Published in final edited form as:

Clin Transplant. 2019 April ; 33(4): e13506. doi:10.1111/ctr.13506.

Comparing Web-Based Video Interventions to Enhance University Student Willingness to Donate Organs: A Randomized Controlled Trial

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Abstract

Background: The efficacy of video interventions to increase organ donation willingness remains unclear.

Methods: 3-arm web-based randomized controlled trial involving 2261 students at 3 northeastern Ohio universities. Intervention students watched a live-action (n=755) or animated (n=753) donation video. Control students (n=753) viewed wellness information from the Centers for Disease Control and Prevention (CDC). The primary outcome was proportion of students who visited their state electronic donor registry to consent. The secondary outcome was intervention quality. Logistic regression assessed the effects of interventions on visiting the state registry to provide donation consent while controlling for baseline variables.

Results: Students in the live-action video arm visited their state registry more frequently than students in the CDC arm (OR = 1.86, 95% CI = 1.20 – 2.88). There was no difference between students in the animated video and CDC arms (OR = 1.10, 95% CI = 0.69 – 1.76). The quality of the live-action video was rated lower than the animated video and the CDC text (75%±18, 84%±16, 80%±16, respectively; $P < 0.001$).

Conclusion: Students who watched the live-action video were more willing to visit their electronic donor registry to register as organ donors, but rated it lower in satisfaction. Future work should identify the most potent components of organ donation interventions.

Trial Registration clinicaltrials.gov Identifier: NCT01969864

INTRODUCTION

Over 110000 people are currently on the national solid organ transplant waiting list, but each year, fewer than 35000 people receive transplants.¹ This gap persists largely because each year fewer than 17000 people donate organs. An increase in organ donation would reduce the gap between supply and demand thereby increasing the opportunity for an improved quality of life among those who are waiting.

Much attention has been devoted to identifying efficacious interventions to increase donation. Video interventions have frequently been used,²⁻⁵ but it remains unclear which video interventions are most effective. While some videos focus primarily on increasing organ donation and transplantation knowledge, others concentrate on fostering an emotional connection between the viewer and those in need of organs. A comparison of six one-minute videos (four with personal narratives, one with donation information but without personal narrative, and one unrelated to organ donation) found no significant difference among the videos in the number of attempts by participants to learn more about donation or to register to donate organs.⁶ However, a systematic review of different interventions that were successful in increasing consent for organ donation identified a “strong interpersonal component” as an important characteristic of successful change.⁷ To our knowledge, there has not been a study demonstrating the effectiveness of one organ donation video type over another in increasing willingness to consent for donation.

The optimal means to disseminate organ donation video interventions also is not known. Most studies examining the efficacy of video interventions were administered directly to the subject.^{8,9} However, direct administration of such interventions is costly and labor intensive. Delivery of video interventions via the Internet may be efficacious and cost-effective.

Using a randomized trial design, we sought to compare the Internet delivery of two widely used organ donation video interventions to general health and wellness information on readiness to consent to organ donation among university students. University students were chosen as this age group has the highest proportion of donors (31%).¹ We hypothesized that both organ donation video interventions would be equally superior to a website of general health and wellness content in increasing willingness to visit state electronic donor registries to consent to donate.

MATERIALS AND METHODS

Study Overview

This randomized controlled trial was conducted via the Internet among students enrolled at one of three Northeastern Ohio universities. Recruitment occurred via email from September through December 2014.

Participant Recruitment and Inclusion

The email addresses of all enrolled students were uploaded into Qualtrics Research Suite software (Qualtrics, Provo, Utah). The software distributed email messages to students explaining the study and inviting them to participate. Each email contained a unique link to the study website. Students who clicked on the link were directed to the website where they received further details regarding the study and provided informed consent.

Visitors to the website who agreed to the terms of the study were asked a series of questions to determine eligibility. Students were required to be enrolled at one of the three universities at the time of the study; to not have previously consented to organ donation; to have an active driver's license, learner's permit, or state identification in a US state; to be older than 18 years of age (and therefore able to provide first person consent for organ donation); and to have English proficiency. Eligible students were shown content based on their study arm assignment. After viewing the content, they completed an online questionnaire which included questions regarding the content they viewed and their willingness to consent to donation. Upon completing the study, students received electronic organ donation brochures provided by the Cleveland branch of the Minority Organ Tissue Transplant Education Program (MOTTEP) and LifeBanc, the organ procurement organization for Northeastern Ohio. Students received a \$10 Amazon electronic gift card to thank them for their participation.

