

Vascularized Composite Allograft Donation and Transplantation: A Survey of Public Attitudes in the United States

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Vascularized composite allograft (VCA) transplantation has emerged as a groundbreaking surgical intervention to return identity and function following traumatic injury, congenital deformity, or disfigurement. While public attitudes toward traditional organ/tissue donation are favorable, little is known about attitudes toward VCA donation and transplantation. A survey was conducted of 1485 U.S. residents in August 2016 to assess VCA donation attitudes. Participants also completed the Revised Health Care System Distrust Scale. Most respondents were willing to donate hands/forearms (67.4%) and legs (66.8%), and almost half (48.0%) were willing to donate the face. Three-quarters (74.4%) of women were willing to donate the uterus; 54.4% of men were willing to donate the penis. VCA donation willingness was more likely among whites and Hispanics ($p < 0.001$), registered organ/tissue donors ($p < 0.001$), and those with less health care system distrust ($p < 0.001$) and media exposure to VCA transplantation ($p = 0.003$). Many who opposed VCA donation expressed concerns about psychological discomfort, mutilation, identity loss, and the reaction of others to seeing familiar body parts on a stranger. Attitudes toward VCA donation are favorable overall, despite limited exposure to VCA messaging and confusion about how VCA donation occurs. These findings may help guide the development and implementation of VCA public education campaigns.

Abbreviations: CI, confidence interval; HIT, Human Intelligence Task; mTurk, Amazon Mechanical Turk; OPTN, Organ Procurement and Transplantation Network; OR, odds ratio; UNOS, United Network for Organ Sharing; VCA, vascularized composite allograft

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Introduction

Vascularized composite allograft (VCA) transplantation has emerged worldwide as a groundbreaking intervention to return identity and function to individuals affected by traumatic injury, congenital deformity, or disfigurement (1–4). VCA transplantation includes face, genitourinary organs (e.g. uterus, penis), lower and upper limbs, abdominal wall, musculoskeletal composite graft segments (e.g. vascularized chest wall, vascularized spinal axis), and glands (e.g. vascularized parathyroid) (1–9). In July 2014, the Organ Procurement and Transplantation Network (OPTN) assumed responsibility for developing policy for VCA transplantation in the United States (10). As of November 21, 2016, there were 61 VCA transplant programs (concentrated within 26 transplant centers), 12 patients on the waitlist for a VCA transplantation, and a total of 21 VCA transplantations have been performed in the United States (OPTN email communication, December 2016).

Like solid organ transplantation, VCA transplantation is made possible by the donation of specified body parts after death. Importantly, however, under OPTN and United Network for Organ Sharing (UNOS) policies, the acquisition of body parts for VCA transplantation requires specific authorization for VCA donation; a general donor registration that an individual wishes to be a “donor” (e.g. via motor vehicle or other online donor registries) is insufficient (10–13). Instead, the donor’s surrogate is asked for explicit permission for the specific VCA donation sought if VCA is a potential option for that donor, given medical criteria and identification of a matching potential VCA transplant recipient. The intent in requiring specific permission for VCA donation was to ensure transparency and to maintain public trust, because it was assumed that the general public was unlikely to know that VCAs could be used for transplantation or expect that designating oneself as an organ donor may include VCAs such as face, limbs, or penis (14).

While public attitudes toward traditional organ and tissue donation are quite favorable (15), comparatively little is known about attitudes toward VCA donation and transplantation specifically. Surveys of the public, health care professionals, and students in various countries have

found generally favorable attitudes toward hand, face, and uterus transplantation (16–23). In the United States, the 2012 National Survey of Organ Donation Attitudes and Behavior by Gallup, Inc. (15) found that while most respondents supported both hand and face donation, people were more willing to consider becoming a hand donor (80%) than a face donor (58%). There was no difference based on sex in willingness to donate hands or face, although older adults were significantly less willing than younger adults to consider face donation.

