A Randomized Intervention to Assess the Effectiveness of an Educational Video on Organ Donation Intent

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Key Points
- Organ donation in the United States is characterized by major racial disparities that are especially prominent in large urban centers.
- Our study provides unique insight into the causes of these disparities in New York City and potential ways to address and correct them.
- Our study provides pathways to improve organ donation registration in a large heterogeneous areas to help correct inequities in health care.

Abstract
Background The primary objective of this study was to evaluate the effectiveness of an emotive educational video on organ donation intent in New York City. The secondary study objective was to determine if the educational video affected various factors associated with organ donation.

Methods New York City residents were recruited via a crowdsourcing online platform and randomized to one of two groups, with exposure to viewing (1) an educational video before completing an 81 question survey on organ donation (“video first” condition) or (2) after completing the survey (“video last” condition). Logistic regression analysis compared organ donation intent (i.e., “how likely are you to become an organ donor?”) between the two groups. Additional variables related to organ donation (e.g., religious beliefs, financial incentives) were also evaluated between the two groups. Analyses were adjusted for organ donation registration status.

Results In total, 1905 participants were randomized. We observed a statistically significant increased odds of organ donation intent among those randomized to the video first condition compared with those randomized to the video last condition (odds ratio [OR], 1.70; 95% confidence interval [95% CI], 1.29 to 2.24). Differences regarding both educational effect on nondonors and racial differences such that there was a decreased odds of organ donation intent among those who identified as Black compared with those who were White (OR, 0.66; 95% CI, 0.47 to 0.92). Black participants were also more likely to report bodily integrity and differential treatment by doctors compared with White participants.

Conclusion Our findings suggest that future interventions to increase organ donation registration among ethnically diverse populations could be effective if sufficient information is presented before decision making to address potential concerns.

KIDNEY360 2: 1625–1632, 2021. doi: https://doi.org/10.34067/KID.0001392021

Introduction
In 2020, there were approximately 108,000 patients on the United States transplant waiting list, and 39,034 transplants were performed that year. Racial and ethnic minorities are disproportionately represented on the transplantation waiting list, comprising 59% of candidates but accounting for only 34% of registered deceased organ donors (1). New York State, one of the most racially diverse regions in the United States, has the lowest organ donation rate in the country (36% compared with the national average of 54%) (2). Testing-specific interventions among racially diverse populations to determine what methods may improve organ donation registration and understanding barriers to organ donation registration is critical.

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Interventions at the Department of Motor Vehicles (DMV) have attempted to address the nationwide organ shortage by revealing facilitator-associated organ donation registration (e.g., clerk training, point of decision material, and multimedia interventions) and barriers (e.g., long wait times) that negatively affect organ donation registration (3–5). In addition, “opt-in” versus “opt-out” policies have been investigated; however, whereas “opt-out” systems may increase rates of consent for organ donation, some studies have demonstrated no effect (6–9). These conflicting observations suggest there are other factors that may account for the variation in attitudes toward this approach to organ donation registration.

Previous studies have indicated that emotional video messaging positively affects organ donation registration (4,10,11). However, these intervention studies have been conducted among a predominantly homogenous (primarily non-Hispanic White) population (10).

Finally, although barriers to organ donation are well documented (e.g., bodily integrity, anxiety associated with removing organs from the body; medical mistrust, fear that doctors may let seriously ill patients who are organ donors die to procure their organs; “ick,” feelings of disgust toward the idea of organ donation; and “jinx,” fear that registration may result in someone dying prematurely because they have made plans for their own death), it is not clearly understood if these barriers are meaningful to a racially diverse population, and to what extent (3,12,13).

The primary aim of this research was to evaluate the effect of a previously tested educational video on organ donor registration intent among a racially diverse population. We hypothesize that the group randomized to view the emotive educational video versus those exposed to a control video (which featured a cardiologist discussing organ transplant) will report greater willingness to become an organ donor (organ donor intent), compared with the group that was not exposed to viewing the educational video before survey administration. Secondary aims were to gain a deeper understanding of predictors, knowledge, perceptions, and attitudes toward deceased organ donation among New York City residents.

Testing this intervention among New York City residents provided a unique opportunity to identify important factors that may improve the current organ shortage.