Students who did not respond to the first email were sent three additional email reminders over three months. Throughout the study, student champions distributed and posted brochures around their campuses which advertised a study to "understand students' thoughts and behaviors regarding health information delivered by video and text" and encouraged students to respond to their unique email invitation. The institutional review boards of each participating university approved this study.

Randomization

Students were the unit of randomization. After informed consent was obtained and eligibility was determined, the survey software assigned students into one of three groups using unrestricted equal randomization: those who were shown an animated video with content focused on addressing informational needs regarding donation, those who were shown a live-action video with content focusing on appealing emotionally and dispelling myths regarding donation, and those who were shown information in the form of text on health and wellness from the Centers for Disease Control and Prevention (CDC).

Intervention 1: Animated Video with Informational Appeal

Organ Donation and Transplantation: *How Does It Work?* is a 5-minute animated video produced by the U.S. Department of Health and Human Services Division of Transplantation. It has been publicly available on their website (www.organdonor.gov) and *YouTube* since August 2013. The video explains the donation and transplantation process including the waiting list, the process of becoming a donor, how organs are matched with recipients, the transplantation surgery, the importance of providing consent to donate organs and the importance of discussing the donation decision with loved ones.

Intervention 2: Live-Action Video Intervention with Emotional Appeal

Won't you Help? is a 5-minute live-action video produced by Palazzo Intercreative (Seattle, Washington). The video contains a free-flowing, non-scripted discussion among an ethnically diverse group of 20 persons of various ages who have a variety of relationships with donation and transplantation, including organ donors and recipients, family members of organ donors and recipients and family members of those who died while waiting for organ transplants. It was designed to address 6 common concerns expressed in prior organ donation research: a desire to not think about death and subsequent disfigurement, concern that consenting to donate may prevent receipt of adequate medical care if found to be carrying a donor card, distrust of the medical establishment, belief that religion may not support donation, desire to be buried with organs intact, and lack of knowledge regarding organ donation.^{10,11} The video was found to increase consent for donation among diverse participants in a variety of settings including the bureau of motor vehicles⁸ and in primary care providers' offices.⁹

Control Group: CDC Health and Wellness Website

Control group participants viewed a website containing text from the Center for Disease Control's website on health and wellness in adolescents and young adults ("College Health and Safety"; www.cdc.gov/family/college/index.htm). The site focuses on healthy and preventive behaviors as well as protective factors to mitigate life stressors.

Questionnaire Content

To maximize the chances that the video or text interventions were viewed in their entirety, the survey software was programmed to require a minimum of 3 minutes before the student could continue to complete the survey. After 3 minutes had passed and the student clicked "next", they were asked to complete an online questionnaire that concluded with a question asking if they would like to go to their state's electronic donor registry to consent to donate organs.

The questionnaire was designed to gather information about the quality of the interventions, readiness to consent to organ donation and personal demographics (questionnaire available upon request). The questionnaire has been used in prior work by our group¹² and was pilot tested with 100 students who were not enrolled in the final study. During study design we reasoned that students who were enrolled at the participating universities would hail from Ohio where the universities were based or from the states surrounding Ohio and we

completed our clinicaltrials.gov application to reflect this. However, during pilot testing we found that students hailed from across the United States of America. We then confirmed that each state had an accessible online registry and electronically linked each one to our survey. However, this change to include all 50 states was not initially reflected in our clinicaltrials.gov application. Student demographic information included age, gender, race/ethnicity, and religious affiliation.

Blinding

Because the Qualtrics software administered the study from subject recruitment to data acquisition, study staff were not involved in the enrollment, randomization process, or administration of the interventions. Study arm allotment was concealed during analysis. All study staff were therefore blinded to group assignment.

Study Outcomes:

The primary outcome was clicking on the “yes” response to the following prompt at the end of the survey:

“You will now be given the opportunity to register with your state’s electronic donor registry to become an organ donor. If you choose to register today, you will be given a link that will direct you to your state’s electronic registry. The link will open in the same window on your screen and you will be exited from the study. Please follow the instructions given by your state on how to become a registered organ donor. Any information provided by you to your state will not be collected as part of the study, nor will the study have access to it.

Would you like to become an organ donor and register on [state name]’s electronic donor registry now?”