Media reports have highlighted individual VCA transplant cases in the United States (24–29), although systematic efforts to educate the public about VCA donation have not yet been undertaken. While media narratives about successful VCA transplantations generally have been favorable, their penetration into the public consciousness about VCA as a form of organ donation is unknown. Considering that VCA donation is not presently part of the standard organ and tissue donor registration process, the donation of face, limb, uterus, and other vascular composites has not been integrated into public education campaigns. Moreover, it is unclear if the general public understands that authorization for VCA donation has more specific requirements than can be met through registering as an organ and tissue donor. As VCA policies and practices continue to evolve, efforts will need to be undertaken to inform the public about its nature and scope so individuals can make informed decisions about VCA donation.

The objective of this study was to assess VCA donation and transplantation perceptions and attitudes among adults in the United States. We assessed willingness to consider VCA donation in the context of other types of deceased organ and tissue donation and then reassessed their VCA donation willingness after providing brief information about VCA transplantation. Additionally, we assessed whether people generally are aware that VCA donation, unlike traditional donor registration, requires surrogate authorization at time of death. Finally, we examined whether willingness to be a VCA donor was associated with demographic characteristics, support for organ and tissue donation generally, media exposure to VCA transplantation, and health care system distrust. We hypothesized that providing some information about VCA transplantation would increase willingness to be a VCA donor. Also, based on prior organ donation research, we hypothesized that VCA donation willingness would be higher among white, younger, female, and more-educated respondents, in addition to those with prior media exposure to VCA and less distrust of the health care system.

Methods

Survey respondents were recruited on Amazon Mechanical Turk (mTurk; www.mturk.com), which is an online crowd sourcing worksite in which

Human Intelligence Task (HIT) requests can be posted for “workers” to complete a survey task for a nominal payment. mTurk is commonly used in social and behavioral sciences to efficiently acquire survey-based data, and it has been shown to yield results that are comparable to more-traditional survey methods (30–32). Also, mTurk has been used to examine public attitudes and perceptions toward deceased and living organ donation (33–35).

We posted a HIT request on mTurk for 2 consecutive days in August 2016. The request informed potential workers that we were conducting an anonymous survey study about how people feel about organ and tissue donation. Study-eligible workers had to be ≥ 18 years old, living in the United States, have a valid U.S. driver’s license, and be able to read English. mTurk workers interested in study participation clicked through and answered questions about their demographic characteristics (age, sex, race, ethnicity, education level, geographical region), current organ donor registration status, general attitudes toward organ donation, willingness to donate the organs of a loved one on their death, their knowledge of which specific body parts are covered when registering to be an organ and tissue donor, and willingness to donate each of 21 body parts at the time of death. Subsequently, we provided brief descriptions of face, hand, leg, penis, and uterus transplantation as follows:

Face: In recent years, it has become possible to perform face transplantations for those who have experienced facial disfigurement from a traumatic injury, burns, disease, or birth defect.

Hand/Forearm: In recent years, it has become possible to perform hand and arm transplantations for those who have lost a hand/arm due to injury or disease or who have a severe deformity of the hand/arm.

Leg: In recent years, it has become possible to perform leg transplantations for those who have lost a leg due to injury or disease or who have a severe deformity of the foot/leg.

Penis: In recent years, it has become possible to perform a penis transplantation for those who have lost part of or the entire penis due to injury or disease.

Uterus: In recent years, it has become possible to perform a uterus transplantation for women who were born without a uterus or have experienced irreversible uterine damage. A uterus transplantation offers such women a chance to carry a pregnancy.

We assessed their support for each type of VCA transplantation and their willingness to donate each body part at the time of their own death and on the death of a loved one if they knew s/he wanted to be an organ and tissue donor. All willingness questions had response options of “very willing,” “somewhat willing,” “not very willing,” and “not at all willing.” For those unwilling to donate VCA organ, we asked an open-ended question about the main reason they would not want to donate the specified body part. We then asked about their opinions about authorization of VCA donation, whether they had been exposed to VCA transplantation in the media, and health care system distrust. The 9-item Revised Health Care System Distrust Scale (36) was used to measure distrust (Cronbach’s $\alpha = 0.86$ overall for study sample). Participants indicate their level of agreement or disagreement with items reflecting distrust of the values (e.g. “The health care system puts making money above patients’ needs.”) and competence (“The health care system makes too many mistakes.”) of the health care system. Total scores range from 9 to 45, with higher scores indicative of more distrust.