Materials and Methods

Study Design
We conducted a randomized study targeting New York City residents aged ≥18 years of age, that consisted of both an online survey and a brief educational video. Data were collected using the online crowdsourcing platform CrowdResearch. CrowdResearch participants can view available Human Intelligence Tasks and self-select to participate and receive a nominal payment. Eligibility criteria included confirmation of New York City residency and data collection was stratified per racial demographics of New York City to increase the representativeness of the sample. Participants were asked to complete an anonymous survey about organ donation and were paid $13.50 for completing the survey, which was on the basis of New York minimum wage rates (14). Participants were randomly assigned to one of two conditions: to view a short video on organ donation before completing the survey (video first), or to complete the survey before viewing the video (video last). Three “attention checks” were embedded at various points within the survey. Participants who failed the attention checks were disqualified and their data were excluded from the analysis (15,16).

The Feinstein Institutes for Medical Research at Northwell Health Institutional Review Board approved this study and informed consent was obtained by all participants before study enrollment.

Survey Instrument
The survey instrument included 14 sections and 81 total questions. It was estimated to take 30–45 minutes for the participant to complete. Demographic information and general impressions of organ donation after death were collected. The survey assessed commonly cited barriers (e.g., sick, jinx, etc.) and motives (e.g., religion, financial, etc.) to organ donation.

Educational Video
A professionally produced, 5-minute video of dialogue among a diverse group of 20 individuals (representing a broad age range of ethnic/racial groups, and varying degrees of experience regarding organ donation) was presented either before or after survey completion (10). The video addresses common barriers and myths associated with donor registration and provides information and knowledge regarding organ donation. The 5-minute video intervention was previously found to significantly increase donation rates in a homogeneous population by Thornton et al. (10)

Statistical Analysis
Summary statistics were used to evaluate participant characteristics. A binomial test of proportions was used to compare participant characteristics by registration status. Binomial logistic regression analyses were used to determine predictors of organ donation registration and effects of the video intervention for participants who were not registered as an organ donor. Data were analyzed using R Statistical Software and Jamovi, Version 1.2.

Power analysis was conducted using the statistical software G*Power version 3.0 (17). Similar to Thornton et al., we sought to detect an effect size of 0.15 with a two-tailed alpha level of 0.05 and 80% power (18). Our power analysis indicated that a total sample of 1398 participants was required. Previous research regarding sampling methodology, especially when using online platforms, suggests it is important to be cognizant of factors such as participants failing to complete the survey or failing attention checks that may adversely affect data quality. Thus, we oversampled our targeted population, and aimed to recruit 3000 participants.

Results
In total, 3257 participants entered the online survey and 1905 had evaluable data for analysis. Overall, 1352 participants were excluded after screening (832 failed to complete the survey, 260 did not consent to participate, 153 failed one of the three attention checks, 20 failed two of the three...
attention checks, and 87 did not complete the survey in 90 minutes) (Figure 1). Of participants, 96% completed the survey in <1 hour and 30 minutes.

Table 1 presents the participant characteristics by the total sample and by registered organ donor, nonregistered organ donor, and those who did not specify. In total, the majority of participants were female, almost half (50%) identified as White, approximately a quarter (23%) identified as Black, and 20% identified as Hispanic. Over half of the sample (57%) reported being between 19 and 39 years of age, single/never married (53%), and the majority were employed full or part time (68%). Over one third of the total sample (37%) were registered as organ donors after death. Almost half of White participants were registered as organ donors, compared with less than a quarter of Black (23%) and 28% of Asian participants. Among those who stated they were spiritual and religious, 37% and 33% were registered as organ donors, respectively. Although 94% of participants with a 4-year degree or graduate degrees were registered as organ donors, 25% of participants with a 2-year degree or less were registered.

Effects of Educational Video

Among participants not registered as organ donors, there was a statistically significant increased odds of respondent willingness to go back to register as an organ donor among those randomized to the video first condition compared with those randomized to the video last condition (odds ratio [OR], 1.64; 95% confidence interval [95% CI], 1.22 to 2.20) (Table 2). Participants in the video first condition were more likely to indicate religious beliefs influenced their decision (OR, 1.51; 95% CI, 1.09 to 2.09), believed organ donation affected funeral proceedings (OR, 1.35; 95% CI, 1.03 to 1.77), knew where to go sign up to be a donor (OR, 1.26; 95% CI, 1.00 to 1.59), knew the process to sign up to be a donor (OR, 1.27; 95% CI, 1.01 to 1.61), knew they could sign up at the DMV (OR, 1.70; 95% CI, 1.32 to 2.20), and knew they could sign up online (OR, 1.40; 95% CI, 1.09 to 1.80) compared with participants in the video last condition. Moreover, participants in the video first condition were less likely to believe there was an age limit to being a donor (OR, 0.73; 95% CI, 0.58 to 0.93) compared with those in the video last condition.

