Don’t Take ‘No’ For An Answer:
An experiment with actual organ donor registrations[*]

By Judd B. Kessler and Alvin E. Roth

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ABSTRACT

We experimentally investigate how individuals respond to an opportunity to change their actual Massachusetts organ donor registration status. Many unregistered individuals join the registry (29%) while almost all registered individuals remain (99%). How individuals are asked impacts the decision. Contrary to a popular hypothesis, a : =: >=< <> frame that forces individuals to choose either yes or no does not increase registration : > > : - ? : > < > >< >< : ; >@ > : = >: > ; : not to register. A second experiment suggests : : =: >=< <> @ : discourage next-of-kin from donating the organs of unregistered deceased relatives.

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Department of Business Economics and Public Policy, The Wharton School, University of Pennsylvania, Philadelphia, PA 19104; judd.kessler@wharton.upenn.edu

Department of Economics, Stanford University, Stanford, CA 94305; alroth@stanford.edu

I.

One potential strategy to encourage organ do individuals are asked to become organ donors may also affect the decisions that next-of-kin make when deciding whether to donate the organs of a deceased who is unregistered. A separate group of experimental subjects made hypothetical choices indicating next of kin would be more likely to donate the organs of a non-registered deceased who had simply failed to opt-in rather than explicitly chosen not to donate in a mandated choice. These findings provide the other inspiration for the title of our paper: an opt-in frame may generate more recovered organs than a mandated choice frame that allows individuals to select an option that is effectively saying = : . These results demonstrate the direct and indirect effects that choice architecture can have on individual decision-making.

Note that many steps can be taken in parallel to relieve the shortage of transplantable organs. One approach to increasing the number of registered donors is to provide priority on organ donor waiting lists for those who had previously registered as donors. This policy has been implemented in Singapore and in Israel and been studied theoretically and experimentally by Kessler and Roth (2012, 2013). Results from Israel suggest that the introduction of the new priority policy has been accompanied by a significant increase in the number of registered donors (Lavee et al. 2012).

Increasing the number of individuals who register as deceased donors is just one way of addressing the need for transplantable organs. Kidney exchange, in which incompatible patient-donor pairs are matched, has facilitated transplantation of kidneys from living donors (Roth, Sonmez and Unver 2004, 2005a,b, 2007; Roth et al. 2006; Saidman et al. 2006). This research has resulted in new institutions, including the New England Program for Kidney Exchange (NEPKE) and the Alliance for Paired Donation, which identify incompatible patient-donor pairs who are compatible with one another allowing for an exchange of kidneys. In addition, these organizations can create chains of donation that start with an undirected donor.[9] While kidney exchange has facilitated a growing number of transplants, kidney waiting lists continue to grow without a sign of slowing down.[10] In addition, while donor chains and exchanges can increase the number

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statistically increases the probability that they become donors, demonstrating that it is possible to increase the likelihood of organ donor registration with a subtle manipulation.

[9] Roth et al. (2006) proposed that chains initiated by a non-directed donor could be performed non-simultaneously, since the patient in an incompatible patient-donor pair would always have received a kidney before the donor was asked to donate. The first non-simultaneous chain that began with an undirected donor started in 2007 and resulted in ten transplants over a period of eight months (Rees et al. 2009). Donor chains beginning with an undirected donor are becoming more common (see Ashlagi et al. 2011 and

of transplanted kidneys, live donation of other solid organs (including the heart, pancreas, and intestine) is not possible and there is very little transplantation of live donor lungs or livers. For a variety of organs in the United States, Table 1 lists the number of living donor transplants, number of deceased donor transplants, and the number of people on the waiting list.[11] Note that the large number of patients waiting for kidney transplants reflects the fact that kidney dialysis is able to keep patients with kidney failure alive for many years while waiting, but that nothing like dialysis exists for other organs.

Table 1: Number of Donors and Waiting List By Organ

Organ	**2011 Living Donor Transplants**	**2011 Deceased Donor Transplants**	**Patients on the deceased donor waiting list at end of 2011**
Kidney	4,922	10,399	86,547
Liver	186	5,596	15,330
Lung	1	1,798	1,630
Heart	N/A	1,931	2,813
Pancreas	N/A	1,091	3,170
Intestine	0	127	271

Data provided from the 2011 OPTN annual report.

This paper proceeds as follows. Section II describes the experimental design of the main experiment. Section III presents the main experimental results. Section IV describes the follow-on experiment about the decisions of next-of-kin and presents its results. Section V discusses the implications of our results and concludes.

II. Experimental Design

In the main experiment, subjects were recruited to the Computer Lab for Experimental Research (CLER) at Harvard Business School. Recruitment information on the CLER website informed potential subjects that they needed Massachusetts credentials > : = > <> > >: > > : > => ?<: card) and the last four digits of their social security number to participate in the study. Potential subjects were also informed that they would be logging onto a state database, making a decision, and

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[11] There is an ongoing literature on donation of blood and bone marrow. Recent work on blood = : : > @ >= > > = @ <> > ? = : ?; =<: > : < = @ : @ >: = > = : >: : = : ? = : <> > <>: >= : without leading to a decrease in blood quality (see Mellstrom and Johannesson 2008; Lacetera and Macis 2010a,b; Lacetera, Macis and Slonim 2012). Recent work on bone marrow donations suggests that fewer individuals are on the bone marrow registry than is optimal (see Feve and Florens 2005; Feve et al. 2007; Bergstrom et al. 2009, 2011).

completing a survey.[12] Subjects were not informed in advance, however, that organ donation was the subject being studied.

Once they arrived at the laboratory, each subject was seated at an isolated computer terminal and provided with a consent form. The consent form indicated what subjects would do in the research study. To ensure subjects understood, the experimenter read one paragraph from the consent form aloud to all subjects. This paragraph read:

What you will do in this research: You will (1) enter information that will be used to log you into a registry of organ and tissue donors in Massachusetts, (2) be provided with information about organ and tissue donation, (3) decide whether or not you would like to >@ > : : @ : = >= : = < >>: > (See Appendix B for the full consent form.)