We based our sample size calculation on a 3% margin of error, a 95% confidence interval, and a U.S. adult population of 250 million. To achieve this, we needed a sample size of 1,068. However, we chose to recruit 1500 participants to ensure that a sufficient number of racial and ethnic

minorities were well represented in our sample. For our analysis plan, we first calculated descriptive statistics for sample demographics and all survey responses. For subsequent analyses we collapsed willingness response options into two categories: willing (“very willing” and “somewhat willing”) or not willing (“not very willing” and “not at all willing”). Using Fisher’s exact tests for categorical data and t-tests for continuous data, we examined associations between VCA willingness and demographic characteristics, media exposure, and health care system distrust. Also, Fisher’s exact tests were used to assess whether willingness to donate VCA organs changed after providing a brief description of the benefit of VCA transplantation. We performed multivariable logistic regression to identify predictors of being less likely to register as an organ donor if VCA was added to the standard organ donor consent. Regarding open-ended responses about why respondents would not be willing to be a VCA donor, two research assistants not involved in the study independently reviewed each comment and classified it into one of seven categories developed a priori based on prior VCA donation literature (e.g. concern about mutilation, identity loss, etc.). Discrepancies in classification were resolved by further discussion and, if consensus was not reached, one of the study’s authors determined the final classification. The percentage of responses for each VCA body part reflecting the categories was calculated. All statistical analyses were performed by using R 3.3.1 (R Development Core Team, 2016).

Study procedures were approved by the Committee on Clinical Investigations at Beth Israel Deaconess Medical Center (Protocol 2016P-000265).

Results

A total of 1500 mTurk workers responded to the HIT request; however, 15 participants were excluded because they stated they did not take the survey seriously. The final sample on which all analyses are based consists of 1485 participants. Median age of the entire sample was 32 years (range = 18–77), 50% ($n = 736$) were female, 25% ($n = 370$) were racial/ethnic minorities (8% black, 7 Hispanic, 7% Asian, 3% other), and 56% graduated from college ($n = 828$). Each of the 11 organ donation and transplantation regions, as defined by the OPTN, was represented in the sample (Table 1). Mean health care system distrust score was 26.34 (SD = 6.58).

There was high support for the donation of organs and tissues for transplantation, with 96.4% of respondents supporting (33.2%) or strongly supporting (63.2%) donation. General support for organ and tissue donation did not differ by sex, age, or education level; however, black respondents (88.5%) were significantly less likely than all others to support donation ($\chi^2 = 26.0$, $p < 0.001$). The majority of respondents (64.9%, $n = 964$) self-identified as registered organ and tissue donors. Of those who indicated that they were not registered ($n = 521$), 26.9% want to be an organ donor but have not yet signed up, 44.3% have not yet decided about donation, and 21.7% do not want to be a donor (7.1% did not respond to the question). Most respondents (92.0%, $n = 1366$) would be willing to donate the organs and tissues of a loved one at the time of their death, if they knew that person wanted to be a donor.

Table 1: Geographic location of survey respondents (N = 1485)

OPTN region	No.	%
1 CT, ME, MA, NH, RI, VT	66	4.4
2 DE, DC, MD, NJ, PA, WV, VA	177	11.9
3 AL, AR, FL, GA, LA, MS, PR	281	18.9
4 OK, TX	106	7.1
5 AZ, CA, NV, NM, UT	182	12.3
6 AK, HI, ID, MT, OR, WA	73	4.9
7 IL, MN, ND, SD, WI	120	8.1
8 CO, IA, KS, MO, NE, WY	85	5.7
9 NY, VT	79	5.3
10 IN, MI, OH	144	9.7
11 KY, NC, SC, TN, VA	172	11.6

OPTN, Organ Procurement and Transplantation Network.