We did not verify whether students completed the consent process. There were two secondary outcomes. The first was readiness to donate organs assessed when students selected one of four possible statements based on the Transtheoretical Model and arranged on an ordinal scale:^{13,14}

1. “I do not want to become an organ donor.” (precontemplation)
2. “I am thinking about becoming an organ donor, but have not made up my mind yet.” (contemplation)
3. “I would like to become an organ donor and plan to register within the next 6 months.” (preparation)
4. “I would like to become an organ donor and would like to register today.” (action)

The second secondary outcome was perceived quality of the video or text interventions using a visual analog scale ranging from 0 (did not like) to 100 (liked).

Statistical Analysis

Based on prior randomized controlled trials of interventions to increase organ donation rates in Ohio,^{8,9} we anticipated that 10% of the control students and 22% of students in both video intervention groups would consent to donation. To detect a meaningful effect size of 12% with a variance error of 50% would require 1509 total participants (503 per study arm) with a 2-tailed α level of .05 and 80% power. The sample size was inflated by 5% to account for potential clustering of students by universities, and by 20% to account for possible student drop outs, leading to a final sample size of 1902 students.

Analyses were conducted according to original randomized assignment regardless of protocol adherence. Student participants were the unit of analysis. We used the χ^2 test to compare categorical variables, and the Kruskal-Wallis test compare continuous variables in the baseline characteristics and secondary outcomes among participants in the three study arms. The effect of intervention group on the binary consent to organ donation outcome was assessed using logistic regression. Specifically, a logistic regression model (for probability of donation) was constructed that included as independent variables, intervention group (two indicator variables for the three groups), and the baseline control variables, race/ethnicity, religion, gender, university, state of residence, and age (all considered as categorical except age which was considered as continuous). Race/ethnicity was categorized as Non-Hispanic White, Black, Hispanic, and other (primary Asian / Pacific Islander). A non-response for Religion was considered as a separate category ('missing'). Aside from 'missing', Religion had eight categories: Agnostic, Atheist, Catholic, Jewish, None, Muslim, other, and Protestant. State of residence was categorized according to the 7 most prevalent states and other. A Wald chi-squared test was used to test each of the three paired comparisons among the three study arms and the corresponding 95% confidence intervals were computed. To account for the three multiple comparisons among the interventions, we applied a Bonferroni correction and used a p value of 0.05/3, or 0.0167 to determine statistical significance.

Missing data were handled using several methods. A complete case approach (excluding subjects with missing for any model variable) was used in the primary analysis. A secondary logistic regression analysis was conducted leaving out the variable as a covariate, thus retaining subjects who were only missing that variable. Sensitivity analyses were conducted to assess the impact on complete case analysis results of possible non-random missingness of the primary outcome, consent to visit the electronic donor registry to consent to donate organs. To be conservative, missing consent to visit the electronic registry responses for the intervention that were found to be significantly different from the others was imputed as 'no', while missing consent to donate responses for the other two groups were randomly imputed as 'yes' (otherwise 'no') with varying probabilities, namely, 20, 40, 60, 80, and 100 percent.

With the secondary outcomes, readiness to donate and perceived quality of the study interventions were analyzed using multiple variable linear regression models. These models included the same covariates as the logistic regression model described above, and a complete case approach was used as before. All analyses were performed using Stata

Statistical Software (Release 14, Stata Corporation, College Station, TX) and SAS (Release 9.2, SAS Institute, Cary, NC).

Role of the Funding Source

This trial was funded by the National Institute on Minority Health and Health Disparities and the U.S. Department of Health and Human Services Health Resources and Services Administration. The funders had no role in the design and conduct of the study; collection, management, analysis, or interpretation of the data; or preparation, review, or approval of the manuscript.

RESULTS

Student Characteristics

An e-mail invitation was sent to 39294 students. The website was accessed by 11686 students (30%, Figure 1). Among the 11686 students who responded to the e-mailed invitations, 8445 (72%) did not meet eligibility criteria largely because they had previously consented to organ donation (6835 or 58%). Less than 10% (980) declined to participate. The remaining sample of 2261 students were randomized into the three study arms (753 in the animated video group, 755 in the live-action video group, and 753 in the control group). The demographics of the study participants are found in Table 1. There was no difference between the three groups among recorded demographic variables. Student participants were residents of states across the country.