After signing the consent form, subjects initiated the study by logging into the Massachusetts Organ and Tissue Donor Registry maintained by the Department of Transportation (DOT) on the website of the Registry of Motor Vehicles. Subjects logged into the registry through a web interface designed specifically for the experiment (see Figure 1). The experimental login screen asked for the same information requested by the Massachusetts DOT login screen: first name, last name, date of birth, MA state ID number, last four digits of social security number, and an email address. The software was designed so that subjects logged into and interacted with the real Massachusetts Organ and Tissue Donor Registry through a front end that could be manipulated experimentally.[13] As will be explained in detail below, the design of the software allowed us to manipulate: (1) the information the subject received about organ donation and (2) how the subject was asked about becoming a donor.[14]

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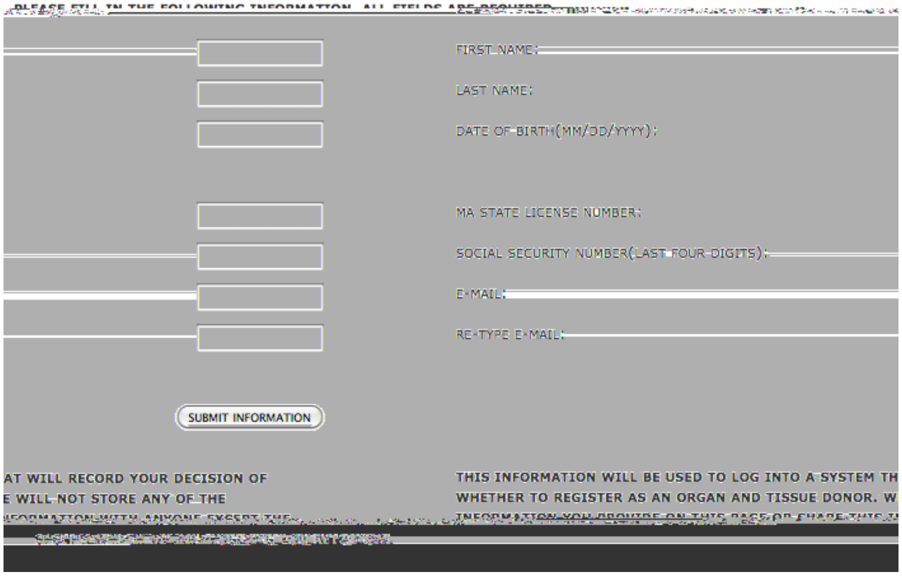
[12] - > >< > ? : < =>= > > " => : < : > = : >: : :< > > %<> >) > , : >" : = >>= > > for entry into the study. Those without a M: :< > > %<> >) > State ID will be turned away. You must also know the last four digits of your social security ; > >> > = ? >? >< > ? :

[13] Given the sensitive information that was required for logging into the Massachusetts RMV organ donor registry (in particular MA State ID number, last four digits of the social security number, name, and date of birth) protecting subject privacy with the experimental software was a technical challenge. The experimental software was built as an add-on to the Firefox browser so that it could run locally on each computer terminal in the lab. The add-on was specifically designed to communicate with the Massachusetts RMV site in the background while displaying the experimental front end to the subject. Since the software ran locally on the computer, when the sensitive data was transmitted from the computer, it was transmitted through the actual Massachusetts RMV online form. It was consequently just as secure as if the subject had directly > >>= > ? : > : :< > + / >? : > ; >< registration decision was completed, the software erased the login information from the computer hard drive and only retained the variables associated with previous donor status and donor status after the decision had been made.

[14] The experimental interface hid the Massachusetts RMV logos to prevent subjects from generating associations of the registry of motor vehicles, including the violent deaths associated with car and motorcycle accidents that might lead to donation.

Figure 1: Login Screens for the Experiment (Figure 1A) and the Massachusetts Registry of Motor Vehicles (Figure 1B)



FIRST NAME:

LAST NAME:

DATE OF BIRTH(MM/DD/YYYY):

MA STATE LICENSE NUMBER:

SOCIAL SECURITY NUMBER(LAST FOUR DIGITS):

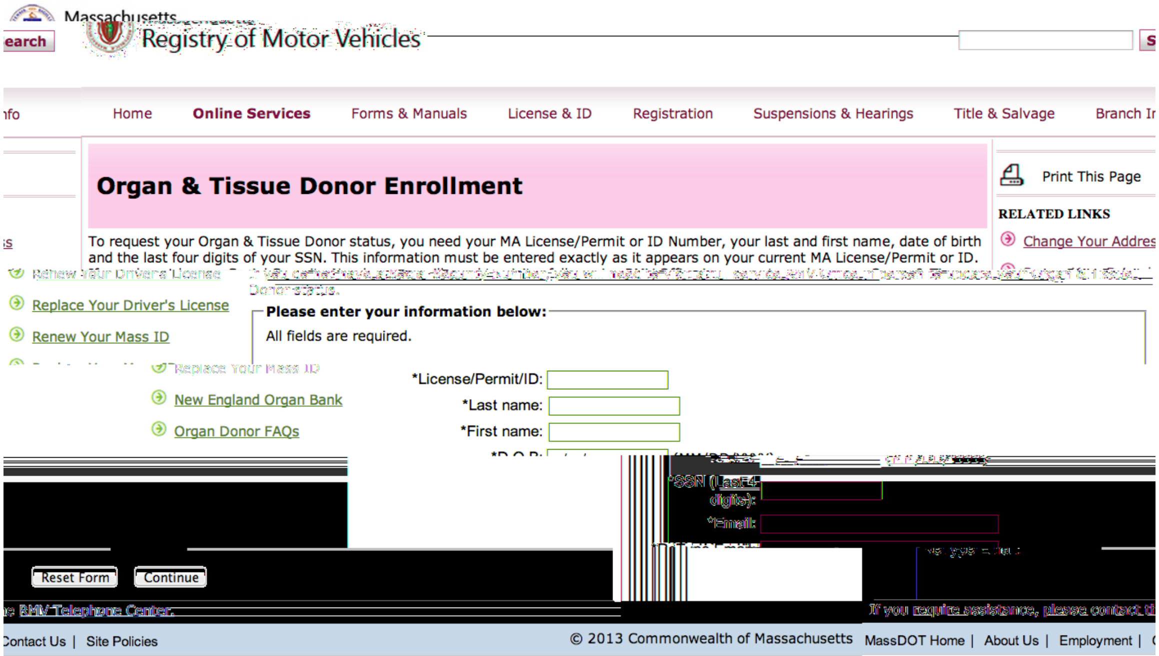
E-MAIL:

RE-TYPE E-MAIL:

THIS INFORMATION WILL BE USED TO LOG INTO A SYSTEM TH
WHETHER TO REGISTER AS AN ORGAN AND TISSUE DONOR. W

AT WILL RECORD YOUR DECISION OF
E WILL NOT STORE ANY OF THE

Figure 1A: Screenshot of login page in Experiment



Organ & Tissue Donor Enrollment

To request your Organ & Tissue Donor status, you need your MA License/Permit or ID Number, your last and first name, date of birth and the last four digits of your SSN. This information must be entered exactly as it appears on your current MA License/Permit or ID.

Please enter your information below:

All fields are required.

*License/Permit/ID:

*Last name:

*First name:

*SSN (Last 4 digits):

*Email:

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Figure 1B: Screenshot of login page on the Massachusetts Registry of Motor Vehicles Webpage that subjects did not see due to the experimental interface

Since the software interacted with the Massachusetts DOT database, we were able >> > ; >< < > = : : = < = >> > > : condition based on that status. In particular, our experimental software gave each current non-donor the opportunity to join the organ and tissue donor registry and each current donor the opportunity to remove their name from > >@ $ >=@> ? > ; >< = status at the start of the experiment is valuable since it allows us to investigate changes in registration status in both directions (from non-donor to donor and vice versa) and it allows us investigate our experimental manipulations on both initial donors and non-donors

After logging into the registry, all subjects those who were previously donors and those who were previously not donors were asked whether they wanted to change their organ and tissue donor registration status. As shown in Figure 2, subjects were in one of four experimental treatments in a two-by-two design.