Racial Comparisons of Factors Associated with Organ Donation

We further explored differences between White and Black participants with regard to factors associated with organ donation (Table 3). Among participants not registered as organ donors, there was a statistically significant
| Characteristics                        | Total (n=1905), n (%) | Registered (n=668), n (%) | Not Registered (n=1160), n (%) |
|----------------------------------------|-----------------------|----------------------------|-------------------------------|
| **Sex**                                |                       |                            |                               |
| Female                                 | 1242 (65.2)           | 440 (35.4)                 | 747 (60.1)                    |
| Male                                   | 651 (34.2)            | 225 (34.6)                 | 407 (62.5)                    |
| Other / prefer not to say              | 7 (0.4)               | 3 (42.9)                   | 6 (85.7)                      |
| **Age, yr**                            |                       |                            |                               |
| ≥39                                    | 1095 (57.5)           | 413 (37.7)                 | 682 (62.3)                    |
| 40–69                                  | 673 (35.3)            | 242 (36.0)                 | 431 (64.0)                    |
| ≥70                                    | 58 (0.3)              | 13 (22.4)                  | 45 (77.6)                     |
| Prefer not to say                      | 2 (0.1)               | 0 (0.0)                    | 2 (100.0)                     |
| **Race**                               |                       |                            |                               |
| White                                  | 907 (47.6)            | 422 (46.5)                 | 485 (53.5)                    |
| Black                                  | 429 (22.5)            | 99 (23.1)                  | 330 (76.9)                    |
| Asian                                  | 231 (12.1)            | 65 (28.1)                  | 166 (71.9)                    |
| Multiracial                            | 110 (5.8)             | 43 (39.1)                  | 67 (60.9)                     |
| Other                                  | 151 (7.9)             | 39 (25.8)                  | 112 (74.2)                    |
| **Hispanic**                           |                       |                            |                               |
| Yes                                    | 366 (19.2)            | 139 (38.0)                 | 227 (62.0)                    |
| No                                     | 1444 (75.8)           | 525 (36.4)                 | 919 (63.6)                    |
| Prefer not to say                      | 18 (0.9)              | 4 (22.2)                   | 14 (77.8)                     |
| **Spirituality**                       |                       |                            |                               |
| Yes                                    | 1164 (61.1)           | 431 (37.0)                 | 733 (63.0)                    |
| No                                     | 607 (31.9)            | 225 (37.1)                 | 382 (62.9)                    |
| Prefer not to say                      | 57 (3.0)              | 12 (21.1)                  | 45 (78.9)                     |
| **Religiosity**                        |                       |                            |                               |
| Yes                                    | 724 (38.0)            | 237 (32.7)                 | 487 (67.3)                    |
| No                                     | 1047 (55.0)           | 417 (40.7)                 | 630 (61.5)                    |
| Prefer not to say                      | 57 (3.0)              | 14 (24.6)                  | 43 (75.4)                     |
| **Religious denomination**             |                       |                            |                               |
| Christian                              | 922 (48.4)            | 350 (38.0)                 | 572 (62.0)                    |
| Jewish                                 | 156 (8.2)             | 52 (33.3)                  | 104 (66.7)                    |
| Muslim                                 | 56 (2.9)              | 14 (25.0)                  | 42 (75.0)                     |
| Buddhist                               | 30 (1.6)              | 8 (26.7)                   | 22 (73.3)                     |
| Hindu                                  | 19 (0.1)              | 9 (47.4)                   | 10 (52.6)                     |
| Nonreligious                           | 516 (27.1)            | 206 (39.9)                 | 310 (60.1)                    |
| Other                                  | 129 (6.8)             | 29 (22.5)                  | 100 (77.5)                    |
| **Marital status**                     |                       |                            |                               |
| Single / never married                 | 1016 (53.3)           | 359 (35.3)                 | 657 (64.7)                    |
| Married / living as married            | 640 (33.6)            | 255 (39.8)                 | 385 (60.2)                    |
| Divorced / separated                   | 124 (6.5)             | 44 (35.5)                  | 80 (64.5)                     |
| Widowed                                | 37 (1.9)              | 9 (24.3)                   | 28 (75.7)                     |
| Prefer not to say                      | 11 (0.6)              | 1 (9.1)                    | 10 (90.1)                     |
| **Level of education**                 |                       |                            |                               |
| 2-year degree or less                  | 794 (41.7)            | 195 (24.6)                 | 546 (68.8)                    |
| 4-year degree                          | 690 (36.2)            | 293 (42.5)                 | 397 (57.5)                    |
| Graduate degree                        | 339 (17.8)            | 173 (51.0)                 | 166 (49.0)                    |
| Other                                  | 58 (3.0)              | 7 (12.1)                   | 51 (87.9)                     |
| **Employment status**                  |                       |                            |                               |
| Full time or part time                 | 1301 (68.3)           | 534 (41.0)                 | 767 (59.0)                    |
| Unemployed                             | 497 (26.1)            | 129 (26.0)                 | 368 (74.0)                    |
| Prefer not to say                      | 30 (1.6)              | 5 (16.7)                   | 25 (83.3)                     |
| **Self-employed**                      |                       |                            |                               |
| Yes                                    | 259 (13.6)            | 101 (39.0)                 | 158 (61.0)                    |
| No                                     | 1569 (82.4)           | 567 (36.1)                 | 1002 (63.9)                   |
| **Annual income, USD**                 |                       |                            |                               |
| <30,000                                | 415 (21.8)            | 124 (29.9)                 | 291 (70.1)                    |
| 30,001–60,000                          | 458 (24.0)            | 170 (37.1)                 | 288 (62.9)                    |
| 60,001–100,000                         | 451 (23.7)            | 174 (38.6)                 | 277 (61.4)                    |
| >100,000                               | 398 (20.9)            | 183 (46.0)                 | 215 (54.0)                    |
decrease in odds of respondent willingness to go back to register as an organ donor among Black participants compared with White participants (OR, 0.66; 95% CI, 0.47 to 0.92). Compared with their White participants counterparts, Black participants were more likely to cite bodily integrity (OR, 1.48; 95% CI, 1.11 to 1.98), differential treatment by doctors in general (OR, 1.42; 95% CI, 1.05 to 1.90) and due to their race (OR, 2.42; 95% CI, 1.70 to 3.46), believe it is legal to buy an organ (OR, 1.53; 95% CI, 1.13 to 2.07), were supportive of receiving funeral payments (OR, 1.17; 95% CI, 1.11 to 1.96), and were inclined toward an opt-out system (OR, 1.42; 95% CI, 1.02 to 1.98). Conversely, Black participants were less likely to cite religious beliefs (OR, 0.61, 95% CI, 0.41 to 0.92), think there is an age limit to donors (OR, 0.61; 95% CI, 0.46 to 0.81), and think it is appropriate to be asked at the DMV (OR, 0.53; 95% CI, 0.39 to 0.71) compared with their White participant counterparts.