Table 2 shows the number (percentage) of respondents who believe donation of the specified body part is authorized when one registers to be an organ and tissue donor, as well as their willingness to donate this body part at the time of death. Most respondents correctly recognized that registering to be an organ and tissue donor provides authorization for donation of solid organs, such as the kidneys (95.2%), heart (95.0%), liver (91.9%), and lungs (86.6%). Fewer respondents knew that donor registry enrollment authorizes donation of tissue such as heart valves (64.8%), corneas (63.8%), skin (43.2%), bone (38.9%), and tendons (34.2%). Most adults were correct in their understanding that VCA organs are not authorized as part of the standard donor registration process; however, a surprising minority thought that the uterus (27.1%), spinal column (22.2%), hands/forearms (22.1%), legs (20.9%), face (19.3%), and penis (17.4%) were authorized for donation when one is registered as an organ and tissue donor.

The majority of adults were willing to donate solid organs and most tissues at the time of their death (Table 2). Regarding VCA organs specifically, most were willing to donate the spinal column (75.5%), hands/forearms (67.4%), and legs (66.8%). Nearly half (48.0%) were willing to donate their face. Nearly three-quarters (74.4%) of women were willing to donate the uterus, while about half (54.4%) of men were willing to donate the penis. Willingness to donate any VCA organ was associated with race ($p < 0.001$), donor registration status ($p < 0.001$), health care system distrust score ($t = 5.2$, $p < 0.001$), and exposure to media messages about VCA transplantation ($p = 0.003$). VCA donation willingness at time of death was more likely among whites (84.4%) and Hispanics (83.1%) compared with blacks (68.1%) and Asians (74.2%), registered organ and tissue donors (94.1% vs 59.3% nonregistered), those with less health care system distrust (score mean 25.9 vs mean 28.2), and those who had media exposure to VCA transplantation in the past year (85.7% vs 79.6% nonexposed).

Table 2: Respondent perceptions about which body parts are authorized for donation as part of standard donor registry enrollment and willingness to donate body part at time of death

Body part	Believe donation of this body part is authorized when one is a registered organ and tissue donor, n (%)	Willingness to donate body part at time of death, %			
		Very willing	Somewhat willing	Not very willing	Not at all willing
Kidneys	1413 (95.2)	73.3	15.6	3.6	7.6
Heart	1411 (95.0)	73.7	15.4	4.0	6.9
Liver	1365 (91.9)	73.1	15.1	4.2	7.6
Lungs	1286 (86.6)	72.7	14.8	4.7	7.7
Heart valves	962 (64.8)	72.3	15.6	4.4	7.7
Pancreas	917 (61.8)	71.4	15.2	4.9	8.5
Corneas	948 (63.8)	62.4	17.6	9.4	10.6
Spleen	791 (53.3)	68.6	15.6	6.2	9.4
Skin	642 (43.2)	53.9	17.1	12.5	16.4
Intestines	587 (39.5)	66.4	17.4	7.0	9.2
Bone	577 (38.9)	63.0	19.1	8.9	9.1
Cartilage	540 (36.4)	64.4	18.9	8.1	8.6
Tendons	508 (34.2)	63.9	17.0	8.4	10.6
Ligaments	494 (33.3)	62.9	18.0	8.6	10.5
Veins	462 (31.1)	62.3	17.6	8.7	11.4
Uterus	403 (27.1)	59.3 ¹	15.1	10.5	15.1
Spinal column	329 (22.2)	58.5	17.0	11.3	13.2
Hands/forearms	328 (22.1)	49.8	17.6	16.3	16.3
Legs	310 (20.9)	50.6	16.2	16.4	16.7
Face	287 (19.3)	35.2	12.8	21.4	30.6
Penis	259 (17.4)	42.7 ²	11.7	18.8	26.7

¹Question was presented only to female respondents (n = 736).

²Question was presented only to male respondents (n = 749).

