per million population is the dependent variable

^p Since no data is available for Hawaii

^q This means that the real maximum or minimum value of the variable (i.e. GDP) is not in the table if the maximum/minimum is in the value of the states that were not included. Basically the tables only show the maximum, minimum and mean values of the states that were included in the regressions

Indiana	21.60	22.57	23.11	22.25	22.38
Iowa	17.37	18.29	21.64	16.33	18.40
Kansas	76.14	76.98	69.60	75.23	74.49
Kentucky	24.49	23.41	29.44	22.89	25.06
Louisiana	33.92	33.84	35.42	31.48	33.66
Maryland	21.03	21.05	20.74	21.28	21.03
Massachusetts	29.34	32.61	34.48	34.76	32.80
Michigan	32.09	28.39	29.26	27.03	29.19
Minnesota	28.10	33.23	28.06	29.94	29.83
Mississippi	27.89	26.42	24.92	24.17	25.85
Missouri	24.18	28.06	25.69	25.79	25.93
Nebraska	18.52	25.05	24.04	19.54	21.79
Nevada	23.32	16.27	18.49	19.46	19.38
New Jersey	19.74	21.13	17.61	15.98	18.62
New Mexico	21.14	25.38	19.85	22.09	22.11
New York	19.16	21.65	19.54	20.19	20.13
North Carolina	29.31	29.31	29.18	28.48	29.07
Ohio	26.46	24.60	26.26	24.86	25.55
Oklahoma	22.78	21.97	21.54	26.11	23.10
Oregon	18.24	24.31	20.58	22.21	21.34
Pennsylvania	51.09	52.12	47.57	51.17	50.49
South Carolina	35.09	29.16	25.45	26.93	29.15
Tennessee	39.58	50.35	42.31	43.88	44.03
Texas	26.29	24.74	25.58	24.81	25.35
Utah	31.90	31.24	27.74	33.01	30.97
Virginia	18.09	17.25	18.32	15.69	17.34
Washington	21.47	17.86	21.06	23.87	21.06
Wisconsin	40.51	36.25	34.08	36.59	36.86
Average	27.09	27.22	26.63	27.07	27.00

We can see that Connecticut has the lowest deceased donors per million population while Kansas has the highest numbers. There is an overall decrease of deceased donors per million population over the years.

Table 5: Minimum and Maximum values for variables of 2008

	Minimum	Maximum	Mean
Deceased Donors per million population ⁹⁸	11.70 Connecticut	76.14 Kansas	27.09
Deaths per million population ¹⁰⁰	5147.87 Utah	10224.69 Arkansas	8372.51
Catholics ¹⁰¹	6% Alabama	42% New Jersey	22%
GDP per capita ¹⁰²	\$ 29,945 Mississippi	\$ 58,874 Connecticut	\$ 41,579
Educational Attainment ¹⁰³	79.60% Texas	91.60% Minnesota	85.88%
Motor Vehicle Fatalities per million population ¹⁰⁴	55.63 Massachusetts	266.31 Mississippi	133.19
Potential Donors per million population ¹⁰⁵	1426.23 Minnesota	3046.72 Mississippi	2090.16

Table 6: Minimum and Maximum values for variables of 2009

	Minimum	Maximum	Mean
Deceased Donors per million population ⁹⁸	10.23 Connecticut	76.98 Kansas	27.22
Deaths per million population ¹⁰⁰	5077.26 Utah	10081.32 Alabama	8179.99
GDP per capita ¹⁰²	\$ 29,099 Mississippi	\$57,554 Connecticut	\$ 40,206
Educational	79.90%	91.50%	86.16%

Attainment ¹⁰³	Texas	Minnesota	
Motor Vehicle Fatalities per million population ¹⁰⁴	50.66 Massachusetts	237.13 Mississippi	120.58
Potential Donors per million population ¹⁰⁵	1404.42 Minnesota	2965.11 Mississippi	2081.34

Table 7: Minimum and Maximum values for variables of 2010

	Minimum	Maximum	Mean
Deceased Donors per million population ⁹⁸	13.15 Connecticut	69.60 Kansas	26.63
Deaths per million population ¹⁰⁰	5323.77 Utah	10035.10 Alabama	8208.04
GDP per capita ¹⁰²	\$ 28,596 Mississippi	\$55,223 Connecticut	\$ 40,367
Motor Vehicle Fatalities per million population ¹⁰⁴	47.90 Massachusetts	215.82 Mississippi	116.52

Table 8: Minimum and Maximum values for variables of 2011

	Minimum	Maximum	Mean
Deceased Donors per million population ⁹⁸	9.50 Connecticut	75.23 Kansas	27.07
GDP per capita ¹⁰²	\$ 28,293 Mississippi	\$56,242 Connecticut	\$ 40,589

When looking at the tables above, we can see that the average deceased donors per million population decreased by 0.02. The minimum value declined more than the maximum value (difference of 2.2 deceased donors per million population as opposed to a difference of 0.91 deceased donors per million population). The average declined from 27.9 to 27.07 deceased donors per million population.