Readiness to Consent for Organ Donation and Willingness to Visit the Online Donor Registry to Consent to Donation

More students in the live-action video group (9%) agreed to visit their state's online donor registry to become registered as organ donors than in the animated video (6%) and CDC groups (5%, $p = 0.02$; Table 2). In a multiple variable logistic regression of consent to visit states' online donor registries there were statistically significant differences in odds of agreeing to visit online registries between participants in the live-action video and the CDC groups (Adjusted OR: 1.86, $p = 0.005$) and between the live-action video and the animated video (Adjusted OR: 1.69, $p = 0.01$). However, a statistically significant difference was not found among students in the animated video versus the CDC groups (adjusted OR: 1.10, $p > 0.99$; Table 3).

We performed a sensitivity analysis involving a conservative imputation of 22 missing values for consent to visit states' online donor registry to become a registered donor (5 for the animated video, 7 for the live-action video, and 10 for the text). Imputing a 0% consent to visit states' online registries rate for the live action video, and assuming a statistically significant difference in consent to visit states' online registries between the live-action and the other two groups combined would require a consent to visit the electronic donor registry rate as high as 60% in the other 2 groups. In addition, to check for a possible modification effect of university, we added a university by intervention group interaction to the multiple logistic regression model of agreeing to visit states' online donor registries. A Wald chi-square test showed no statistically significant interaction (chi-square=2.09, degrees of

freedom = 4, $p = 0.72$); thus, we found no evidence that the intervention effects vary over universities.

Students in the animated and live-action video groups exhibited a greater readiness to consent to donation compared to students in the CDC group ($p < 0.001$ for both, Table 2). There was no difference in readiness between students in the live-action and animated video groups ($p = 0.14$). More students in the live-action video group were ready to donate in the next 6 months compared to students in both the animated video and CDC groups (18% vs. 15% and 10%, respectively, $p < 0.001$). In the adjusted analysis students in both the live-action video group and the animated video group had a greater readiness to donate compared to students in the CDC group ($p = 0.001$ and $p < 0.001$ respectively, Supplementary Table 4). Older students were less ready to donate compared to younger students ($p = 0.001$).

Intervention Exposure and Quality

The majority (97%) of students reported viewing the video or text information in its entirety (Table 2). Viewing of the intervention did not differ by study group assignment ($p = 0.32$). Students spent less time viewing the text information (median: 3.48 minutes, IQR: 3.12 – 4.40) compared to the live action video (median: 5.32 minutes, IQR: 5.08 – 5.78) and animated video (median: 5.11 minutes, IQR: 5.04 – 5.38, $p < 0.001$). There was also no difference among students in the three groups in time spent viewing each intervention ($p = 0.55$). Students rated the quality of the live-action video ($75 \pm 18\%$) below that of the animated video ($84 \pm 16\%$, $p < 0.001$) and the CDC text ($80 \pm 16\%$, $p < 0.001$). The animated video was rated higher in quality than the CDC text ($p < 0.001$). In the adjusted analysis, male students rated the quality of the study interventions lower than female students ($p < 0.001$; Supplementary Table 5). Black and Asian / Pacific Islander students rated the quality of the interventions higher than white students ($p = 0.01$ and $p = 0.001$ respectively). Hispanic students rated the video similarly to white students ($p = 0.26$).

Adverse Effects

No adverse effects from the study interventions were reported.

DISCUSSION

We found that a brief live-action video emphasizing an emotional appeal delivered via the Internet successfully increased organ donation readiness and willingness to visit state online registries to consent to donate among university students. The results of this study suggest that the Internet may be an effective means to promote consent for organ donation. The findings also suggest that the type of video matters in increasing donation readiness and consent.

What might be responsible for the increased effect of the live-action video on willingness to donate? Our study design prevents us from knowing for sure. However, we can glean some clues from prior studies. While the animated video focused on providing factual information regarding donation and transplantation in an easily understood format, the live-action video focused on dispelling myths and linking personal stories with an appeal to donate. Dispelling myths regarding organ donation is essential in increasing donation consent,

particularly among minorities.¹⁵ Addressing both the myths of donation and the lack of factual information about donation are important in increasing awareness of and support for donation. This was substantiated in a quasi-experimental study examining the differential effectiveness of 4 different organ donation appeals (counterargument, emotional, motivating action, dissonance). Counterargument was by far the most efficacious, especially in diverse academic settings such as a library, a university, and a community college. The emotional appeal was most successful in hospitals.¹⁶ However, other studies evaluating interventions among university students found those interventions that focused on the affective aspect of donation to be most likely to increase consent.^{17,18} Perhaps both the emotional appeal and dispelling of myths are essential in increasing consent in this population.

