Published in final edited form as:

Prog Transplant. 2013 September ; 23(3): 290–296. doi:10.7182/pit2013406.

Do Trained Specialists Solicit Familial Authorization at Equal Frequency, Regardless of Deceased Donor Characteristics?

Derek A. DuBay, MD¹, David T. Redden, PhD², Akhlaque Haque, PhD³, Stephen H. Gray, MD, MSPH¹, Mona Fouad, MD, MPH⁴, Connie Kohler, DrPH⁵, Garry Taylor, BS⁶, and Devin E. Eckhoff, MD¹

¹Division of Abdominal Transplant, Department of Surgery, University of Alabama at Birmingham

²Department of Biostatistics, School of Public Health, University of Alabama at Birmingham

³Graduate Studies in Public Administration, Department of Government, University of Alabama at Birmingham

⁴Preventive Medicine Division, Department of Medicine, University of Alabama at Birmingham

⁵Department of Health Behavior, School of Public Health, University of Alabama at Birmingham

⁶Alabama Organ Center, Birmingham, Alabama

Abstract

Context—The Organ Donor Breakthrough collaborative recommended high-leverage changes including “Master Effective Requesting”.

Objective—The purpose of this investigation is to measure who approaches decedent families to request organ donation. Our hypothesis is that trained specialists will solicit authorization at equal frequency regardless of donor characteristics.

Methods—A retrospective analysis of an organ center donor database was performed for the years 2006 to 2009. Decedents were stratified into those that met OPTN eligible death criteria (ED donors) and those that did not (not eligible death--NED donors).

Results—Of decedents whose families were approached for authorization, 46% were ED donors and 54% were NED donors. Trained specialists solicited authorization from 76% of the total population, but were more likely to solicit authorization from ED donors than NED donors (86% vs. 68%, $p < 0.0001$). Trained specialists were more likely to solicit authorization from donors whose cause of death were over-represented in ED donors, and donors under the age of 50. Trained specialists were more likely to obtain authorization in both ED and NED donors. Multivariable modeling demonstrated that having a trained specialist approach the decedent’s family was associated with the highest odds of obtaining authorization.

Discussion—Trained specialists approached the majority of families of decedents for authorization, but disproportionately approached fewer families of NED donors. Having a trained specialist approach the decedent family has the strongest impact on obtaining donor authorization. These data suggest that fewer resources are allocated to NED donors, which may adversely impact deceased donor organ supply.

Corresponding Author Contact Information: Derek DuBay, MD, Division of Transplantation, University of Alabama at Birmingham, ZRB 701; 1530 3rd Ave S, Birmingham, AL 35294-0007.

Disclosure: The authors of this manuscript have no conflicts of interest to disclose as described by Progress in Transplantation.

Keywords

Donor Authorization; Eligible Death Donor; Race; Cause of Death; Deceased Donor Organs

INTRODUCTION

The Organ Procurement and Transplantation Network (OPTN) requires individual organ procurement organizations (OPOs) to report the rate at which potential organ donors are converted into actual organ donors. This includes obtaining authorization for organ donation and placement of procured organs for transplantation. To define a common denominator to evaluate OPO performance, the eligible death donor concept was introduced by the OPTN. An eligible death donor, broadly defined, is a decedent who has been legally declared brain dead, 70 years of age or younger, not in multisystem organ failure, and without communicable diseases (malignancy, most infectious diseases, etc.).(1)

Donors that meet the OPTN eligible death criteria include the “optimal” donors from whom the most organs can be procured and transplanted. The US Health and Human Services Department has set a goal for OPOs to achieve a 75% authorization rate for all eligible death donors and to transplant, on average, 3.75 organs per eligible death donor.(2) OPO performance is measured by these publically available metrics, thus there is significant incentive to meet the donor authorization and transplant rate goals.

However, potential donors may be converted into organ donors even if they do not satisfy the OPTN definition of an eligible death donor. One common example is brain dead donors without significant comorbidities who are over 70 years of age. Fewer organs are procured and transplanted from donors that do not meet eligible death criteria. Data suggest that while these donors that do not meet eligible death criteria may increase the pool of organs available for transplantation, there are increased resource utilization and increased costs associated with organ procurement and transplantation compared to ideal donors that meet the eligible death criteria.(3, 4)

The purpose of this investigation is to measure differences in OPO practice patterns in approaching families of donors who meet OPTN eligible death criteria compared to families of donors who do not. Our hypothesis is that trained specialists will solicit authorization at equal frequency regardless of whether or not the donor meets eligible death criteria.