Figure 2: Four Treatments (2x2 Design)

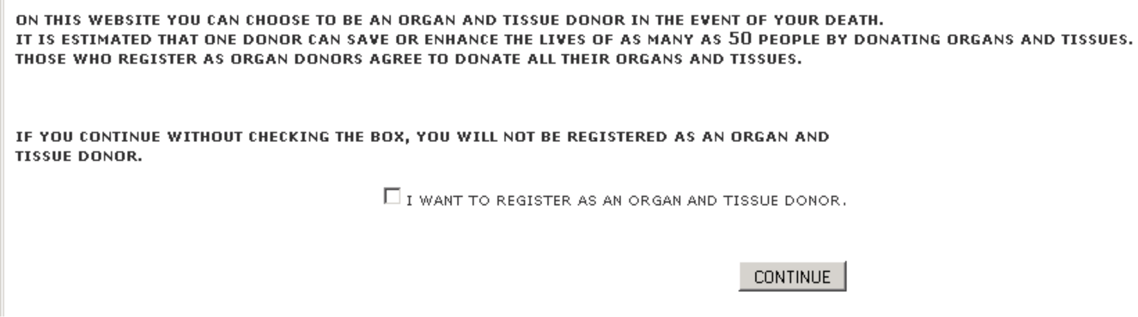
2 x 2 Design		Choice Frame	
		Opt-In	Mandated Choice
Information Provided	Control	93 subjects (55 non-donors and 37 donors)	82 subjects (51 non-donors and 31 donors)
	List of Organs	95 subjects (55 non-donors and 40 donors)	99 subjects (51 non-donors and 48 donors)

One dimension that the experiment varied was the choice frame in which subjects decided whether to join the registry. On this dimension, subjects were either provided : (- ?: > : : =. >= <> ?: > " > -in frame, subjects were given the opportunity to change their organ donor status by checking a box and clicking < > %>: @ >; ; : : =< < @< > > > @ = registration status unchanged. In the mandated choice frame, subjects were provided with two radio buttons, one that would add them the organ and tissue donor registry (or leave them on the registry if they were already on it) and one would leave them off the registry (or remove them from the registry if they were already on it). Subjects were required to < >< > ? >; : =< < < > ; >? >< @ > > ? > = See Figure 3 for screenshots of the opt-in conditions (3A and 3C) as well as the mandated choice conditions (3B and 3D).

The other dimension that the experiment varied was the information provided to subjects before they decided whether or not to change their donor status. Subjects were either provided with a standard control message or a message that included a list of organs that might bef 0 0ts were ybefd0 1 457.cETd t Tmd w heart (for valves), heart with connective tissue, kidneys, liver or iliac vessels, lungs, pancreas, skin, small intestine, > >>>:< > ? > : >: = preceded by a bullet. See Figure 3 for screenshots of the control conditions (3A and 3B) as well as the list conditions (3C and 3D).[15]

After subjects made their organ donor registration decision, they completed a 40-question survey.

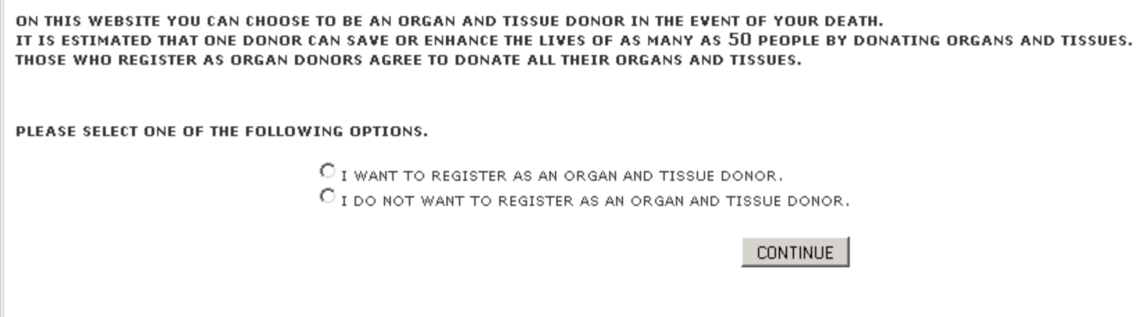
Figure 3: Registration Screens from the Experiment (Figures 3A, 3B, 3C, and 3D) and from Massachusetts Registry of Motor Vehicles (Figure 3E)


ON THIS WEBSITE YOU CAN CHOOSE TO BE AN ORGAN AND TISSUE DONOR IN THE EVENT OF YOUR DEATH.
IT IS ESTIMATED THAT ONE DONOR CAN SAVE OR ENHANCE THE LIVES OF AS MANY AS 50 PEOPLE BY DONATING ORGANS AND TISSUES.
THOSE WHO REGISTER AS ORGAN DONORS AGREE TO DONATE ALL THEIR ORGANS AND TISSUES.

IF YOU CONTINUE WITHOUT CHECKING THE BOX, YOU WILL NOT BE REGISTERED AS AN ORGAN AND TISSUE DONOR.

☐ I WANT TO REGISTER AS AN ORGAN AND TISSUE DONOR.

Figure 3A , <>> ? > > >@ : :@> (-in, Control >: >


ON THIS WEBSITE YOU CAN CHOOSE TO BE AN ORGAN AND TISSUE DONOR IN THE EVENT OF YOUR DEATH.
IT IS ESTIMATED THAT ONE DONOR CAN SAVE OR ENHANCE THE LIVES OF AS MANY AS 50 PEOPLE BY DONATING ORGANS AND TISSUES.
THOSE WHO REGISTER AS ORGAN DONORS AGREE TO DONATE ALL THEIR ORGANS AND TISSUES.

PLEASE SELECT ONE OF THE FOLLOWING OPTIONS.

○ I WANT TO REGISTER AS AN ORGAN AND TISSUE DONOR.
○ I DO NOT WANT TO REGISTER AS AN ORGAN AND TISSUE DONOR.