Following the presentation of brief information about the purpose of VCA transplantation, the majority of respondents indicated “strong support” or “support” for VCA transplantation: face (80.8%), hand/forearm (91.9%), leg (91.8%), penis (76.2%), and uterus (87.6%) (Figure 1). Also, most respondents were willing (“very willing” or “somewhat willing”) to donate VCA organs at the time of their own death or at the time of a loved one’s death if it was known that person wanted to be an organ and tissue donor (Figures 2 and 3). Importantly, the provision of this simple information about the different types of VCA transplantation led to a net increase in the number (percentage) of respondents who were now willing to donate the specified body part. For instance, compared with donation willingness responses earlier in the survey (Table 2), responses after presenting information about VCA transplantation (Figure 2) showed a higher percentage of people were “very willing” or “somewhat willing” to donate the face (48.0% vs 53.2%, $p < 0.001$), hands/forearms (67.4% vs 81.4%, $p < 0.001$), legs (66.8% vs 81.8%, $p < 0.001$), penis (54.4% vs 62.6% of men, $p < 0.001$), and uterus (74.4% vs 80.1% of women, $p < 0.001$).

Among those respondents who would choose not to donate VCA body parts, vague psychological discomfort and nonspecific concerns were the most common reasons across all VCA body parts (Table 3). In addition,

those opposed to face donation expressed more concern about identity loss and about how difficult it would be for surviving family members to see their face on another person, while concerns about body mutilation and inability to have an open casket funeral were more commonly cited for hand and leg donation.

Participants were next informed that, in the United States, VCA organs require specific authorization currently obtained from legal next-of-kin at the time of death for donation to proceed, regardless of one’s organ donation registration status. Nearly two-thirds (62.9%, $n = 934$) agreed with this approach, while 37.1% thought that next-of-kin authorization for VCA organs should not be necessary if the deceased was a register organ and tissue donor. When asked how changing the donor registration process to formally include VCA organs would affect their willingness to be an organ and tissue donor, 23.1% of currently registered donors (223/964) and 54.1% of those undecided about donor registration (125/231) stated they would be less likely to register as a donor in the future if such registration included VCA organs. In multivariate analysis, we found that being non-white, not being registered as an organ and tissue donor, and more health care system distrust were significantly associated with being less likely to register as an organ donor if VCA was added to the standard donor registration process (Table 4).

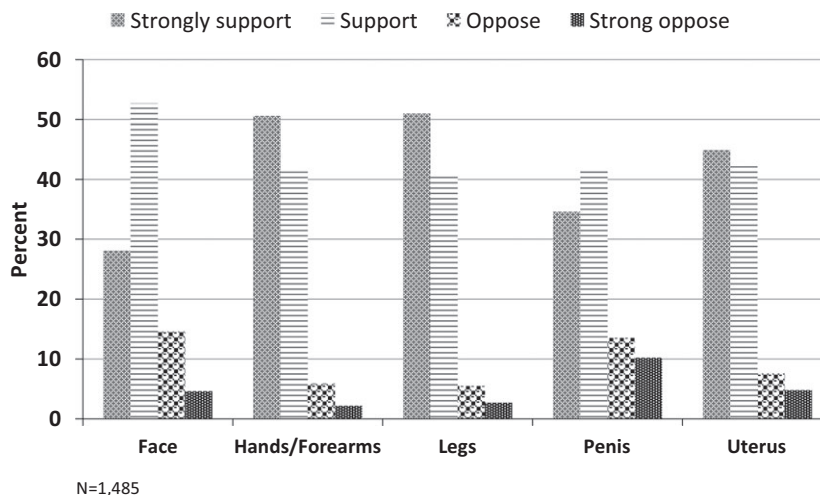


Figure 1: Percentage of respondents who support/oppose vascularized composite allograft transplantation of specified body part.