A review of the literature identified only one randomized controlled trial comparing video interventions to increase consent for organ donation delivered via the Internet. In that study, participants were recruited on Amazon Mechanical Turk to watch six videos in a random order.⁶ Each video was one minute in duration and was shown either with or without sound. Four of the videos featured personal narratives of those personally affected with chronic diseases or organ donation/transplantation. One of those videos highlighted the experiences of a six-year-old liver transplant patient and her grateful mother. The fifth video provided factual information regarding the need for organ donation, but did not provide personal accounts. The last video served as a control and did not discuss organ donation but instead featured scenic landscapes from around the world. Participants rated the video featuring the young liver transplant patient significantly higher than the others ($p < 0.001$). They also rated that video highest in motivating them to think more seriously about consenting to donate organs. Despite the different ratings of the videos, there was no difference between any of them in increasing visitation to the Donate Life America website to learn more about donation or to register as an organ donor ($p = 0.10$). In our study, no difference was found in the proportion of students who stated that they viewed each intervention. However, students spent less time viewing the text compared to the videos. Despite spending significantly more time watching the live-action video, students rated it the least favorable yet were readier and more willing to visit the donor registry to consent for donation. The results from these studies suggest that enjoyment of organ donation interventions is not a mediator between viewing organ donation videos and readiness to consent to donate. More work in this area is needed to further understand the key factors associated with donation consent and how to successfully address those factors in future video interventions.

Widespread dissemination of a video via the Internet is easy and inexpensive. Therefore, it is not difficult to imagine it becoming a mainstay for organ donation interventions. However, an important part of video interventions is ensuring that they are fully viewed by the target population in order to maximize their effect. For example, a recent randomized trial of a silent, subtitled organ donation video played on monitors in motor vehicle offices found that the video was less effective in increasing donation consent compared to education of motor vehicle staff, displaying print materials regarding donation, and instituting a volunteer donation ambassador program.⁵ In a logistic regression model viewing of the video was positively associated with consent for organ donation. In this study, we were unable to determine if students actually viewed all of the study interventions. Future studies involving

video interventions should focus on means to verify and increase video viewership while maintaining subject attention.

Despite the lack of additional randomized trials conducted via the Internet, there has been some work examining the effectiveness of different donation interventions delivered via the U.S. postal mail. In one trial the U.S. postal mail was used to randomly deliver a letter from the Illinois Secretary of State, a brochure from the Illinois Secretary of State, or both to 139356 18 year-old state residents.¹⁹ Results revealed no difference in consent for donation among those who received a letter compared to those who received a letter and brochure (6.2% vs. 6.3%). However, there was an increased donation rate when the letter alone was compared to the brochure alone (6.2% vs. 3.3%). Production and mailing costs were estimated to be between \$0.38 and \$0.43 per participant depending on the intervention. A similar trial design involving the U.S. postal mail but focusing on differing organ donation messaging strategies from the vantage point of donors, recipients, those waiting for organs or a combination found that the combination message was most effective with an overall registration rate of 6%.²⁰ These studies suggest that mass donation campaigns using the U.S. postal mail can also be effective. Whether this is a more cost-effective means of increasing donation compared to the Internet remains to be seen.

In this study, 58% of students across all three universities had previously consented to organ donation. While this rate far exceeds the national 48% donor designation share for persons age 18 and over, it is similar to the 60% donor designation share noted for Ohio.²¹ This suggests that organ donation campaigns have been effective in increasing donation consent across the state. Even with this high prevalence of donor designation, the live-action video was successful in increasing donation consent among those who had not previously consented to donation.

Limitations to this study should be considered when interpreting our results. We were unable to verify if students subsequently consented to organ donation on their state registries. However, there was congruence between readiness to consent to donate and willingness to visit the state electronic donor registry to consent to donate. This suggests that students seriously considered consenting to donate. In fact, earlier in the survey many students who chose the options stating that they were willing to donate in the next 6 months or that they were thinking about donation but had not made up their mind yet subsequently agreed to visit their state registry to consent to donate. The simple act of asking about readiness to donate may have been a stimulus to take action regarding donation.