Figure 3B , <>> ? > > >@ : :@> : =: >d, Control >: >

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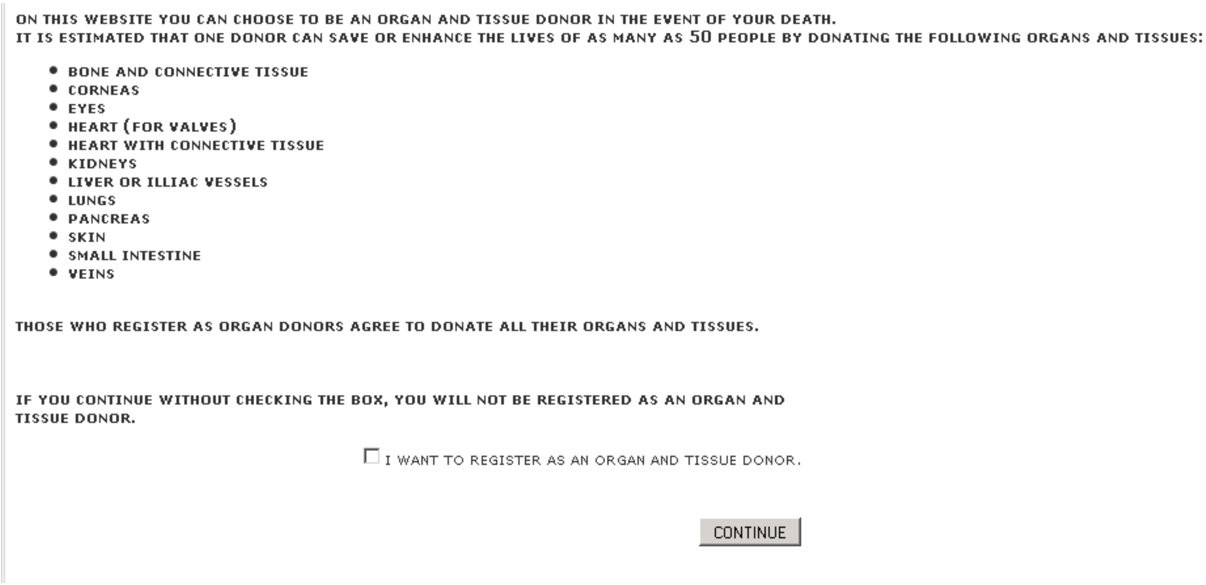
[15] Originally, we intended to have a third dimension of variation in which the request for >@ : >?>> <>= >:= > :<: <: : : > < <: > ?=>: h that might lead to organ donation. We hypothesized that donation would be more costly if associated with @ ?=>: . ? : > : ? : >; @> :>=: > ? > - > >@ > : organ donors agree to donate all their organs and > ? > <>> ? >? subjects who received the head injury language without the list of organs. This bug prevented a clean analysis of the effect of head injuries language. After recognizing this bug and having continued low recruitment numbers, we decided to cut the head injuries language from future sessions of the experiment. In total, 121 subjects saw the head injuries language, 70 of those subjects were not donors when they entered the lab. All of our analysis is qualitatively the same if we exclude these subjects from the analysis.



ON THIS WEBSITE YOU CAN CHOOSE TO BE AN ORGAN AND TISSUE DONOR IN THE EVENT OF YOUR DEATH.
IT IS ESTIMATED THAT ONE DONOR CAN SAVE OR ENHANCE THE LIVES OF AS MANY AS 50 PEOPLE BY DONATING THE FOLLOWING ORGANS AND TISSUES:

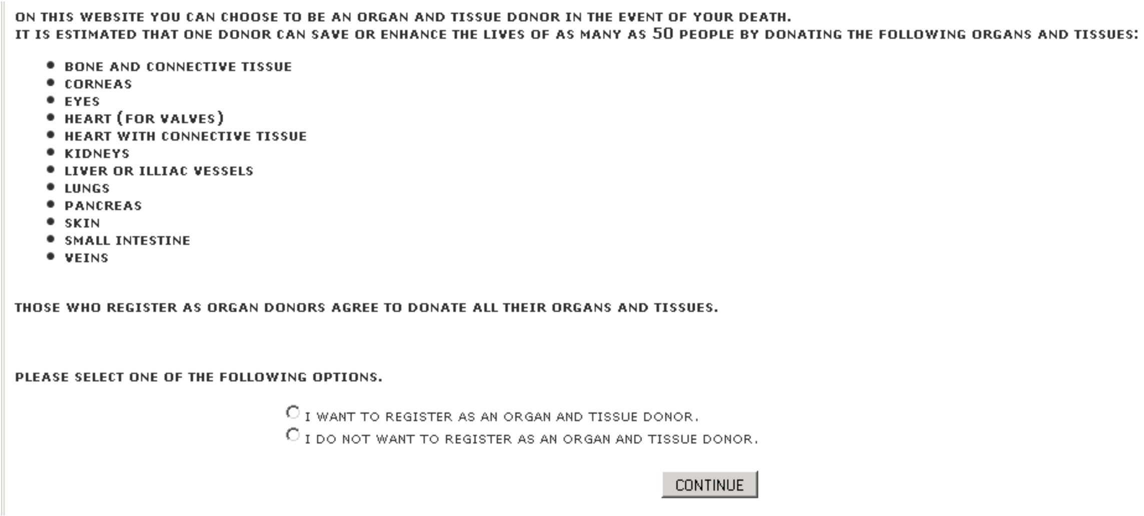
- BONE AND CONNECTIVE TISSUE
- CORNEAS
- EYES
- HEART (FOR VALVES)
- HEART WITH CONNECTIVE TISSUE
- KIDNEYS
- LIVER OR ILLIAC VESSELS
- LUNGS
- PANCREAS
- SKIN
- SMALL INTESTINE
- VEINS

THOSE WHO REGISTER AS ORGAN DONORS AGREE TO DONATE ALL THEIR ORGANS AND TISSUES.

IF YOU CONTINUE WITHOUT CHECKING THE BOX, YOU WILL NOT BE REGISTERED AS AN ORGAN AND TISSUE DONOR.

☐ I WANT TO REGISTER AS AN ORGAN AND TISSUE DONOR.

Figure 3 , <>> ? > > >@ : :@> (- % treatment)



ON THIS WEBSITE YOU CAN CHOOSE TO BE AN ORGAN AND TISSUE DONOR IN THE EVENT OF YOUR DEATH.
IT IS ESTIMATED THAT ONE DONOR CAN SAVE OR ENHANCE THE LIVES OF AS MANY AS 50 PEOPLE BY DONATING THE FOLLOWING ORGANS AND TISSUES:

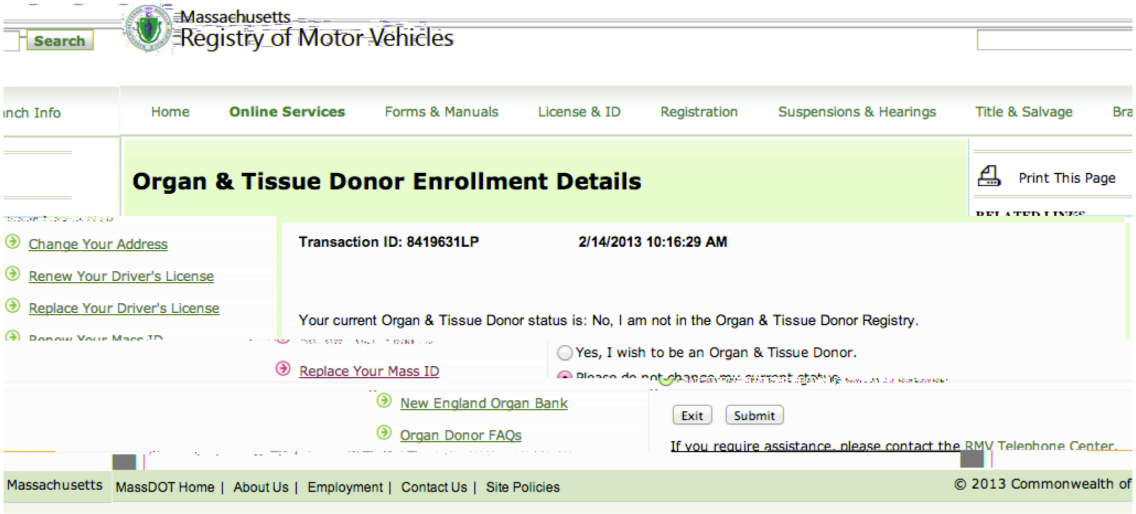
- BONE AND CONNECTIVE TISSUE
- CORNEAS
- EYES
- HEART (FOR VALVES)
- HEART WITH CONNECTIVE TISSUE
- KIDNEYS
- LIVER OR ILLIAC VESSELS
- LUNGS
- PANCREAS
- SKIN
- SMALL INTESTINE
- VEINS

THOSE WHO REGISTER AS ORGAN DONORS AGREE TO DONATE ALL THEIR ORGANS AND TISSUES.

PLEASE SELECT ONE OF THE FOLLOWING OPTIONS.

○ I WANT TO REGISTER AS AN ORGAN AND TISSUE DONOR.
○ I DO NOT WANT TO REGISTER AS AN ORGAN AND TISSUE DONOR.

Figure 3 , <>> ? > > >@ : :@> : =: >d % >: >



Massachusetts Registry of Motor Vehicles

Search

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Organ & Tissue Donor Enrollment Details

Print This Page

- Change Your Address
- Renew Your Driver's License
- Replace Your Driver's License
- Replace Your Mass ID
- New England Organ Bank
- Organ Donor FAQs

Transaction ID: 8419631LP **2/14/2013 10:16:29 AM**

Your current Organ & Tissue Donor status is: No, I am not in the Organ & Tissue Donor Registry.

○ Yes, I wish to be an Organ & Tissue Donor.

● Please do not change my current status.

Exit Submit

If you require assistance, please contact the RMV Telephone Center.

Massachusetts | MassDOT Home | About Us | Employment | Contact Us | Site Policies | © 2013 Commonwealth of

Figure 3E: Screenshot of Massachusetts Registry of Motor Vehicles registration page that subjects did not see due to the experimental interface. ' >) >: >= < : @> < > : >=>?: : : : <: >><>= > : @> - >>< > > >= > > > > , ; ; > >=

III. Results

A total of 368 subjects participated in one of 66 sessions on one of 25 dates between August 2010 and April 2012 at the CLER at Harvard Business School.[16] Of these who participated, 156 subjects (42.4%) entered the lab as registered organ donors and the other 212 subjects (57.6%) were non-donors at the start of the study.

For a subject to enter the lab as a non-donor in our study, that subject must have previously received an identification card issued by Massachusetts: either a license, permit, or state ID card. State policy requires that an individual who applies for any of these three types of identification cards be asked to register as an organ and tissue donor.[17] Consequently, the subjects who were not registered organ and tissue donors when they entered the laboratory had previously been asked to register and had declined.

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[16] The experiment was run over a period of roughly 20 months since our requirement that subjects have a Massachusetts State ID card (either a license, permit or state ID) generated a much smaller potential subject pool than usual. When we designed the experiment, the CLER recruitment software did not keep track of whether potential subjects had a Massachusetts ID and we overestimated the percentage of the CLER subject pool that would be eligible to participate in our study. Our goal of getting 200 subjects who were not already donors was only met during our last wave of sessions in April 2012.

[17] From the Massachusetts RMV website: When the customer applies for a Massachusetts permit/license/ID card, he/she will have the opportunity to become an organ and tissue donor ; <>< @ > > > 0 = > >@ > ; > < > ; > : @ : = >= > > <> >" <: =: <:

III.1 Asking again for organ donation

Table 1 provides demographic information about the 368 subjects who participated in the study as collected in the survey conducted after the registration decision. For each demographic breakdown, we show the percentage of those subjects who were donors before they entered the lab and those who were donors when they left. In the PR test p-value column, we denote the p-value associated with a two-sample test of proportions and indicate whether the change in percentage of registered donors during the experiment is statistically significant.

The top row of Table 1 demonstrates that across all of our treatments subjects were significantly more likely to be on the registry of organ and tissue donors by the end of our experiment. The increase in share of donors from 42% to 58% is highly statistically significant. This effect is driven by the fact that 61 of the 212 subjects (28.8%) who were not on the organ donor registry when they entered the laboratory joined the Massachusetts Organ and Tissue Donor Registry while only 2 of the 156 subjects (1.3%) who entered the laboratory as donors took themselves off the organ donor registry.

Result 1: Giving people the opportunity to change their organ donor registration status increases the number of registered donors.

Asking people again to become organ donors has a positive effect on the number of individuals who register as donors. The subjects who were recruited to the experiment were not told that the experiment was about organ donation so we have no reason to believe that the experiment selected subjects who were particularly inclined towards organ donation.[18] Forty-two percent of our subjects were registered as organ donors when they entered the laboratory, which is remarkably close to the percent of individuals designated as organ and tissue donors in Massachusetts, which rose from 44% at the end of 2010 to 48% at the end of 2011 (Donate Life America 2011, 2012). The organ donor designation rates of the subjects who participated in our study in 2010 and 2011 were not significantly different from the Massachusetts average in either year.[19]

(https://secure.rmv.state.ma.us/Policybrowserpublic/PolicyBrowser.aspx => %<> >) <
(@ : =- >) < ' > :<<> >=

[18] In addition, upon completion of the study, subjects were instructed not to discuss the study with others who might participate in order to avoid selection issues in later sessions of the experiment.

[19] The fact that the donor percentage in the subject pool mirrors the general population further
@@> : >> > > == > > ><> >>< ? ; >< : >= <: @> >
donor status. 67 of the 171 subjects in 2010 were donors, this 39.2% is not different from 44%, binomial probability test p=0.22; 55 of the 112 subjects in 2011 were donors, this 49.1% is not statistically significantly different from 48%, binomial probability test p=0.85.

Result 2: People who are given the opportunity to change their organ donor registration status overwhelmingly add themselves to the registry and do not remove themselves from the registry.

The increase in the number of donors highlighted in Result 1 was driven by both: (1) previous non-donors adding themselves to the registry and (2) previous donors keeping themselves on the registry. When given the opportunity to change their organ and tissue donor registration status, current donors were very unlikely to remove themselves from the registry (the 1.3% probability of removal from the registry is not statistically significantly different from 0; two-sided t-test, p>0.1). Previous non-donors, however, were quite likely to add themselves to the organ and tissue donor registry (the 28.8% probability of joining the registry is statistically and economically significant). These results suggest that the intention to register as a donor appears to be stable, while the intention not to register appears to be less stable.