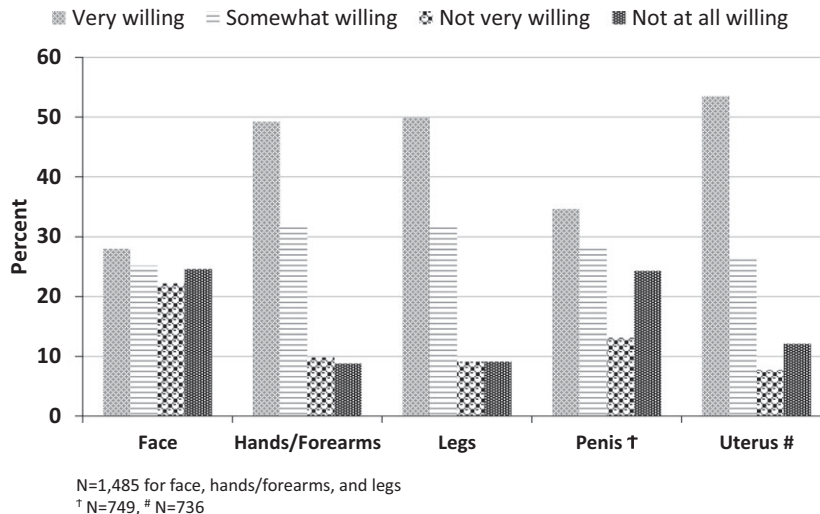


Figure 2: After providing minimal information about vascularized composite allograft transplantation, percentage of survey respondents' willingness to donate specified body part at time of own death.

Approximately one-third of the sample (37.3%, n = 554) had been exposed to one or more media messages or stories about VCA transplantation in the past year. Of those respondents with prior VCA exposure, most had read or seen information about face transplantation (85.4%), followed by hand/forearm (35.9%), penis (28.2%), uterus (17.1%), and leg (8.1%) transplantation.

Discussion

In this study, we sought to add new data and perspective regarding public perceptions of VCA donation and

transplantation in the United States. As VCA transplantation emerges as a viable option for those with severe injury, disease, or deformity, it is necessary to better understand the public's views about this technology since they represent the source of future potential VCA organs. This is the first comprehensive examination of the perceptions and attitudes of VCA transplantation and donation in a large sample of U.S. residents. Findings from this study may have implications for public education about VCA donation as well as for future policy discussions regarding authorization of VCA donation.

Most study participants had positive and supportive perceptions of VCA transplantation. Support was strongest for

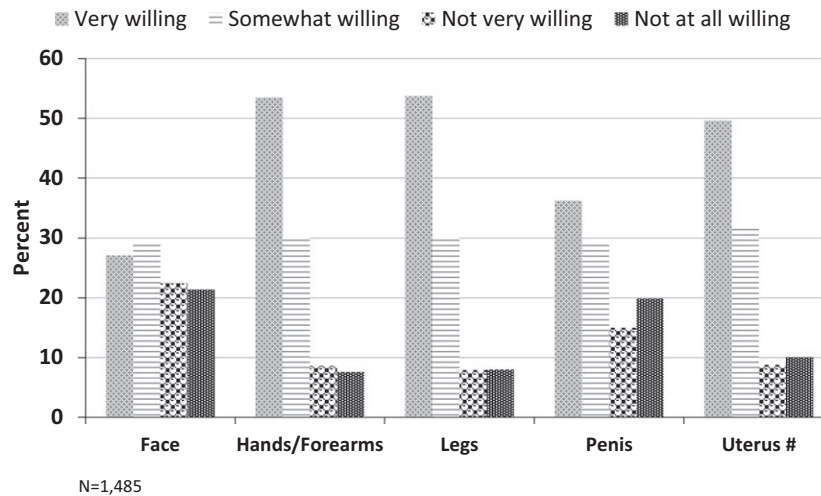


Figure 3: After providing minimal information about vascularized composite allograft transplantation, percentage of survey respondents' willingness to donate specified body part of a loved one at the time of their death, if you knew that they wanted to be an organ and tissue donor.