The study design prevents us from determining which components of the video, the live-action, the emotional appeal, or another factor were most effective. This study was performed among students attending three large universities in Northeast Ohio. While the students resided in states across the country, the majority were from Ohio. It is unclear how much impact the interventions would have on students from other regions. Stipends were provided to participants and may have impacted willingness to participate in the study. The study design also prevented us from obtaining information on students who chose not to participate. It is unclear if they differed from study participants in response to study interventions. Because the study was administered over the Internet, we do not know the

effectiveness of study interventions on participants who desired to consent for donation using paper donor cards or in person at the bureau of motor vehicles. For example, some data suggests that Hispanic adults prefer the idea of in-person consent to donate such as via the bureau of motor vehicles or doctors' offices to the Internet or over the telephone.²² However, in another study of a Hispanic-predominant population, when given an immediate and complete registration opportunity compared to the opportunity to mail donation cards in at a convenient time, participants offered the immediate registration opportunity were significantly more likely to register to donate (86% vs. 54%, $p < 0.001$).²³ The immediate opportunity to register in this study may have mediated concerns regarding online registration.

In summary, we found that a live-action video distributed over the Internet was effective in increasing readiness to consent for organ donation among university students despite receiving a lower satisfaction rating. Future studies should continue to compare organ donation interventions to determine the ideal means of increasing readiness and consent.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Supported, in part, by grant P60MD002265 from the National Institute on Minority Health and Health Disparities, grant UL1TR000439 from the National Center for Advancing Translational Sciences, and grants R39OT22056 and R39OT26989 from the U.S. Department of Health and Human Services Health Resources and Services Administration. The contents of this publication are the sole responsibility of the authors and do not necessarily represent the views of the U.S. Department of Health and Human Services Health Resources and Services Administration. The authors report no commercial associations that might pose a conflict of interest in connection with this manuscript. Drs. Thornton and Albert had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Abbreviations:

CDC Centers for Disease Control and Prevention

REFERENCES

1. OPTN: Organ Procurement and Transplantation Network. U.S. Transplant Data. <http://optn.transplant.hrsa.gov/data>. Published 11 11, 2016 Accessed November 11, 2016.
2. Singh M, Katz RC, Beauchamp K, Hannon R. Effects of anonymous information about potential organ transplant recipients on attitudes toward organ transplantation and the willingness to donate organs. *J Behav Med*. 2002;25(5):469–476. [PubMed: 12442561]
3. Fahrenwald NL, Belitz C, Keckler A. Outcome evaluation of “sharing the gift of life”: an organ and tissue donation educational program for American Indians. *Am J Transplant*. 2010;10(6):1453–1459. doi:10.1111/j.1600-6143.2010.03120.x. [PubMed: 20486910]
4. Tian Y Organ donation on Web 2.0: content and audience analysis of organ donation videos on YouTube. *Health Commun*. 2010;25(3):238–246. doi:10.1080/10410231003698911. [PubMed: 20461609]
5. Rodrigue JR, Fleishman A, Fitzpatrick S, Boger M. Organ donation video messaging in motor vehicle offices: results of a randomized trial. *Prog Transplant*. 2015;25(4):332–338. doi:10.7182/pit2015166. [PubMed: 26645928]