Number of deaths per million population decreased as well. This could make sense; the lower the number of deaths, the lower the number of deceased donors. Moreover, the argument is even stronger when looking at the motor vehicle fatalities, which decreased quite a lot, and this is an important source for organ donation.⁷ When looking at motor vehicle fatalities, we can see that in 2008, 2009 and 2010 Mississippi has the highest number so we could expect Mississippi to have higher deceased donors per million population. However, this is not the case at all. For 2008, Mississippi had a number of deceased donors per million population slightly above the average (27.89 compared to an average of 27.09). For the two years thereafter the number of deceased donors of Mississippi is lower than the average.

When looking at the percentage of Catholics in 2008, we can see that there is quite a difference between the minimum and maximum percentage (6% in Alabama compared to 42% in New Jersey).

I would expect that the states with more educated people would have more deceased donors. For 2008 we can see that Minnesota, which is the state with the highest percentage of educational attainment (91.60%) has 28.10 deceased donors per million population, which is higher than the average of 27.09. Texas, with the lowest percentage (79.60%) has a number of deceased donors (26.29) that is slightly lower than the average of that year. For 2009, Minnesota and Texas again have the highest and lowest educational attainment, respectively. Minnesota's deceased donors per million population is quite higher than the average (33.23 compared to 27.22). For Texas, the number is below the average (24.74).

A very interesting observation is that in the four years that were analyzed, Connecticut has the lowest number of deceased donors per million population and Kansas the highest.

I expected to see that states with higher GDP would have higher rate of donors but this is not true as can be seen in all four tables where Connecticut has the lowest number of deceased donors per million population while at the same time it has the highest GDP per capita.

6.2 Regression

The results of the linear regressions are all summarized in tables hereunder. There are 4 different tables, each representing the regressions for a different year.

Table 9: General Linear Model estimates of the determinants of the number of deceased donors in 2008

Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8
UAGA_2008	0.877	1.874	2.030	0.386	1.978	0.947	0.994	0.976
p-value	0.818	0.627	0.638	0.925	0.643	0.824	0.820	0.822
Deaths		0.002	0.002		0.001	0.001	0.001	0.001
p-value		0.211	0.245		0.628	0.729	0.732	0.730
Catholics			-0.011	-0.095	0.167	0.207	0.202	0.185
p-value			0.955	0.613	0.492	0.391	0.430	0.513
GDP_per_capita					0.000	0.000	0.000	0.000
p-value					0.205	0.089	0.137	0.105
Educational_Attainment						0.862	0.817	0.737
p-value						0.172	0.338	0.480
Motor_vehicle_fatalities							-0.007	
p-value							0.937	
Potential_Donors								-0.002
p-value								0.880
Constant	26.769	9.968	9.464	28.98	37.338	-24.606	-19.438	-10.926
p-value	0.000*	0.461	0.587	0.000*	0.184	0.639	0.818	0.142
R ²	0.001	0.046	0.05	0.009	0.097	0.151	0.151	0.151
Adjusted R ²	-0.026	-0.009	-0.037	-0.049	-0.016	0.014	-0.019	-0.019
Number of observations	38	38	37	37	37	37	37	37

* p-value < 0.05

As we can see in the table above, no result is statistically significant as no p-value is smaller than 0.05. The only exceptions are Regression 1 and 4 because

“Constant” is statistically significant. For Regression 1, this means that a state would have 26.769 deceased donors per million population if it did not implement the UAGA before 2008.

The coefficients of *UAGA_2008* and *Deaths* are all positive, meaning that with the enactment of the UAGA and with more people dying, the number of deceased donors would be higher. However, the values are not statistically significant. The coefficients of *Catholics* are both negative and positive, those of *Educational_Attainment* are positive and *GDP* has no effect since its value is zero everywhere. For all these variables, the results are not statistically significant. Contrary to my expectation, *Motor_vehicle_fatalities* and *Potential_donors* both have negative coefficients. The values however, are not statistically significant.