METHODS

Ethics approval for this study was obtained from the University of Alabama Institutional Review Board Protocol #N100301001.

a) Study Population

Consistent with the referral practices of The Routine Death Notification Legislation (42 CFR Part 482),(5) hospitals that receive Medicare funding are mandated to notify the designated OPO of every death or imminent death. Between January 1, 2006 and December 31, 2009, the Alabama Organ Center received 3423 decedent notifications. Based upon standardized telephone screening by an organ procurement specialist, the Alabama Organ Center requested familial authorization for organ donation from 1292 decedent families who form the study population. The reasons for not approaching the remaining 2131 decedent families were that the potential candidate was not brain dead (failing to satisfy legal definition with poor likelihood to digress to brain death or failing to satisfy locally established guidelines for donation after cardiac arrest opportunities - 32%), sepsis/

multisystem organ failure (15%), medical concerns (14%), malignancy (13%), advanced age (10%), decedent death prior to referral process (4%), communication difficulties with referring hospital (4%), and other (8%). During this study period, the Alabama Organ Center did not practice first person authorization. Written or telephone-recorded authorization was required from the decedent's family in all cases.

b) Donation Authorization Process

The Alabama Organ Center has trained organ donor family specialists (herein referred to as trained specialists) and strategically locates them throughout the Designated Service Area (DSA), which is the geographic boundary of the state of Alabama. When a deceased donor referral is made, a trained specialist approaches the family and requests authorization. A concerted effort is made to ensure the treating team has notified the decedent's family of brain death (or impending brain death), and to then have the trained specialist discuss organ donation with the decedent's family. In some cases, however, the treating physician, nurse or hospital chaplain had already requested authorization for organ donation. If the family brought up their desire to donate organs prior to being approached by a trained specialist, they were considered family referred. During the study period, trained specialists did not routinely re-approach decedent families who had already declined donor authorization.

c) Data Collected

Data were obtained from the Alabama Organ Center internal donor referral database. Decedent referral data were captured in an electronic database (Microsoft Access™) and maintained in an electronic medium. This information is the source data for mandated OPTN performance reporting. At the time of decedent notification, the following data are collected on all referrals: decedent name, date of birth, gender, race, cause of death, referral date, referring hospital, and donor registry designation. In the event that an approach for donation is made, subsequent data are collected; including whether authorization is obtained and who first approached the decedent's family. Decedent OPTN eligible death status is determined per published criteria.(1) Donor hospital referral compliance is analyzed each month and compared against the hospital death records. Monthly death record reviews are conducted at all hospitals with more than 150 licensed beds. Missed referrals or incomplete data fields may be identified during this reconciliation. Hospital-specific referral data, imminent deaths, converted donors, and non-converted decedent information is provided to the OPTN on a monthly basis as federally mandated. All collected decedent data were used for this study.

d) Statistical Analysis

The dependent variable of interest in this study was familial authorization for organ donation. Examination of the data began by examining measures of central tendency (sample mean and median) as well as measures of dispersion (variance, standard deviations). The primary outcome variable, obtaining authorization for organ donation, is dichotomous and therefore the analytic approaches employed both Pearson Chi-square analyses and logistic regression. To identify the most parsimonious model that could explain the variation in the log-odds of obtaining authorization, multivariable logistic regression models were constructed. Measures of association are summarized with odds ratios with corresponding 95% confidence intervals. For all inferences, the probability of a Type I error (α) was set to 0.05. All analyses were conducted using the SAS 9.2 (Cary, NC).

RESULTS

a) Eligible Death (ED) vs. Not Eligible Death (NED) Donors

Of the decedents whose families were approached for authorization, 46% (589/1292) were ED donors and 54% (703/1292) were NED donors. The primary reason for not fulfilling OPTN eligible death criteria was not brain dead (60%); other reasons were multisystem organ failure (22%), age over 70 (7%), donation after cardiac death (5%), positive serology (2%), cancer history (2%), medical history (1%) and social history (1%).