6. Rodrigue JR, Fleishman A, Vishnevsky T, Fitzpatrick S, Boger M. Organ donation video messaging: differential appeal, emotional valence, and behavioral intention. *Clin Transplant*. 2014;28(10):1184–1192. doi:10.1111/ctr.12449. [PubMed: 25125237]
7. Deedat S, Kenten C, Morgan M. What are effective approaches to increasing rates of organ donor registration among ethnic minority populations: a systematic review. *BMJ Open*. 2013;3(12):e003453. doi:10.1136/bmjopen-2013-003453.
8. Thornton JD, Alejandro-Rodriguez M, Leon JB, et al. Effect of an iPod video intervention on consent to donate organs: a randomized trial. *Ann Intern Med*. 2012;156(7):483–490. doi: 10.7326/0003-4819-156-7-201204030-00004. [PubMed: 22473435]
9. Thornton JD, Sullivan C, Albert JM, et al. Effects of a Video on Organ Donation Consent Among Primary Care Patients: A Randomized Controlled Trial. *J Gen Intern Med*. 2016;31(8):832–839. doi:10.1007/s11606-016-3630-5. [PubMed: 26921161]
10. Callender CO, Bayton JA, Yeager C, Clark JE. Attitudes among blacks toward donating kidneys for transplantation: a pilot project. *Journal of the National Medical Association*. 1982;74(8):807–809. [PubMed: 6752431]
11. McNamara P, Guadagnoli E, Evanisko MJ, et al. Correlates of support for organ donation among three ethnic groups. *Clin Transplant*. 1999;13(1 Pt 1):45–50. [PubMed: 10081634]
12. Thornton JD, Wong KA, Cardenas V, Curtis JR, Spigner C, Allen MD. Ethnic and gender differences in willingness among high school students to donate organs. *J Adolesc Health*. 2006;39(2):266–274. doi:10.1016/j.jadohealth.2005.12.028. [PubMed: 16857540]
13. Prochaska JO, Velicer WF, Rossi JS, et al. Stages of change and decisional balance for 12 problem behaviors. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association*. 1994;13(1):39–46.
14. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *Am J Health Promot*. 1997;12(1):38–48. [PubMed: 10170434]
15. Morgan M, Kenten C, Deedat S, On Behalf Of The Donate Programme Team. Attitudes to deceased organ donation and registration as a donor among minority ethnic groups in North America and the UK: a synthesis of quantitative and qualitative research. *Ethn Health*. 12 2012. doi:10.1080/13557858.2012.752073.
16. Siegel JT, Alvaro EM, Crano WD, Lac A, Ting S, Jones SP. A quasi-experimental investigation of message appeal variations on organ donor registration rates. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association*. 2008;27(2):170–178. doi:10.1037/0278-6133.27.2.170.
17. van den Berg H, Manstead ASR, van der Pligt J, Wigboldus DHJ. The role of affect in attitudes toward organ donation and donor-relevant decisions. *Psychology and Health*. 2007;20(6):789–802. doi:10.1080/14768320500161786.
18. Anker AE, Feeley TH, Kim H. Estimating the attitude-behavior relationship in prosocial donation domains. *Journal of Applied Psychology*. 2010;40(6):1293–1324. doi:10.1111/j.1559-1816.2010.00619.x.
19. Quick BL, Bosch D, Morgan SE. Message framing and medium considerations for recruiting newly eligible teen organ donor registrants. *Am J Transplant*. 2012;12(6):1593–1597. doi: 10.1111/j.1600-6143.2012.04010.x. [PubMed: 22420417]
20. Quick BL, Lavoie NR, Morgan SE, Bosch D. You've got mail! An examination of a statewide direct-mail marketing campaign to promote deceased organ donor registrations. *Clin Transplant*. 2015;29(11):997–1003. doi:10.1111/ctr.12620. [PubMed: 26344824]
21. Donate Life America Inc. 2014 National Donor Designation Report Card. (Donate Life America Inc., ed.). Richmond; 2014:1–12. <https://www.donatelife.net/wp-content/uploads/2016/06/Report-Card-2014-44222-Final.pdf>.
22. Siegel JT, Alvaro EM, Jones SP. Organ donor registration preferences among Hispanic populations: which modes of registration have the greatest promise? *Health Educ Behav*. 2005;32(2):242–252. doi:10.1177/1090198104272251. [PubMed: 15749969]
23. Alvaro EM, Siegel JT, Jones SP. Increasing organ donor registration rates by providing an immediate and complete registration opportunity: An experimental assessment of the IIFF model.

Psychol Health Med. 2011;16(6):686–694. doi:10.1080/13548506.2011.564353. [PubMed: 21678198]

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FIGURE 1.
Screening, enrollment, and randomization of study participants

Table 1:

Characteristics of Study Participants (N = 2261)