In all the regressions we can see that R^2 is small, meaning that the variables used in the regressions explain a small percentage of the variance in deceased donors. Also, Adjusted R^2 has negative values (except in regression 5), meaning that the model contains variables that do not help to predict the dependent variable.¹⁰⁶

Table 10: General Linear Model estimates of the determinants of number of deceased donors in 2009

	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6
UAGA_2009	1.246	2.600	1.467	0.107	0.098	0.262
p-value	0.753	0.516	0.736	0.981	0.982	0.953
Deaths		0.003	0.002	0.001	0.001	0.002
p-value		0.140	0.418	0.477	0.588	0.365
GDP_per_capita			0.000	0.000	0.000	0.000
p-value			0.497	0.228	0.422	0.190
Educational_Attainment				0.936	1.058	0.589
p-value				0.151	0.173	0.507
Motor_vehicle_fatalities					0.024	
p-value					0.762	
Potential_donors						-0.006
p-value						0.565
Constant	26.438	4.919	22.734	-45.596	-60.503	-5.114
p-value	0.000*	0.738	0.451	0.413	0.421	0.955
R ²	0.003	0.064	0.077	0.133	0.136	0.142
Adjusted R ²	-0.025	0.01	-0.005	0.028	0.001	0.008
Number of observations	38	38	38	38	38	38
*p-value < 0.05						

As in table 9, we can see that only Regression 1 has a coefficient that is statistically significant. In this regression, where UAGA is the only variable, we can see that “Constant” is statistically significant. This means that without the enactment of the Uniform Anatomical Gift Act, there would be 26.438 deceased donors per million population.

Again, *UAGA_2009* and *Deaths* are positive in all the regressions, *GDP* has no effect on the number deceased donors (since its coefficient is 0) and *Educational_Attainment* is has positive values in all the regressions. Unlike in 2009, *Motor_vehicle_fatalities* has a positive coefficient. *Potential_donors* is still negative. None of the independent variables have statistically significant coefficients. As a result no conclusion can be drawn.

R² is small, so the variables only explain a small percentage of the variation in deceased donors. Also in this table, the values of Adjusted R² are negative for regressions 1 and 3. For the other regressions, the values of R² positive but very

small.

Table 11: General Linear Model estimates of the determinants of number of deceased donors in 2010

Variables	Regression	Regression	Regression	Regression
	1	2	3	4
UAGA_2010	-0.966	-0.143	-1.295	-1.319
p-value	0.796	0.969	0.770	0.769
Deaths		0.002	0.002	0.002
p-value		0.122	0.374	0.458
GDP_per_capita			0.000	0.000
p-value			0.628	0.766
Motor_vehicle_fatalities				0.010
p-value				0.891
Constant	27.353	8.320	20.856	19.195
p-value	0.000*	0.507	0.470	0.544
R ²	0.002	0.069	0.075	0.076
Adjusted R ²	-0.026	0.016	-0.006	-0.036
Number of observations	38	38	38	38
*p-value < 0.05				

Unlike in 2008 and 2009, we can see here that *UAGA_2010* has negative coefficients. This means that by implementing the Act, the number of deceased donors per million population decreases.

“*Constant*” is again the exception that is statistically significant and shows that without the enactment there would be 27.353 deceased donors per million population.

As in the previous years, *Deaths* is positive and *GDP* is zero. Once more, none of the coefficients are statistically significant since no p-value is smaller than 0.05.

R² is very small so the dependent variables only explain a small percentage of the variance in deceased donors. Adjusted R² is negative except for Regressions 2.

Table 12: General Linear Model estimates of the determinants of number of deceased donors in 2011

Variables	Regression	
	1	2
UAGA_2011	-3.408	-5.465
p-value	0.496	0.292
GDP_per_capita		0.000
p-value		0.168
Constant	29.938	47.801
p-value	0.001*	0.001*
R ²	0.013	0.066
Adjusted R ²	-0.014	0.012
Number of observations	38	38
*p-value < 0.05		

Like in the regressions of 2010, in these two regressions UAGA is negative but not statistically significant. The first regression shows us that without the enactment a state would have 29.938 deceased donors per million population.

GDP again has no effect. By looking at R² we see that the independent variables explain a very small percentage (1.3% and 6.6%) of the variance of deceased donors.

As we can see no result is statistically significant as there are no p-values that are smaller than 0.05 in all four years. The only exceptions are the regressions in which the *UAGA* is the only independent variable, regression 4 of 2008 where the variables are *UAGA* and *Catholics*, and in 2011 where the variables are *UAGA* and *GDP*. In this case, *Constant* is statistically significant.