There were no significant differences in gender or race distribution between ED and NED donors. As expected, ED donors were younger than NED donors (37.0 ± 17.6 years vs. 50.0 ± 20.2 , $p < 0.0001$). (Table 1)

b) The Type of Professional Who Approached Decedent Families and Organ Donation Authorization

A trained specialist solicited authorization from the families of decedents 76% of the time (Figure 1). A patient care nurse (10%), treating physician (9%), or a chaplain (2%) approached the remaining families. The decedent families inquired about organ donation in the remaining cases (3%). Trained Specialists were more likely to solicit authorization from families of ED donors than from families of NED donors (86% vs. 68%, $p < 0.0001$). Conversely, nurses, physician and chaplains were more likely to solicit authorization from the families of NED donors ($p < 0.001$, Table 1).

Authorization was obtained from 63% (371/589) of ED donor families compared to 38% (266/703) of families of NED donors (OR 2.80, 95% CI 2.23 – 3.51). Authorization from ED donor families was most likely when a trained specialist (350/507) or nurse (12/25) approached the family or when the families were self-referred (7/11). In contrast, authorization from ED donor families was poor when a physician (4/41) or chaplain (0/6) approached the family. (Figure 2) Authorization from NED donor families was most likely when a trained specialist (239/478) approached the family or when the families were self-referred (11/22). Authorization from NED donor families was poor when a physician (4/77), nurse (5/105), or chaplain (4/21) approached the family. (Figure 2)

A subgroup analysis was next performed to assess for variations in who approaches NED decedent families based upon donor hospital geography. The trained specialists employed by the Alabama Organ Center all reside in highly urban areas of the state (where the high volume donor referral hospitals are located). We thus measured the differences in who approaches NED decedents based upon whether or not the donor hospital was in one of these metropolitan areas. The odds of a trained specialist approaching the family of a NED decedent located in a highly urban area was 1.04 (95% CI 0.76 – 1.42, $p = 0.85$) compared to rural location suggesting no differences based upon donor hospital geography.

c) Interaction between Decedent Cause of Death and Who Solicits Donor Authorization

Cerebral vascular accident ($n=632$) was the most common cause of decedent death followed by, in decreasing order, motor vehicle accident ($n=209$), gunshot/stab wound ($n=124$), myocardial infarction ($n=114$), non-trauma ($n=60$), asphyxiation ($n=48$), head trauma ($n=42$), drug overdose ($n=31$) and other ($n=32$). The causes of death were significantly different between donor ED and NED decedents ($p < 0.001$, Table 1). Motor vehicle accident, gunshot/stab wound, and head trauma were more common causes of death in ED donors whereas sepsis, asphyxiation, and cardiac etiologies were more common causes of death in NED donors. (Table 1)

There were significant differences in who approached the donor families based upon the decedent cause of death ($p<0.001$). A trained specialist solicited authorization at a significantly higher rate in decedents who died from a motor vehicle accident, gunshot/stab wound or head trauma. (Figure 3) In contrast, a trained specialist was less likely to solicit authorization in decedents who died of sepsis, asphyxiation, and cardiac etiologies. (Figure 3) Thus, trained specialists were more likely to solicit authorization in decedent causes of death that are more common in ED donors and are much less likely to solicit authorization in decedent causes of death that are more common in NED donors (Table 1).

d) Interaction between Decedent Age and Who Solicits Donor Authorization

There is a non-linear relationship between donor age and who solicits authorization. Trained specialists were most likely to approach the families of decedents 10–49 years and least likely to approach the families of decedents 0–9 years and over 50 years of age. (Figure 4) For decedents over the age of 50, the odds of a trained specialist soliciting authorization decreases at a multiplicative rate of 0.68 for every 10 year increase in age ($p<0.001$).

f) Multivariable Analysis of Predictors of Organ Donor Authorization

A multivariable model was fitted to predict the odds of organ donation as a function of age, gender, race, organ donor registry status, who solicited authorization, and decedent cause of death. All variables were significantly associated with an increased odds ratio of organ donor authorization in the presence of each other with the exception of gender. The variable that had the most effect upon organ donor authorization was who approached the decedent's family. Compared to a physician soliciting authorization, the odds ratio of a trained specialist obtaining authorization was 17.3 (95% CI 8.0 – 37.3) while the odds ratio of authorization from a family that was self-referred was 16.5 (95% CI 5.9 – 45.6). Registry status, Caucasian race, younger age and motor vehicle accident or gunshot/stab causes of death etiology were also strongly associated with obtaining familial authorization on the multivariable analysis. (Table 2)

DISCUSSION

The most surprising result of this investigation is the fact that trained specialists are much less likely to solicit authorization from the families of NED donors. Overall, trained specialists approached the families of 76% of decedents deemed to be acceptable organ donors. However, these specialists disproportionately approached the families of ED donors (86%) and left 1 out of 3 NED donor referrals to non-trained specialists. This finding is particularly disappointing given the markedly improved authorization rates obtained with trained specialist compared to all others. In fact, the disparity in donor authorization rates was most marked in the NED donors (Figure 2).