Motivation for Organ Donation

Table 4 presents motivations for organ donation among the total participant sample. The majority of participants did not have a preference for the demographic characteristics, ethnic background, or notoriety of the individual delivering the organ donation message (56%, 69%, and 70%, respectively). Less than half of participants (41%) indicated they would be motivated by a message highlighting the welfare of those in need.

| Outcome | Odds Ratio | 95% Confidence Interval | P Value |
|---------|------------|-------------------------|---------|
| Willingness to go back | 1.64 | 1.22 to 2.2 | 0.001 |

Factors associated with OD

- Religious beliefs: 1.51 (1.09 to 2.09)
- Bodily integrity: 1.21 (0.94 to 1.54)
- Affect funeral proceedings: 1.35 (1.03 to 1.77)
- Treated differently by doctor: 1.12 (0.88 to 1.42)
- Donor: 0.98 (0.75 to 1.28)
- Ick factor: 1.07 (0.81 to 1.42)
- Jinx factor: 1.03 (0.82 to 1.3)
- Health of donor: 0.93 (0.74 to 1.18)
- Age limit of donor: 0.73 (0.58 to 0.93)
- Treated differently by race: 0.8 (0.59 to 1.07)
- Notify relatives: 1.02 (0.77 to 1.34)
- Association with pain: 1.33 (0.88 to 2.01)
- Legal to buy an organ: 1.08 (0.84 to 1.39)
- Know where to sign up: 1.26 (1.00 to 1.59)
- Know process to sign up: 1.27 (1.01 to 1.61)
- Know can sign up at DMV: 1.7 (1.32 to 2.2)
- Know can sign up on line: 1.4 (1.09 to 1.8)
- Appropriate to be asked at DMV: 1.26 (0.99 to 1.59)
- Receive compensation: 0.86 (0.67 to 1.11)
- Receive funeral payment: 0.93 (0.74 to 1.18)
- Opt-out system: 0.77 (0.59 to 1.01)

OD, organ donation.