Also, *UAGA* has positive coefficients in the regressions for the years 2008 & 2009 and negative coefficients for 2010 & 2011. This could be explained by the fact that the states that did not implement UAGA 2006 at all or implemented it in 2010 or later have a higher number of deceased donors than the states that did implement it before 2010.[†] This can also be seen in all the tables in regression 1 when looking at coefficient of *Constant*. In 2008 the number was 26.769; in 2009

[†] Pennsylvania and Massachusetts are two states did not have the UAGA in 2010 and have quite high numbers of deceased donors in that year (47.57 and 34.48 respectively)

it was 26.438; in 2010 27.353 and finally in 2011 the mean of deceased donors per million population of the states that did not implement the Act or implemented it after 2010 was 29.938. This might be the reason why *UAGA* get negative coefficients.

Another interesting observation is that in all the regressions that included GDP per capita as an independent variable, the coefficient was always zero. In other words, GDP has no effect whatsoever on deceased donors. This result however, is not statistically significant.

As we can see for the variable *Deaths*, it always has a positive, but small coefficient, but the results are never statistically significant.

Motor_Vehicle_Fatalities has positive values except for 2008. *Potential_donors* has negative coefficients both for 2008 and 2009, although I expected them to be positive. These values however, are not statistically significant.

Table 13: General linear Model estimates of the determinants of number of deceased donors (pooled data)

Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7
UAGA_2008	0.327	1.386	1.528	-0.258	0.786	-0.201	0.006
p-value	0.874	0.499	0.512	0.908	0.740	0.931	0.998
Deaths		0.002	0.002		0.001	0.001	0.001
p-value		0.012*	0.022*		0.186	0.247	0.541
Catholics			0.000	-0.099	0.100	0.143	0.193
p-value			0.997	0.344	0.436	0.258	0.151
GDP_per_capita					0.000	0.000	0.000
p-value					0.129	0.013*	0.062
Educational_Attainment						0.909	1.180
p-value						0.008*	0.006*
Motor_vehicle_fatalities							0.049
p-value							0.269
Constant	26.794	7.912	7.583	29.333	26.716	-39.404	-70.331
p-value	0.000*	0.297	0.443	0.000*	0.095	0.178	0.083
R ²	0.000	0.056	0.056	0.009	0.077	0.136	0.146
Adjusted R ²	-0.009	0.039	0.03	-0.01	0.042	0.095	0.097
Number of observations	114	114	111	111	111	111	111
* p-value < 0.05							

These regressions include pooled data from the years 2008, 2009 and 2010. As can be seen, there are a few statistically significant values. Firstly, in Regression 1, we can see that without the enactment a state would have 26.794 deceased donors per million population. Regression 2 and 3 show us that an additional death per million population would lead to an increase in deceased donors per million population. Regression 6 shows us two things. Firstly, that an additional dollar in GDP per capita would have no effect (or a really small positive effect) on the rate of deceased donors. Secondly, higher educational attainment in a state would lead to an increase in deceased donors. The final regression shows us the same as the latter observation, namely that more educated people will have a positive effect on donation rates from deceased donors. The rest of the values in the table are not statistically significant.

R^2 increases as more variables are added and in Regression 7 we can see that the variables explain 14.6% of the variance in the deceased donors.

7. Discussion

7.1 Limitations of the Empirical Analysis

Firstly, twelve states were not taken into account since data about the number of deceased donors was not available. These include Alaska, Delaware, Idaho, Maine, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota, Vermont, West Virginia and Wyoming. As a result only 76% of the states could be included in the regressions. It would have been better to be able to analyze them all and have more accurate results.

Next, when using the variable *Deaths*, it included all the people that died in that year from all ages and all causes. Of course, of these people a lot could not have been donors because of their age, disease and place of death.

Because of the limitation above, I tried to correct it with the variable *Potential_Donors*. Of course, the variable is still far from perfect. I subtracted from the number of deaths those that died over the age of 70 and those that died because of cancer or HIV. Obviously, there are a lot of other reasons why a person dies and is not suitable for donation but I did not manage to correct it even more.

The main problem was the missing data regarding religion. I would have liked to analyze the influence of the different religions on organ donation even more but this was not possible due to lack of data.

A very important limitation of this research is that I used quite basic statistics. In the statistical analysis by Loes Stevens in which the variables GDP, religion and traffic deaths all had significant outcomes, as opposed to my results, which were not statistically significant.¹⁰⁷ Also the study by Rumsey, Hurford and Cole⁹ shows that Religion is statistically significant. This study however looked at people's attitudes instead of donation rates.