These results are relevant for policy in that they suggest that an individual being listed on a state registry or having a heart or an organ donor signature on his or her = > <> > reliably reflects current intent to be a donor. This is an important fact for the Anatomical Gift Act, which says that these intention measures can be used to reflect the last wishes of a deceased donor (Glazier et al. 2009).

Furthermore, Glazier (2006) has suggested that an online registry from which one <: >: > > > : >at any time makes intention to donate clearer. One might still be concerned that transaction costs might prevent people from removing their names from an online registry after changing their minds. Here we find evidence in support of Glazier (2006), namely individuals who are listed in the Massachusetts Organ and Tissue Donor Registry at the start of the study are very unlikely to change their donor registration status even when the transaction costs to doing so are completely removed. This result might also question the policy active in Massachusetts and elsewhere that individuals must reaffirm their desire to remain on the organ and tissue donor registry each time they renew their state license, permit or ID.[20] "? = = : preferences to remain on the registry are stable over time it is possible that forcing an individual to confirm his desire to stay on the registry each time he renews his license may lead to accidental attrition off the registry if an individual does not pay attention to the question each time he or she is asked.

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[20] From the Massachusetts RMV website: "? >customer is currently registered as a donor, he/she still >>= < >< > > > 0 = > >@ > ; > < > be, an organ and tissue donor >permit/license/ID card application in order to remain in the : :< > +>@ (https://secure.rmv.state.ma.us/Policybrowserpublic/PolicyBrowser.aspx => %<> >) < (@ : =- >) < ' > :<<> >=

Table 2: Demographics of Subject Population

	Number	**Percent of Subjects**	**% Donor Before**	**% Donor After**	**PR test p-value**
All Subjects	368	100%	42	58	0.000***
Breakdown by age					
18 to 21	108	29%	38	60	0.001***
22 to 30	140	38%	51	62	0.070*
31 and older	120	33%	36	53	0.009***
Breakdown by race					
Asian	54	15%	26	41	0.103
Black Hispanic	2	1%	0	0	.
Black Non-Hispanic	39	11%	31	51	0.065*
Native American	3	1%	100	100	.
Other	14	4%	21	21	.
White Hispanic	20	5%	50	55	0.752
White Non-Hispanic	236	64%	48	66	0.000***
Breakdown by Educational Background					
Grade School	4	1%	25	25	.
High School	30	8%	13	36	0.037**
Some College					

Finally, the results on Table 2 show that this effect of giving subjects the opportunity to change their organ registration status leading to more registered donors is not being driven by any particular subgroup. Table 2 breaks the experimental subjects down by demographic characteristics identified in our survey. We find directionally positive effects for every subgroup with more than 14 subjects and positive and statistically significant effects for every subgroup of more than 75 subjects.

III.2 How to ask for organ donation

The experimental variation in how subjects were asked to change their organ and tissue donor registration status provides additional results. Does the way we ask these subjects about registering as an organ donor influence their decisions to join the registry? Results show that subjects were somewhat more likely to register as donors when the request to register as an organ donor was provided in an opt-in frame rather than a mandated choice frame. In addition, subjects were significantly more likely to register as donors when exposed to the list of organs than if they received the standard message.

Table 3: Registration Rates by Treatment

2 x 2 Design		Choice Frame	
		Opt-In	Mandated Choice
Information Provided	Control	14/55 (25.5%) joined registry 37/37 (100%) remained on registry	10/51 (19.6%) joined registry 30/31 (96.8%) remained on registry
	List of Organs	22/55 (40%) joined registry 39/40 (97.5%) remained on registry	15/51 (29.4%) joined registry 48/48 (100%) remained on registry

Table 3 shows the number of subjects in each treatment that ended up on the registry by initial donor status. Table 4 presents this data in a regression framework. It presents results about whether individuals end up on the registry (left panel) and whether previous non-donors join the registry (right panel). Regressions (1) through (3) show that subjects who receive the mandated choice frame and the list of organs are more likely to end up as registered donors than those who do not. Looking exclusively at subjects who were not donors at the start of the study in regressions (4) through (6), the mandated choice frame makes subjects 8 to 9 percentage points less likely to register as donors (8.2 is a 25% decrease on a base registration rate of 32.7% under the opt-in frame). The list of organs makes subjects 12 to 16 percentage points more likely to register as donors (12.3 is a 54% increase on a base registration rate of 22.6 under the standard message).[21] The

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[21] Subsequent answers from the survey provide suggestive evidence for why the list of organs may have had a positive impact on the likelihood that subjects registered as organ donors. Being exposed to the list appears to make subjects believe that a single donor can save more lives and they are they are more likely to report a family member having received an organ. Among

coefficient on mandated choice and the coefficient on the list of organs do not change much as we add dummies for the date of the sessions in (2) and (5), valuable given that the experiment was run on 25 different dates over 21 months. Additional controls for receiving the additional wording associated with the car crash and missing a line of text in the appeal due to the computer bug also does not change the coefficients in (3) and (6).

Table 4: Organ Registration By Condition

	Organ and Tissue Donor Registration (0 or 1) OLS Specifications					
	All Subjects			All Initial Non-Donors		
	(1)	(2)	(3)	(4)	(5)	(6)
Mandated Choice Frame	-0.050 (0.037)	-0.063* (0.037)	-0.062* (0.037)	-0.082 (0.062)	-0.093 (0.066)	-0.093 (0.066)
List of Organs	0.074** (0.037)	0.082** (0.037)	0.095** (0.046)	0.123** (0.062)	0.160** (0.069)	0.159* (0.084)
Initially Registered	0.700*** (0.033)	0.680*** (0.035)	0.679*** (0.035)			
Constant	0.275*** (0.033)	0.257*** (0.069)	0.252*** (0.068)	0.275*** (0.052)	0.182 (0.123)	0.184 (0.124)
Date Dummies	No	Yes	Yes	No	Yes	Yes
Treatment Dummies	No	No	Yes	No	No	Yes
Observations	368	368	368	212	212	212
R-squared	0.50	0.54	0.54	0.03	0.12	0.12

Robust standard errors are in parentheses: * significant at 10%; ** significant at 5%, *** significant at 1%. Date dummies include a dummy for each of the 25 dates experimental sessions were run.

Result 3: Framing the decision to become an organ donor as a mandated choice make subjects somewhat less likely to register.

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previously unregistered subject, those who see the list appear to report that more life-saving organs can be transplanted from a single deceased donor (12.7 versus 9.6, t-test 211 obs, p=0.059). In addition, subjects in that group who see the list are more likely to report that a family member has received an organ transplant the (4.7% versus 0.9%, t-test 212 obs, p=0.099). The latter result suggests that subjects who are exposed to the list broaden their interpretation of what constitutes an organ transplant. Together, these results suggest that seeing the list may make subjects think (1) the value of being an organ donor is higher and (2) that they have personal connection to organ donation. Neither of these increases in response to seeing the list mediates the increase in the donation rate, however, suggesting that these effects are not the whole story.