• OR represents odds of selecting “Yes” to respective question for those in the video first condition compared with those in the video last condition.
Factors associated with OD

| Outcome                                | Odds Ratio | 95% Confidence Interval | P Value |
|----------------------------------------|------------|-------------------------|---------|
| Willingness to go back                 | 0.66       | 0.47 to 0.94            | 0.02    |
| Religious beliefs                      | 0.61       | 0.41 to 0.92            | 0.02    |
| Bodily integrity                       | 1.48       | 1.11 to 1.98            | 0.01    |
| Affect funeral proceedings             | 0.84       | 0.60 to 1.17            | 0.30    |
| Treated differently by doctor          | 1.42       | 1.05 to 1.90            | 0.02    |
| Recipient                              | 1.83       | 1.31 to 2.54            | <0.001  |
| Ick factor                             | 0.99       | 0.70 to 1.39            | 0.94    |
| Jinx factor                            | 0.79       | 0.60 to 1.05            | 0.10    |
| Health of donor                        | 0.88       | 0.66 to 1.17            | 0.37    |
| Age limit of donor                     | 0.61       | 0.46 to 0.81            | <0.001  |
| Treated differently by race            | 2.42       | 1.70 to 3.46            | <0.001  |
| Notify relatives                       | 1.02       | 0.73 to 1.41            | 0.93    |
| Association with pain                  | 0.98       | 0.60 to 1.59            | 0.93    |
| Legal to buy an organ                  | 1.53       | 1.13 to 2.07            | 0.01    |
| Know where to sign up                  | 0.89       | 0.68 to 1.18            | 0.43    |
| Know process to sign up                | 0.85       | 0.64 to 1.13            | 0.27    |
| Know can sign up at DMV                | 0.77       | 0.57 to 1.05            | 0.10    |
| Know can sign up online                | 0.94       | 0.70 to 1.26            | 0.66    |
| Appropriate to be asked at DMV         | 0.53       | 0.39 to 0.71            | <0.001  |
| Receive compensation                   | 1.17       | 0.86 to 1.59            | 0.32    |
| Receive funeral payment                | 1.48       | 1.11 to 1.96            | 0.01    |
| Opt-out system                         | 1.42       | 1.02 to 1.98            | 0.04    |

OD, organ donation; DMV, Department of Motor Vehicles.

*OR represents odds of selecting “Yes” to respective question for those who identified as Black compared with those who identified as White.

Discussion

Previous studies have asserted that ethnically heterogeneous populations are less likely to donate than homogeneous ones (10). The primary reason we conducted this study was to observe whether a previously established intervention to increase organ donation in a homogeneous (primarily non-Hispanic White) population would lead to an increase in organ donation intent in a highly diverse region (10,18). Our study was conducted in New York City, one of the most diverse areas of the country regarding race, ethnicity, culture, and religion.

We observed that a previously developed educational video intervention was effective in increasing organ donation intent among a heterogeneous population. Participants who were in the video first condition had greater odds of reporting intentions to register compared with those in the video last condition. Interestingly, although participants reported no preference for the “deliverer” of the video message, the majority of those who expressed a preference were motivated by highlighting the welfare of those in need for organ donation. This suggests that “who” is delivering the message is not as important as “what” the message communicates.

Our study also supports prior research that barriers may emerge due to a lack of opportunity, awareness, or knowledge regarding organ donation (10). Specifically, video exposure improved knowledge of where to go and what to do, and dispelled myths regarding organ donation, particularly in terms of age of donor and health status (e.g., “I am too old to donate”). Previously reported barriers to donation include fear of racism and premature declaration of death among Black participants, religious concerns and distrust in who will receive the organs among the Hispanic American population, and distrust in the medical community and bodily integrity/disfigurement among the Asian American population (12,19). Despite these previous findings, our study found that providing individuals with information that addresses their concerns significantly increases their self-reported intention to donate.

Furthermore, we investigated racial differences between White and Black participants in regard to the aforementioned factors. For example, we found that Black participants were more likely to favor funeral payments of the deceased organ donor as compensation, and more likely to be in favor of an opt-out system. By comparing these racial groups, we are able to begin to identify and dissect important areas future organ donation messaging should target to increase the number of racial minorities who sign up to be an organ donor.