Table 3: Survey respondents who were not willing to donate specific VCA organs and the number (%) whose comments reflected the reasons noted

	Face n = 695	Hand/Arm n = 276	Leg n = 270	Penis n = 280	Uterus n = 146	Sample comments
Identity loss	187 (27%)	7 (3%)	13 (5%)	8 (3%)	2 (1%)	Face is your main identity. Feels as if the donor would be stealing my identity. Someone walking around with my identifying information...my fingerprints on those hands.
Family members seeing body part on another person	133 (19%)	21 (8%)	14 (5%)	0 (0%)	0 (0%)	I don't want my loved ones to see someone looking like me and remind them of me and cause them additional pain. I am willing to donate my internal parts, but my legs are an external part of me and it is out of bounds simply because it makes others think of me when they see that person and I don't want that.
Mutilation / Inability to have open casket funeral	108 (16%)	81 (29%)	88 (33%)	12 (4%)	3 (2%)	My family would not get to have an open casket and see me one last time. An open casket funeral with someone missing their arms would shock the people attending.
Body part is not viable	17 (2%)	12 (4%)	18 (7%)	8 (3%)	33 (23%)	I have a skin disorder that has affected my hands and arms, I would not be a suitable candidate for donation. I do not think it will work.
Vague psychological discomfort	263 (38%)	101 (37%)	92 (34%)	183 (65%)	60 (41%)	I just think the idea sounds very odd to me. It's creepy and while I should not care I just do.
Nonspecific	100 (14%)	77 (28%)	65 (24%)	48 (17%)	46 (32%)	Do not like the idea. Its' just not right.
Other	19 (3%)	11 (4%)	12 (4%)	15 (5%)	5 (3%)	Because it's my body and the way the organ system is set up is not fair. Rich people get bumped to the head of the line and people that can't afford it (like me) don't get the help. It's my face that God gave me. I don't think it should go to anyone else.

Column numbers do not match total respondents and percentages do not equal 100 because respondents were permitted to identify more than one reason.

Table 4: Multivariate predictors of being less likely to register as an organ donor if VCA donation was part of the standard donor registration process

Variables	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Nonwhite	1.86 (1.43, 2.43)	<0.001	1.48 (1.12, 1.95)	0.01
Not registered as an organ donor	2.88 (2.28, 3.64)	<0.001	2.58 (2.03, 3.29)	< 0.001
More health care system distrust	1.04 (1.02, 1.05)	<0.001	1.03 (1.01, 1.04)	0.004

hand/forearm and leg transplantation and, while still favorable, comparatively weaker for face, penis, and uterus transplantation. This finding seems to mirror the collective studies that have been published regarding VCA attitudes in different populations and in different regions of the world (16–23). Importantly, we also found moderate to high willingness to donate VCA organs at the time of one's own death, although this varied by body part type (which directly supports the OPTN policy decision to require explicit permission for specific VCA donations), reflected a weaker level of commitment than for traditional solid organs and tissues and was not as strong as the support for VCA transplantation. There was considerable willingness to donate the uterus, hands/forearms, and legs for transplantation. In contrast, adults were less likely to consider face or penis donation, both for themselves and for deceased loved ones. These findings are similar to those of the 2012 Gallup survey (15), both finding a higher willingness to donate hands (Gallup: 80.3%; current study: 81.4%) than face (Gallup: 58.2%; current study: 53.2%). A similar level of willingness for face donation (50.8%) was found in a predominantly Muslim population in Turkey (16). Interestingly, medical students in South Africa were considerably less likely to consider face donation (24%) (18).

We found that many of those opposed to VCA donation expressed vague psychological discomfort and concerns about mutilation, identity loss, and the reaction of loved ones to seeing familiar body parts on a complete stranger. Identity concerns may be particularly prominent for face donation, as the face may have stronger personal identity associations since it is a central part of self-perception and social interaction (19). These same concerns may explain the lower likelihood of donating a deceased loved one's face in comparison to other VCA organs. Next-of-kin authorization rates for VCA organs are unknown and the reasons for refusal have not been systematically examined—both should be targets for future investigation.