	Animated Video (n = 753)	Live-Action Video (n = 755)	CDC (n = 753)	Test Stat*	p value
Age, mean $\pm$ SD, y	24.9 $\pm$ 9.1	24.5 $\pm$ 8.4	25.0 $\pm$ 8.7	2.37	0.305
Gender				0.802	0.670
Female	430 (57.1)	425 (56.5)	441 (58.7)		
Male	323 (42.9)	327 (43.5)	310 (41.3)		
Race/Ethnicity				8.67	0.371
Non-Hispanic White	495 (66.7)	474 (64.1)	496 (66.3)		
Black	122 (16.4)	117 (15.8)	131 (17.5)		
Asian/Pacific Islander	89 (12)	106 (14.3)	91 (12.2)		
Hispanic	34 (4.6)	36 (4.9)	29 (3.9)		
Other	2 (0.3)	6 (0.9)	1 (0.1)		
Religious Affiliation				8.69	0.850
None	102 (14.5)	94 (13.2)	98 (13.8)		
Agnostic	72 (10.2)	64 (9.0)	71 (10.0)		
Atheist	45 (6.4)	44 (6.2)	44 (6.2)		
Catholic	168 (23.8)	198 (27.9)	187 (26.3)		
Jewish	25 (3.5)	26 (3.7)	24 (3.4)		
Muslim	36 (5.1)	49 (6.9)	34 (4.8)		
Protestant	250 (35.5)	230 (32.4)	245 (34.5)		
Other	7 (1.0)	5 (0.7)	7 (1.0)		
State of License Registration				3.88	0.996
California	12 (1.6)	11 (1.5)	10 (1.3)		
Illinois	30 (3.9)	35 (4.6)	29 (3.8)		
Michigan	20 (2.7)	18 (2.4)	26 (3.5)		
New York	36 (4.8)	30 (4.0)	31 (4.1)		
Ohio	554 (73.6)	560 (74.2)	564 (74.9)		
Pennsylvania	31 (4.1)	31 (4.1)	26 (3.5)		
Texas	8 (1.1)	7 (0.9)	7 (0.9)		
Other	62 (8.2)	63 (8.3)	60 (8.0)		
University				0.152	0.997
1	376 (50)	373 (49.4)	372 (49.4)		
2	257 (34.1)	264 (35)	263 (35)		
3	120 (15.9)	118 (15.6)	118 (15.6)		

* Chi-square for categorical, Kruskal-Wallis for continuous variables.

Table 2:**Outcomes Assessed Among Study Participants**

	Animated Video (n = 753)	Live-Action Video (n = 755)	CDC Text (n = 753)	Test Stat[*]	p value
Able to view entire intervention content	727 (96.7)	729 (96.8)	736 (97.9)	2.31	0.32
Time viewing intervention, median (IQR), minutes	5.11 (5.04 – 5.38)	5.32 (5.08 – 5.78)	3.48 (3.12 – 4.40)	782.3	<0.001
Quality of the intervention, mean $\pm$ SD, (0 – 100)	84.5 $\pm$ 15.9	75.0 $\pm$ 17.9	80.0 $\pm$ 15.8	123.7	<0.001
Readiness to consent to donate				33.10	<0.001
Register today	30 (4.0)	30 (4.0)	21 (2.8)		
Register within next 6 months	114 (15.2)	134 (17.8)	73 (9.7)		
Have not made up mind	448 (59.8)	450 (59.9)	454 (60.6)		
Unwilling	157 (21.0)	137 (18.2)	201 (26.8)		
Agreed to visit state donor registry to consent to donate	42 (5.6)	64 (8.6)	39 (5.2)	8.13	0.017

^{*} Chi-square for categorical, Kruskal-Wallis for continuous variables.

Table 3:

Results of a Multiple Variable Logistic Regression of Willingness to Visit State Electronic Registry to Consent to Donate

	OR	95% CI
Age	1.01	0.98 – 1.03
Male Gender	0.64	0.44 – 0.93
Race/Ethnicity		
Non-Hispanic White	Referent	
Black	0.62	0.32 – 1.20
Asian/Pacific Islander	0.49	0.28 – 0.86
Hispanic	1.28	0.62 – 2.68
Religious Affiliation		
Protestant	Referent	
None	1.76	0.97 – 3.21
Agnostic	2.05	1.10 – 3.83
Atheist	2.73	1.38 – 5.43
Catholic	1.27	0.74 – 2.17
Jewish	1.17	0.44 – 3.10
Muslim	0.73	0.21 – 2.49
Other	3.08	0.64 – 14.8
State of License Registration		
California	Referent	
Illinois	1.84	0.54 – 6.21
Michigan	1.25	0.33 – 4.74
New York	1.60	0.47 – 5.50
Ohio	0.39	0.12 – 1.27
Pennsylvania	0.48	0.12 – 1.93
Texas	0.62	0.09 – 4.06
Other	1.06	0.32 – 3.51
University		
1	Referent	
2	2.13	1.29 – 3.53
3	1.09	0.58 – 2.01
Group		
Animated Video vs CDC	1.10	0.69 – 1.76
Live-Action Video vs CDC	1.86	1.20 – 2.88
Live-Action Video vs Animated Video	1.69	1.10 – 2.58