Interestingly, although the DMV is the most common setting for decision making about organ donation, all respondents clearly endorsed the primary care setting as the most “appropriate” setting to be asked about organ donation registration, followed by the DMV, will/estate discussions, and emergency room. Moreover, participants favored the opt-out consent approach for donation, which has been supported by previous studies (6–9).

Our findings suggest future interventions could be effectively implemented to improve organ donation rates in heterogeneous areas such as New York City, if the intervention is developed in such a way that it provides prospective donors with sufficient information to address their concerns.
The present survey study focused on organ donation intent in a very heterogeneous population, rather than actual donor registration. However, in accordance with the transtheoretical model, examining organ donation intent is a first step toward increasing rates of actual organ donation registration (20). The transtheoretical model states that change is a process that unfolds over time and occurs through progression of stages. For an individual to engage in action, they must be fully aware of the issue and have researched it to arrive at an informed decision. Thus, we sought to target these two prerequisites (awareness and contemplation) by providing prospective donors with sufficient information to address their concerns and evoke their emotions. These informational interventions could either: (1) augment approaches presently used by the DMV with information to ameliorate potential donor concerns, or (2) target alternate settings (such as primary care settings, the preferred venue for discussions about organ donation as reported), with informational interventions to complement existing efforts to facilitate organ donation at the DMV. The results of this study show that using this kind of intervention in settings such as New York City—our next step is to test this intervention in these settings, now we have preliminary data that show significant increases in intention to donate in a multicultural sample of New York City residents.

Our findings strongly suggest the development of a public health informational intervention that focuses on evoking donor emotional responses has the potential to on the basis of the demographic breakdown of New York City residents to increase the representativeness of our sample. Nevertheless, future studies should utilize alternate settings to replicate our findings. This study has important implications for a public health issue that has long evaded successful amelioration. As noted above, our findings suggest future interventions to improve organ donation could be effectively implemented if the intervention is developed in such a way that it provides prospective donors with sufficient information to addresses their concerns and evoke their emotions. These informational interventions could either: (1) augment approaches presently used by the DMV with information to ameliorate potential donor concerns, or (2) target alternate settings (such as primary care settings, the preferred venue for discussions about organ donation as reported), with informational interventions to complement existing efforts to facilitate organ donation at the DMV. The results of this study show that using this kind of intervention in settings such as the DMV—and primary care practitioner offices—may facilitate improvements in organ donation in areas such as New York City.

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Our findings strongly suggest the development of a public health informational intervention that focuses on evoking donor emotional responses has the potential to

**Table 4. Motives for organ donation**

| Motive by hearing from | Total (n=1905), n (%) | Registered Organ Donor (n=668), n (%) | Not Registered Organ Donor (n=1160), n (%) |
|------------------------|----------------------|--------------------------------------|------------------------------------------|
| Yes No Doesn’t matter   | Yes No Doesn’t matter | Yes No Doesn’t matter                | Yes No Doesn’t matter                    |
| Receiving message from  |                      |                                      |                                          |
| Someone like you        | 250 (13.1) 356 (18.7)| 89 (35.6) 112 (31.5)                 | 150 (60.0) 230 (64.6)                    |
| Someone who identifies as same sex | 211 (11.1) 366 (19.2)| 64 (30.3) 117 (32.0)                 | 138 (56.4) 230 (62.8)                    |
| Someone who is same race |                    |                                      |                                          |
| Someone from your community |                |                                      |                                          |
| Someone of same economic status |   |                                      |                                          |
| Someone from own ethnic background |         |                                      |                                          |
| Highlights increased welfare of those in need | |                                      |                                          |
| From a public figure | 202 (10.6) 462 (24.3)| 86 (42.6) 139 (30.1)                 | 106 (52.5) 305 (66.0)                    |
| Motivated by hearing from |                      |                                      |                                          |
| The relatives of the organ donor | 343 (18.0) — | 132 (38.5) —                         | 200 (58.3) —                             |
| The recipient of the organ donation | 730 (38.3) — | 278 (38.1) —                         | 417 (57.1) —                             |
| The family members whose loved one died waiting for an organ | 815 (42.8) — | 225 (27.6) —                         | 529 (64.9) —                             |

Frequency of responses regarding motivation to participate in an organ donor program.