Trained specialists were more likely to approach decedents' families where the cause of death was more commonly associated with ED donors: motor vehicle accident, gunshot/stab wound or head trauma (Table 1, Figure 3). In contrast, trained specialists were least likely to approach decedent's families where the cause of death was more commonly associated with NED donors: sepsis, asphyxiation, and cardiac etiologies (Table 1, Figure 3). Similarly, trained specialists were most likely to approach the families of decedents whose age range is within ED criteria and least likely to approach the youngest and oldest donors (Figure 4) as noted by other researchers.⁽⁶⁾ No differences were appreciated in the frequency of trained specialists approaching NED decedent families based upon donor hospital geography.

A purely OPO business approach may favor this practice as trained specialists are focusing their time on the ED potential donor pool in which authorization is most likely, a higher

number of organs are procured and transplanted, and a smaller number of organs are discarded compared to NED donors.(3) However, there is a majority consensus among the transplant community that all potential donors should be evaluated. Furthermore, the Organ Donor Breakthrough Collaborative recommended “aggressive pursuit of every donation opportunity”.(2) This study suggests that the only modifiable variables associated with obtaining authorization for organ donation is who solicits authorization (Table 2).

The significance of having a trained specialist approach decedent families cannot be over emphasized. The multivariable analysis (Table 2) clearly demonstrates that the strongest predictor of authorization is who approached the decedent family. Benchmark studies in the 1990s demonstrated that “decoupling” the notification of brain death and the request for donation significantly increased authorization rates (7–10) and utilizing a professional trained in seeking donation authorization significantly increased organ donation authorization (8, 11) Contemporary studies of the families of the decedent, interviewed after the organ donation process, suggest that two of the most important steps in organ donation are simply that the treating health care team informs the family that the decedent is brain dead (but not attempt organ donor authorization) and utilizing a trained specialist (not part of the treating team) to discuss organ donation and solicit authorization.(12, 13) Other studies suggest that “decoupling” is not as important and advocate having a combination of a trained specialist and a non-physician member of the treating team (such as an ICU nurse with an established relationship with the decedent’s family) solicit authorization.(7, 14–16) Accordingly, the second Collaborative suggested “high-leverage changes” in the approach to decedent families including, “Deploy a self-organizing team of staff from the organ procurement organization and the hospital”. (17) In large donor hospitals, the presence of an in-house organ recovery coordinator has also been shown to significantly increase donation authorization. (18–20)

Given the large disparity in donor authorization achieved by trained specialists, there needs to be heightened efforts to educate medical personnel from referring hospitals as to the importance of deferring to trained specialists to solicit authorization. In cases where a non-trained specialist has already approached the donor family, there may be utility to having a trained specialist re-approach decedent families’ to solicit donor authorization. Recent anecdotal experience suggests that a re-approach may increase familial authorization, especially when the trained specialist makes a time investment with the donor family such as through bereavement counseling, although this method has not been formerly studied.

As with all retrospective database studies, this investigation has limitations. First, the study population consists of decedents who died only in Alabama. Compared to US census data, (21) African American race is over-represented and there were not significant numbers of Hispanics or Asians in the database for analysis. Second, the study is dependent upon data entry by several OPO coordinators. To ensure data accuracy, monthly death records are reviewed from all referrals from hospitals with at least 150 beds. Finally, generalizability of the data may be limited by the differences in how aggressively individual OPOs pursue NED donors.

In conclusion, this study demonstrates that while trained specialists approached the majority of families of decedents deemed to be acceptable organ donors, they disproportionately approached fewer families of NED donors compared to ED donors. Multivariable modeling demonstrates that having a trained specialist approach the decedent family has the strongest impact on obtaining authorization for organ donation. These data suggest that fewer resources are allocated to NED donors, which may adversely impact deceased organ donor supply.

Acknowledgments

This research was supported in part by a grant from the Alabama Health Services Foundation and NIH NIDDK 1 K23 DK091514-01A1

Special thanks to Walt Montgomery, PhD from the Alabama Organ Center for donor data retrieval.