There clearly is some confusion about what organs and tissues are being authorized for donation when registering as a donor. This is true even for those who have already designated their intention to be an organ and tissue donor at the time of death. While most people understood that the major organs (e.g. kidney, liver) are authorized, many were not aware that they were authorizing tissue donation when registering as a donor. Moreover, although the majority correctly recognized that VCA organs are excluded, 27.1%

and 19.3% of respondents mistakenly believed that the uterus and face, respectively, are part of the standard donor registration process. When informed that current national policy requires specific (and separate) authorization for VCA donation, most were supportive of maintaining this requirement regardless of the deceased individual's donor registration status. Importantly, there is a risk of losing potentially thousands of existing registered donors if VCA organs were incorporated without option in the standard donor registration process. While there is no proposed plan to combine VCA organs with traditional organs and tissues, any future modification of the donor registration process should be considered only after a concerted effort to better educate the public about VCA transplantation and the donation process. Future research might examine public attitudes toward enabling adults to specifically designate VCA donation as an option at the time of general donor registration.

We were surprised to find that giving respondents very limited information about the potential benefit of VCA transplantation led to significant increases in donation willingness across all VCA organs. In addition to addressing the life-enhancing benefits of VCA transplantation for recipients, comments from unwilling respondents suggest that public education efforts should also consider fairness and equity in VCA recipient selection and prominent concerns about mutilation, identity loss, and impact of donation on family members. To date, media reports have focused solely on the benefits of VCA transplantation for the recipient, which may increase awareness about the availability of this technology. Research has shown that exposure to favorable organ donation messaging is associated with higher rates of donor registration and donation authorization for a deceased loved one (37).

One-third of survey respondents had heard about VCA transplantation in the past year via print, social, or visual media. While highlighting the life-changing benefits of a hand or face transplant is a necessary component of public education, it seems imperative to address donation myths and concerns as well as donation benefits for the deceased's family for public education strategies to be most effective in changing attitudes and behavior. The VCA transplantation and donation communities must engage the public and other key stakeholders (e.g. VCA transplant recipients and donor families) in developing a coordinated approach to public education, particularly in these early stages of VCA development.

While this study yields interesting and novel insights into the public's perceptions about VCA transplantation and donation, its findings should be considered in the context of study limitations. As with any survey of the public, there is the likelihood of selection bias since only those mTurk respondents interested in the topic likely chose to respond to our request. This may have resulted in higher favorability toward VCA donation than might be expected in the general population. Nevertheless, our sample was similar to the national Gallup survey (15) sample in terms of support for organ and tissue donation (96.4% and 94.9%, respectively). Our sample was younger (i.e., more than two-thirds was less than 40 years old) and had more formal education compared with both the general population and the Gallup survey (15). As such, our findings may insufficiently reflect the VCA attitudes of older and less-educated adults, who are less likely to have registered as organ and tissue donors (15). Also, while the percentage of registered organ and tissue donors (64.9%) in our sample was comparable to that seen in the Gallup survey (62.3%), both of these numbers are higher than the 54% of registered donors in the United States (38). Given our finding that registered organ donors have more favorable VCA donation attitudes, it is possible that our findings overestimate the support that can be expected for VCA donation in the general public. Also, our questions about VCA donation focused on willingness, not actual VCA donation registration since this is not yet an option; willingness may not accurately reflect future donor registration behavior. Our questionnaire has not undergone validity testing and there are other interesting questions that were not included in the survey that may be important to examine going forward, such as the likelihood that one would personally consider receiving a VCA transplant in the event of a severe injury or disability, perceptions about other emerging VCA procedures such as abdominal wall transplantation (8), or differentiation of attitudes for pediatric versus adult VCA transplantation and donation (39). Finally, in addition to overcoming the foregoing limitations, future research should be guided by theoretical frameworks that have been shown to explain variance in organ donation behavior (e.g. vested interest theory, bystander intervention model, organ donation model, IIFF model) (40–42).

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Disclosure

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