**Limitations**

The present survey study focused on organ donation intent in a very heterogeneous population, rather than actual donor registration. However, in accordance with the transtheoretical model, examining organ donation intent is a first step toward increasing rates of actual organ donation registration (20). The transtheoretical model states that change is a process that unfolds over time and occurs through progression of stages. For an individual to engage in action, they must be fully aware of the issue and have researched it to arrive at an informed decision. Thus, we sought to target these two prerequisites (awareness and contemplation) by exploring how knowledge, motives, and attitudes change toward organ donation as a result of the intervention. Future studies should also investigate the effect of a similar video intervention on actual donor registration. We recognize the importance of using a validated survey. Because no such survey exists, one of our long-term goals is to develop one to continue research in this area. Another potential study limitation is the use of an online survey. We utilized this approach to reach a very diverse pool of potential donors in a time- and cost-effective manner. Furthermore, we incorporated best practices in utilizing online samples and previous work has found crowdsourced data are comparable to those collected via college student and social media samples (15,16,21). Additionally, selection bias that may be present given our approach can limit our sample to participants who have access to the internet. We recruited participants to the basis of the demographic breakdown of New York City residents to increase the representativeness of our sample. Nevertheless, future studies should utilize alternate settings to replicate our findings. This study has important implications for a public health issue that has long evaded successful amelioration. As noted above, our findings suggest future interventions to improve organ donation could be effectively implemented if the intervention is developed in such a way that it provides prospective donors with sufficient information to addresses their concerns and evoke their emotions. These informational interventions could either: (1) augment approaches presently used by the DMV with information to ameliorate potential donor concerns, or (2) target alternate settings (such as primary care settings, the preferred venue for discussions about organ donation as reported), with informational interventions to complement existing efforts to facilitate organ donation at the DMV. The results of this study show that using this kind of intervention in settings such as the DMV—and primary care practitioner offices—may facilitate improvements in organ donation in areas such as New York City. Our next step is to test this intervention in these settings, now we have preliminary data that show significant increases in intention to donate in a multicultural sample of New York City residents.

Our findings strongly suggest the development of a public health informational intervention that focuses on evoking donor emotional responses has the potential to
significantly “move the dial,” on organ donation, even in highly heterogeneous areas, thereby saving thousands of people that die every year waiting for an organ.

The vast variability in organ donation rates in the United States constitutes a challenge and an opportunity. As evidenced by our study findings, it is imperative that future interventions target other populous, heterogeneous areas with low organ donor rates to increase organ donation registration. Implementing educational interventions that elicit emotional responses, alleviate donor concerns, and incorporate preferences of potential donors are prerequisites to improving the overall registration rate.

Disclosures
D. Thornton reports having other interests/relationships in Lifebank and National Minority Organ Tissue Transplant Education Program. All remaining authors have nothing to disclose.

Funding
This project was funded by the Roberta Schaefer Family Foundation and the North Shore University Hospital Medical Staff Society at Northwell Health.

Acknowledgments
The authors would like to acknowledge Mr. Robert Castano, Vice President, Northwell Health Foundation, Mr. Bruce Waller, Director, Roberta Schaefer Family Foundation, North Shore University Hospital Medical Staff Society, Northwell Health, and Ms. Aisha M. Tator, Executive Director, Donate Life New York State for their expertise and assistance in developing and funding the above study. The Roberta Schaefer Family Foundation and the North Shore University Hospital Medical Staff Society, Northwell Health, provided funding support but had no role in the design, collection, or conduct of the study. All statements in this report, including its findings and conclusions, are solely those of the authors and do not necessarily represent the views of the funding organizations.

Author Contributions
D. Thornton, K. Finuf, C. Molmenti, E. Molmenti, V. Patel, and R. Pekmezaris conceptualized the study; K. Finuf, C. Molmenti, E. Molmenti, V. Patel, and R. Pekmezaris were responsible for data curation; K. Finuf, C. Molmenti, E. Molmenti, V. Patel, and R. Pekmezaris were responsible for formal analysis; C. Molmenti, E. Molmenti, and R. Pekmezaris were responsible for funding acquisition; D. Thornton, K. Finuf, C. Molmenti, E. Molmenti, V. Patel, and R. Pekmezaris were responsible for methodology; D. Thornton was responsible for resources; E. Molmenti and R. Pekmezaris provided supervision; K. Finuf, C. Molmenti, E. Molmenti, V. Patel, and R. Pekmezaris wrote the original draft; K. Finuf, C. Molmenti, E. Molmenti, V. Patel, R. Pekmezaris, and D. Thornton reviewed and edited the manuscript; and K. Finuf and V. Patel were responsible for validation.