By using more advanced statistical techniques such as panel data in this thesis,

the tests would have more power by taking into account potential biases. I tried to do that by pooling all the data in Table 13. By doing that I assumed that the error for a certain state in a certain year is not related to the error of that same state but for a different year.

7.2 Implications for the Future

For future research I would recommend analyzing the effect of other religions on organ donation. It could be good to conduct a research about what people of different religions say regarding organ donation. By doing this, we don't only have the explanations of the different religions but we can have a view on peoples' perceptions regarding organ donation with respect to their religion.

It could also be interesting to analyze how long it takes for a legislation to take effect. In this research I took into account one year. For example, when analyzing for the year 2008, I only considered states that implemented the Act before 2008 as states with enactment. Those that implemented it in 2008 were taken into account in the year 2009. It would be interesting to know how long it really takes.

Also, it would be good to make the number of *Potential_donors* more perfect. By that I mean, taking more into account than only age, Cancer and HIV. Other diseases or viruses might be a barrier for donation as well. Moreover, it would be interesting to exclude the number of people that died somewhere else than in a hospital. Usually, organs of these people could not have been kept alive long enough for transplantation.

As could be seen in the tables of part 6.1, Connecticut had the lowest deceased donors while Kansas had the highest deceased donors per million population. It would be interesting to analyze these two states into much more details and try to find a reason for this.

For the future in general, I believe the Uniform Anatomical Gift Act of 2006 was not revised well enough to increase organ donation. It should be reviewed and

new implementations should be introduced in order to strengthen the Act even more and be more strict with OPOs and hospitals to be sure that they respect the Uniform Anatomical Gift Act as they should.

Another recommendation for the future is to introduce presumed consent in the United States. It was shown that the countries with the opting-out system have a higher rate of deceased donors. The problem is, as mentioned earlier in the paper, that the American Medical Association rejected this system as it is considered insensitive.

Another option could be to find ways to motivate people to subscribe. An example could be what was done in Israel. Namely that registered people and their families can jump the waiting list should they need an organ.³¹

Also, I believe that people should be made more aware of organ donation. Schools must inform their students about organ donation and how donor registration could help a lot of people. Religious leaders should also make people more aware of organ donation by making people conscious that it is indeed permitted. This could be done in churches, synagogues, temples etc. Moreover, there should be more public awareness campaigns. Media plays an important role in the United States thus they could devote more TV-shows and documentaries to organ donation.

8. Conclusion

The aim of this paper was to try and answer the questions of how organ donation is legally organized and what the different religions say about organ donation, if they are in favor or if they object to it. Moreover, what is the impact of those legal and religious aspects on organ donation?

As the lack of supply of organs is a major problem worldwide, I tried to cover this issue in my thesis. For this, I focused on the United States of America, as it is a big geographical area and a melting pot of different religions. Moreover, for my analysis I concentrated on deceased donors rather than on living donors. This, because deceased donors can save more than one life.

The above questions were analyzed in two different ways.

The first question was answered theoretically, by analyzing the National Organ Transplant Act as well as the Uniform Anatomical Gift Act. Moreover, I analyzed the point of views of the different religions regarding organ donation. The research shows that organ donation has the least restrictions in Christianity since several churches promote donation. This is specifically the case with Catholics who believe in the universal authority of the Pope (who himself announced that he is a donor). In other religions donation is considered more problematic since there are different views on subjects such as brain death. The Jews tried to resolve this issue by establishing the Halachic Organ Donor Society (HODS). The theoretical part also included explanations of different concepts regarding organ donation such as the different systems of donation worldwide.

The second question was answered empirically by doing linear regressions on SPSS. The regressions included different variables and tested if they had an effect on the number of deceased donors. The legal variable used was the Uniform Anatomical Gift Act of 2006 and the variable used for the religion part was the percentage of Catholics. Based on the empirical analysis, no conclusion could be drawn, as no result was statistically significant. However, the last table, which consist of regressions of all the data (pooled), does show that more deaths have a

positive effect on the number of deceased donors.^s Moreover, more educational attainment (more educated people) also leads to an increase in deceased donors per million population.^t

To conclude, I would like to mention that it is of vital importance to try and increase the supply of organs. In order to do that, reviewing the current system of organ donation, education, public awareness and promotion in schools/universities as well as by the different religions are truly necessities.

It is important to remember: “Whoever saves a life, it is considered as if he saved an entire world”.¹⁰⁸

^s Regressions 2 and 3

^t Regressions 6 and 7

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- ⁴ <http://donatelife.net/understanding-donation/organ-donation/>
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