Result 4: Including a list of organs that might be donated by a deceased donor makes subjects more likely to register.

Results from Table 4 show that framing the decision to register as a mandated < <> < ; >< : > > > < < " : >@ > : an organ and tissue = "= : >@ > : : @ : = >= : > ; >< directionally less likely to join the registry (between 5 and 10 percentage points depending on the specification). The opt-in frame where a subject simply checks the box > " : >@ > : : @ : = >= : = >: > ; : > registry leads to directionally more registrations.[22]

This result contrasts with previous results (from hypothetical-choice experiments) suggesting that forcing individuals to choose yes or no about becoming an organ donor will lead to more registrations than an opt-in frame with a default of no donation (Johnson and Goldstein 2003, 2004). While we do not get statistical significance beyond p<0.1 (and we only get that in some specifications) a one-sided test can reject the hypothesis that mandated choice outperforms the opt-in frame among initial non-donors (25% to 33%, one-sided t-test 212 obs, p<0.1). In our setting, asking people to check a box to join the registry and leaving it blank to not join the registry is no worse, and directionally better, than forcing them to choose one or the other.

Even no change in donation rates as a result of framing the decision as a mandated choice might have a negative effect on transplantation rates if the way in which the donor is asked to register causes the next of kin to make a different inference about >=><>: >= > . For example, > ? @ > > >< <> "= : >@ > : : @ : = >= : : > < ; >: = >>: >: @ >; ; : > " : >@ > : : @ : = >= @ ; > interpreted differently. Put another way, not being on the registry might provide different information to : =><>: >= next of kin, depending on how the deceased was asked to register. We investigate this hypothesis with a follow-on experiment, discussed next.

IV. Next-of-Kin Decisions

To investigate the potential effect of the decision frame in which an individual was asked to register as a donor on the decision of their next of kin, we designed a survey experiment that we conducted on : Mechanical Turk platform.[23]

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[22] When the subject was already registered as an organ donor, the box in the opt-in frame allowed the subject to remove himself from the registry.

[23] Mechanical Turk is an online marketplace run by Amazon.com and has become a common platform for survey experiments https://www.mturk.com/mturk/welcome (Buhrmester, Kwang and Gosling 2011)

IV.1 Design

The survey > > > : ; >< >< >= : Mechanical Turk platform on January 8, 2013. Subjects were told the survey would take 5 to 10 minutes (on average it was completed in just over 5 minutes). Subjects were paid $0.50 for completing the survey, relatively large compensation for a 5-10 minute survey on Mechanical Turk.

In the survey, subjects were asked about what a hypothetical next of kin should do with regards to donating the organs of a recently deceased relative. The subjects were asked to make decisions about four scenarios, presented one-at-a-time in one of four random orders. All scenarios began in the same way. Subjects read:

“An individual has died. The individual's next of kin has been asked whether or not they would like to donate the organs of the deceased. The only information that the next of kin has about the wishes of the deceased is that the deceased saw this screen…”

Subjects were then shown one of two organ donation decision screens from the main experiment either Figure 3A or 3B along with what the hypothetical deceased had chosen in that scenario.

For the opt-in frame, they were told the deceased either:

“selected ‘I want to register as an organ and tissue donor’”
or
“did not select ‘I want to register as an organ and tissue donor.’”

For the mandated choice frame, they were told the deceased either:

selected ‘I want to register as an organ and tissue donor’”
or
“selected ‘I do not want to register as an organ and tissue donor.’”

The deceased was then asked whether the next-of-kin should donate the organs of the deceased and how confident they were in that answer.[24] Confidence options were: > < ?=> < ?=> > : < ?=> : = < ?=> After subjects with the same decision frame but the opposite decision by the deceased (e.g. if they first answered > :; : =><: >= ><>= " : >@ > : : @ : = >= >opt-i ?: > > >> > : >=:; : =><: >= == >< " : >@ > : : @ : = >= >opt-in frame).

After answering both questions for one frame, they answered the questions for two more scenarios with decisions being made by next of kin under the other frame. For < > => ? >=><: >= =< > >@ : kept the same for each frame (e.g. if subjects had been asked about a deceased who joined the registry in the first scenario, they were asked about a deceased who joined the registry in the third scenario). This generated four orders of scenarios. Subjects were randomly assigned to one of these four orders.

- : > > ; < first scenario was randomly chosen to be either: (1) a deceased who joined the registry in an opt-in frame, (2) a deceased who had not joined the registry in an opt-in frame, (3) a deceased who joined the registry in a mandated choice frame, or (4) a deceased who had not joined the registry in a mandated choice frame. Subjects then saw the opposite decision by the deceased in the same frame, then saw the first decision by the deceased in the other frame, and finally saw the opposite decision of the deceased in the other frame.

IV.2 Results

The design of the experiment allows for both a between-subject analysis of the next-of-kin questions (comparing answers from the first scenario a subject saw) and a within-subject analysis (comparing how the same subject responded to the deceased making the decision to join or not join the registry under different frames). We discuss the between-subject results first.

Result 5: Subjects think the next of kin should donate organs of an unregistered deceased more often when the deceased did not opt-in than when the deceased declined to register under mandated choice.

Table 5 reports the percent of subjects who said the next of kin should donate the organs of the deceased as well as their confidence on a 7-point scale with mean 0 constructed from the confidence answers.[25] When the deceased was not on the registry because the deceased had not opted in, 38.1% of subjects stated that the next of kin should donate the organs. When the deceased was not on the registry because they

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[25] - > <: > : @> ? > < ?=> : >next of kin should donate equal to 3.5, : = > < ?=> > > ? = = : >> : -3.5, with confidence > > :<>= >: < : = : ? < ?=> : > > ? == : > < ?=> > ext of kin should not donate, from 0.5 to -0.5.

indicated they did not want to register under a mandated choice frame, only 26.7% of subjects thought next of kin should donate. This 11.4 percentage point difference is statistically significant (t-test, 803 observations, p<0.05) and represents a 43% increase (on the base of 26.7 percent) in the number of subjects who say the next of kin should donate the organs of the deceased. Subjects are much more hesitant about donating the organs of a deceased who indicated that they did not want to be a donor in a mandated choice frame than a deceased who simply did not chose to opt-in to become a donor.