References
1. Human Resources and Services Administration: Organ Donation Statistics | Organ Donor, 2020. Available at: http://www.organdonor.gov/statistics-stories/statistics.html. Accessed June 22, 2020
2. Registry DL: General Information on Organ, Eye and Tissue Donation. New York State Donate Life Registry, 2020. Available at: https://donatelife.ny.gov/register. Accessed June 22, 2020
3. Feeley TH, Anker AE, Evans M, Reynolds-Tylus T: A Department of Motor Vehicle-based intervention to promote organ donor registrations in New York State. *Prog Transplant* 27: 273–280, 2017
4. Rodríguez JR, Fleishman A, Fitzpatrick S, Boger M: Organ donation video messaging in motor vehicle offices: Results of a randomized trial. *Prog Transplant* 25: 332–338, 2015
5. Siegel JT, Tan CN, Rosenberg BD, Navarro MA, Thomson AJ, Lyrintzis EA, Alvaro EM, Jones ND: Anger, frustration, boredom and the Department of Motor Vehicles: Can negative emotions impede organ donor registration? *Soc Sci Med* 153: 174–181, 2016
6. English V: Is presumed consent the answer to organ shortages? Yes. *BMJ* 334: 1088, 2007
7. Wright L: Is presumed consent the answer to organ shortages? No. *BMJ* 334: 1089, 2007
8. Coppen R, Friele RD, Marquet RL, Gevers SKM: Opting-out systems: No guarantee for higher donation rates. *Transpl Int* 18: 1275–1279, 2005
9. Rithalia A, McDaid C, Suekarran S, Myers L, Sowden A: Impact of presumed consent for organ donation on donation rates: A systematic review. *BMJ* 338: a3162, 2009
10. Thornton JD, Alejandro-Rodriguez M, León JB, Albert JM, Baldeon EL, De Jesus LM, Gallardo A, Hossain S, Perez EA, Martin JY, Lasalvia S, Wong KA, Allen MD, Robinson M, Heald C, Bowen G, Sehgal AR: Effect of an iPad video intervention on consent to donate organs: A randomized trial. *Ann Intern Med* 156: 483–490, 2012
11. Rodríguez JR, Fleishman A, Vrighnesky T, Fitzpatrick S, Boger M: Organ donation video messaging: Differential appeal, emotional valence, and behavioral intention. *Clin Transplant* 28: 1184–1194, 2014
12. Sminoff LA, Burant CJ, Ibrahim SA: Racial disparities in preferences and perceptions regarding organ donation. *J Gen Intern Med* 21: 995–1000, 2006
13. Shepherd L, O’Carroll RE: Do affective attitudes predict organ donor registration? A prospective study. *J Health Psychol* 19: 1329–1333, 2014
14. New York State’s Minimum Wage: Welcome to the State of New York, 2016. Available at: https://www.ny.gov/new-york-states-minimum-wage/new-york-states-minimum-wage. Accessed September 29, 2020
15. Follmer DJ, Sperling RA, Suen HK: The role of MTurk in education research: Advantages, issues, and future directions. *Educ Res* 46: 329–334, 2017
16. Chmielewski M, Kucker SC: An MTurk crisis? Shifts in data quality and the impact on study results. *Soc Psychol Personal Sci* 11: 464–473, 2020. 10.1177/1948550619875149
17. Faul F, Erdfelder E, Lang A-G, Buchner A: G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods* 39: 175–191, 2007
18. Thornton JD, Sullivan C, Albert JM, Cedeño M, Patrick B, Pencak J, Wong KA, Allen MD, Kimber L, Mekesa H, Bowen G, Sehgal AR: Effects of a video on organ donation consent among primary care patients: A randomized controlled trial. *J Gen Intern Med* 31: 832–839, 2016
19. Bratton C, Chavin K, Baliga P: Racial disparities in organ donation and why. *Curr Opin Organ Transplant* 16: 243–249, 2011
20. Prochaska JO, Redding CA, Evers KE: The transtheoretical model and stages of change. In: *Health Behavior: Theory, Research, and Practice*, edited by Glanz K, Rimer BK, Viswanath K, San Francisco, Wiley, 2015, pp 125–148
21. McCredie MN, Morey LC: Who are the Turkers? A characterization of MTurk workers using the personality assessment inventory. *Assessment* 26: 759–766, 2019

Received: February 26, 2021 Accepted: July 15, 2021
See related editorial, “Moving Hearts and Minds: Video Intervention To Improve Organ Donor Registration Intent,” on pages 1551–1552.