Abbreviations

OPTN	Organ Procurement and Transplantation Network
OPO	Organ Procurement Organization
UNOS	United Network for Organ Sharing
DSA	Designated Service Area
OR	Odds Ratio
95% CI	95% Confidence Interval
ICU	Intensive Care Unit

References

1. Organ Procurement and Transplantation Network and Scientific Registry of Transplant Recipients (SRTR). OPTN/SRTR 2010 Annual Data Report. [cited 2011 March 30]; Available from: <http://optn.transplant.hrsa.gov/>
2. US Department of Health and Human Services: Donate the gift of life. [cited 2011 March 30]; Available from: <http://www.organdonor.gov/research/breakthroughcollaborative.html>
3. Gray S, Hicks A, Redden D, Haque A, Fouad M, Eckhoff D, et al. Predictors of decedent authorization in UNOS eligible donors. *American Journal of Transplantation*. 2011; 11(s1):62.
4. Englesbe MJ, Ads Y, Cohn JA, Sonnenday CJ, Lynch R, Sung RS, et al. The effects of donor and recipient practices on transplant center finances. *Am J Transplant*. 2008; 8(3):586–92. Epub 2008/02/26. [PubMed: 18294154]
5. Electronic Code of Federal Regulations. Dec 10. 2010 Available from: <http://ecfr.gpoaccess.gov/>
6. Brown CV, Foulkrod KH, Dworaczyk S, Thompson K, Elliot E, Cooper H, et al. Barriers to obtaining family authorization for potential organ donors. *J Trauma*. 2010; 68(2):447–51. Epub 2010/02/16. [PubMed: 20154557]
7. Gortmaker SL, Beasley CL, Sheehy E, Lucas BA, Brigham LE, Grenvik A, et al. Improving the request process to increase family authorization for organ donation. *J Transpl Coord*. 1998; 8(4): 210–7. Epub 1999/04/17. [PubMed: 10205460]
8. von Pohle W, Linda L. Obtaining organ donation: Who should ask. *Heart Lung*. 1996; 25:304–9. [PubMed: 8836746]
9. Garrison RN, Bentley FR, Raque GH, Polk HC Jr, Sladek LC, Evanisko MJ, et al. There is an answer to the shortage of organ donors. *Surg Gynecol Obstet*. 1991; 173(5):391–6. Epub 1991/11/11. [PubMed: 1948591]
10. Evanisko MJ, Beasley CL, Brigham LE, Capossela C, Cosgrove GR, Light J, et al. Readiness of critical care physicians and nurses to handle requests for organ donation. *Am J Crit Care*. 1998; 7(1):4–12. Epub 1998/01/16. [PubMed: 9429678]
11. DeJong W, Franz HG, Wolfe SM, Nathan H, Payne D, Reitsma W, et al. Requesting organ donation: an interview study of donor and nondonor families. *Am J Crit Care*. 1998; 7(1):13–23. Epub 1998/01/16. [PubMed: 9429679]
12. Rodrigue JR, Cornell DL, Howard RJ. Organ donation decision: comparison of donor and nondonor families. *Am J Transplant*. 2006; 6(1):190–8. Epub 2006/01/26. [PubMed: 16433774]

13. Rodrigue JR, Cornell DL, Howard RJ. The instability of organ donation decisions by next-of-kin and factors that predict it. *Am J Transplant*. 2008; 8(12):2661–7. Epub 2008/10/16. [PubMed: 18853951]
14. Siminoff LA, Gordon N, Hewlett J, Arnold RM. Factors influencing families' authorization for donation of solid organs for transplantation. *JAMA*. 2001; 286(1):71–7. Epub 2001/07/04. [PubMed: 11434829]
15. Kleiger J, Nelson K, Davis R, Van Buren C, Davis K, Schmidt T. Analysis of factors influencing organ donation rates. *Journal of Transplant Coordinators*. 1994; 4:132–4.
16. Ehrle R. Timely referral of potential organ donors. *Crit Care Nurse*. 2006; 26(2):88–93. Epub 2006/03/28. [PubMed: 16565283]
17. Shafer TJ, Wagner D, Chessare J, Schall MW, McBride V, Zampiello FA, et al. US organ donation breakthrough collaborative increases organ donation. *Critical care nursing quarterly*. 2008; 31(3): 190–210. Epub 2008/06/25. [PubMed: 18574367]
18. Salim A, Brown C, Inaba K, Mascarenhas A, Hadjizacharia P, Rhee P, et al. Improving authorization rates for organ donation: the effect of an in house coordinator program. *J Trauma*. 2007; 62(6):1411–4. discussion 4–5. Epub 2007/06/15. [PubMed: 17563657]
19. Shafer TJ, Davis KD, Holtzman SM, Van Buren CT, Crafts NJ, Durand R. Location of in-house organ procurement organization staff in level I trauma centers increases conversion of potential donors to actual donors. *Transplantation*. 2003; 75(8):1330–5. Epub 2003/04/30. [PubMed: 12717225]
20. Shafer TJ, Wood R, Van Buren C, Guerriero w, Davis K, Sullivan H. An in-house coordinator program to increase organ donation in public trauma hospitals. *Journal of Transplant Coordinators*. 1998; 8:82–7.
21. US Census Bureau, State and Count Quickfacts. [cited 2010 March 15]; Available from: <http://quickfacts.census.gov/qfd/states/01000.html>