Table 5: Decisions and Confidence By Condition

		Percent who said next of kin should donate		**Average confidence: from confident should donate (3.5) to confident should not donate (-3.5)**	
Deceased was:	**Question was:**	*First Choice*	*All Four Choices*	*First Choice*	*All Four Choices*
Registered	Opt-in	93.2%	92.0%	2.65	2.62
	Mandated Choice	94.7%	94.9%	2.71	2.83
	Difference (Opt MC)	*-1.6%*	*-3.0%***	*-0.064*	*-0.209****
Unregistered	Opt-in	38.1%	35.5%	-0.552	-0.728
	Mandated Choice	26.7%	21.2%	-1.31	-1.69
	Difference (Opt MC)	*11.4%***	*14.3%****	*0.753****	*0.966****

For t-tests and Ranksum tests: * significant at 10%; ** significant at 5%, *** significant at 1%.

Table 6 investigates the likelihood of suggesting donation and shows that the differences between the opt-in and mandated choice questions for unregistered donors are strongly significant. Regressions (1) and (2) report the results from the first scenario that subjects saw when asked whether the next of kin should donate the organs of the deceased. The interaction between mandated choice frame and not on registry is statistically significantly negative (p=0.013) as is the 11.5% difference between mandated choice and opt-in for unregistered donors (p=0.014). Regressions (3) and (4) use all four scenarios about which subjects answered and combine the within and between variation, identifying an even stronger impact of the mandated choice frame on the likelihood of

deceased was asked to register as a donor without a major experimental manipulation of state policy (followed by a long wait for people to die and next of kin to make organ donation decisions). Consequently we think it is reasonable to start the process with experimental survey data that can provide guidance about how individuals might respond to state policies and what policy might be best.[27]

V. Discussion

- > ? > ? > > ? : > -: > ' > - >? : @ @ = =: > join the organ and tissue donor registry in Massachusetts generates a significant number of new registrants, even though these Massachusetts ID holders have been previously asked to register as an organ donor and have declined. Put simply, asking again for organ donation generates more donors > = : > : : ? : : > > = : > ? : answer). The second set of results is that the mandated choice frame does not increase the number of registered donors in our experiment, and we identify a potential risk of asking subjects to register under mandated choice, since people become less supportive of next of kin donating the organs of an unregistered deceased when that deceased declined to register under a mandated choice frame. Put simply, our results suggest that mandated choice may not improve outcomes over opt-in when asking people to register we might prefer an opt-in frame that does not offer a option as an answer > = take no for an answer).

(>? = : > ? : : > e saw a large increase in the number of donors who registered as a result of having the opportunity to change their organ and donor registration status as part of our study, even though they had declined to register previously. This suggests that policy makers who want to increase the number of organ donors may find it useful to ask for organ donation regularly in a variety of contexts (e.g. on income tax documents as has been proposed in some states).[28] In other contexts,

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[27] Looking at empirical results of policy changes may also be a fruitful avenue to pursue. An > > > : =: >= <> : > =>= - > : : ? > : > ? > @ > > @> than expected (Siminoff and Mercer 2001). Empirical studies may be possible in the states of Illinois, California, and New York and in Great Britain, all of which have changed or plan to change from opt- : =: >=< <> > > > >@ > ? = > <> > Illinois, see Thaler 2009; in July 2011 in California, see http://marketdesigner.blogspot.com/2010/10/organ-donation-legislation-in.html; in August 2011 in Great Britian, see Wellesley 2011; and proposed for 2013 in New York, see http://newyork.cbslocal.com/2012/10/04/gov-cuomo-signs-laurens-law-in-effort-to-boost-number-of-organ-donors/). Aside from the long waiting time before newly registered donors die and either do or do not become actual deceased donors, other changes in donor registration will also have to be accounted for. For example, in Britain, those with public insurance are also now given multiple opportunities to register when they interact with the National Health Service.

[28] While it is illegal to pay people to register as donors it is legal to pay people to participate in a research study where they make an organ donation decision. Consequently, one might wonder

actual donor registration decisions, which may explain some of the difference from previous papers that rely on hypothetical decisions. Second, we do not vary the default for organ donation in Massachusetts (as is varied in the hypothetical scenarios of Johnson and Goldstein 2003, 2004) we just vary how individuals are asked to register. Given that our experiment does not find a benefit of mandated choice on registration rates, it is particularly worrisome that subjects believe next of kin should be less willing to donate the organs of a non-registered deceased who failed to register under mandated choice. While choosing to opt-in as an organ and tissue donor is a legally binding decision, failing to opt-in is not a legally binding decision under UAGA. One risk with moving to a mandated choice frame is that a person who *declines* to donate could potentially be making a decision that is legally binding on the next of kin.[30] However, our results suggest that even if declining to donate under a mandated choice is *not* legally binding, it may still dampen donation rates through its effect on the donation decisions of next of kin.

Finally it is worth noting that giving information about the benefits of donation namely providing a list of organs that might be donated increases the likelihood of registration, which is promising for policy interventions that aim to educate potential donors of the value of organ donation (see a growing literature on messaging to increase organ donor registrations including Quinn et al. 2006 and Thornton et al. 2012).

In conclusion, we note that the frequency with which we ask individuals to provide public goods can have an impact on contribution decisions. The context of organ donor registration has an interesting added feature in which how we ask an individual to register as a donor can also affect the donation decisions of those who might be asked to donate on their behalf. Both the direct and indirect effects are worthy of consideration and analysis.

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[30] The risk that a negative response be treated as legally binding might be might be mitigated by choice of phrasing. For example, a negative reply could be phrased as a decision not to register as a donor *at this time*. This type of wording was adopted in California where the negative option is: " = >@ > : >

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Appendix A: Study Recruitment Text on CLER Website

IN ORDER TO PARTICIPATE IN THIS STUDY YOU MUST HAVE A MASSACHUSETTS DRIVER'S LICENSE, MA PERMIT, OR MA STATE ID AND WILL NEED TO PRESENT IT FOR ENTRY INTO THE STUDY. THOSE WITHOUT A MASSACHUSETTS DRIVER'S LICENSE, MA PERMIT, OR MA STATE ID WILL BE TURNED AWAY. YOU MUST ALSO KNOW THE LAST FOUR DIGITS OF YOUR SOCIAL SECURITY NUMBER.

Study Description: You will log into a state database, make a decision and complete a survey.

Compensation: Participants who arrive on time and are eligible to participate will receive $15 for completing the study. There is the possibility that some subjects will be turned away from the experiment. Those who are eligible and are turned away will receive a $10 turn-away fee and will not be required to stay for the study.

Appendix B: Consent Form

Please consider this information carefully before deciding whether to participate in this research.

Purpose of the research: To understand the decision to register as an organ donor.

What you will do in this research: You will (1) enter information that will be used to log you into a registry of organ and tissue donors in Massachusetts, (2) be provided with information about organ and tissue donation, (3) decide whether or not you would like to register as an organ and tissue donor, and (4) complete a survey.

Time required: Participation will take approximately 45 minutes to complete.

Risks: There are no anticipated risks associated with participating in this study.

Benefits: At the end of the study, we will provide a thorough explanation of the study and of our hypotheses. We will describe the potential implications of the results of the study both if our hypotheses are supported and if they are disconfirmed. If you wish, you can send an email message to Judd Kessler (