Figure 1. Pie chart depicting who approached the decedent families to request authorization for organ donation. The category “Family” refers to decedents whose families inquired about organ donation prior to being approached.

Figure 2.
Familial authorization stratified by who approached the decedent family.

Figure 3.
Who approached the decedent families to request authorization for organ donation stratified by cause of death.

Figure 4.
Who approached the decedent families to request authorization for organ donation stratified by donor age.

Table 1

Population Demographics.

Variable	ED Donor	NED Donor	Significance
Population	589	703	
Obtained Authorization	63%	38%	<0.0001
Decedent Age *	37.0 ± 17.6	50.0 ± 20.2	<0.0001
Male Gender	57%	57%	0.75
Female Gender	43%	43%	
Race			0.19
Caucasian	60%	65%	
Black	36%	33%	
Other	3%	2%	
Cause of Death			<0.0001
CVA	45%	53%	
MVA	24%	10%	
Gunshot/Stab	14%	6%	
Cardiac	5%	12%	
Head Trauma	5%	2%	
Sepsis	2%	7%	
Asphyxiation	2%	5%	
Drug Overdose	3%	2%	
Other	2%	3%	
Who Requested Authorization			<0.0001
Trained Specialist	86%	68%	
Physician	7%	11%	
Nurse	4%	15%	
Chaplain	1%	3%	

ED Eligible Death, NED Non-Eligible Death, CVA Cerebrovascular Accident, MVA Motor Vehicle Accident

* Years, Mean ± SD

Table 2
Factors Associated with Odds of Obtaining Family authorization for Organ Donation

Variable	Univariate Analysis			Multivariable Analysis	
	Odds Ratio	95% CI	Significance	Odds Ratio	95% CI
Age (per 10 years)	0.76	0.71 – 0.81	<0.0001	0.80	0.74 – 0.88
Caucasian Race	2.7	2.2 – 3.5	<0.0001	3.2	2.3 – 4.3
Registered Donor	4.6	3.3 – 6.3	<0.0001	4.9	3.3 – 7.2
Authorization Requested by *					
Physician	Reference				
Trained Specialist	19.5	9.4 – 40.6	<0.0001	17.3	8.0 – 37.3
Family	15.6	6.1 – 39.6	<0.0001	16.5	5.9 – 45.6
Nurse	1.8	0.7 – 4.5	0.19		
Chaplain	2.2	0.5 – 8.9	0.29		
Cause of Death **					
Cardiac	Reference				
CVA	1.4	0.9 – 2.2	0.11		
MVA	4.3	2.7 – 7.1	<0.0001	1.9	1.0 – 3.5
Gunshot/Stab	5.2	3.0 – 9.1	<0.0001	3.3	1.7 – 6.6
Head Trauma	2.5	1.2 – 5.1	0.015		
Sepsis	0.9	0.5 – 1.8	0.8		
Asphyxiation	0.8	0.4 – 1.8	0.6		
Drug Overdose	4.1	1.7 – 9.9	0.0016		
Other	0.8	0.3 – 2.0	0.7		

* p-value <0.0001 for an omnibus 4 degree of freedom test to access whether odds of obtaining authorization vary by whom requested. All odds are relative to the odds of a physician obtaining familial authorization.

** p-value <0.0001 for an omnibus 8 degree of freedom test to access whether odds of obtaining authorization vary among causes of death. All odds are relative to obtaining familial authorization from a deceased donor cardiac cause of death.