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Organ Transplantation for Foreign Nationals in Canada: A Survey of Transplant Professionals

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Abstract

Background: Transplantation for foreign nationals (non-citizens and non-residents) (FNs) in Canada is a complex issue. Currently, there are no Canadian guidelines for the provision of organ transplantation for FNs, and no empirical data on this issue or on transplant professionals' practices are available.

Objective: This project aimed to gather empirical data on transplant professionals' perspectives and practices regarding transplantation for FNs.

Design: Survey research design.

Setting: A Web-based survey of members of the Canadian Society of Transplantation (CST).

Participants: All members of the CST were invited to participate between April and June 2016.

Measurements: Multiple-choice questions were developed to capture participants' attitudes toward different fictitious clinical scenarios in which an FN needed a transplant, their experiences with FNs, their attitude toward FNs in need of transplantation, their knowledge about relevant institutional and organ donation organization (ODO) policies, and their perspectives on a quota. There were two questions with a five-point Likert scale to measure respondents' agreement with statements related to possible policy options and arguments for and against transplantation for FNs. There was one open-ended question about the content of transplant programs' policies on transplantation for FNs.

Methods: Descriptive statistical analysis were performed.

Results: A total of 87 transplant professionals completed the survey. Over the 4-year period from 2012 to 2016, 47.1% of respondents dealt with at least one situation of listing or performing a transplant for an FN. Only 19.5% of respondents reported that their transplant program had a policy about transplantation for FNs and 59.7% did not know if their ODO had such a policy. When asked about policy options, 47.5% disagreed with a policy of no transplantation for FNs and 41.4% agreed with offering transplantation for FNs in some circumstances (including life-saving and non–life-saving organs). Study participants agreed that transplantation should not be offered to FNs traveling to Canada specifically for transplantation, that FNs should not be transplanted with organs not suitable for Canadian citizens and that there should not be a transplantation quota for FNs. Participants also seem to be more inclined to offer transplantation of life-saving organs, particularly for children.

Limitations: The major limitation of this study is the low response rate of transplant professionals to this survey.

Conclusion: This is the first study to describe Canadian transplant professionals' perspectives on transplantation for FNs. The findings of this study will be of interest for future policy development on access to transplantation for FNs. Further studies are needed to gather various key stakeholders' perspectives on this issue, as well as to analyze the legal and ethical issues and the economics, to develop future policies.

Abrégé

Contexte: Au Canada, les greffes d'organes chez des ressortissants étrangers (RÉ), soit des non-résidents ou des non-citoyens, sont un enjeu complexe. Actuellement, au pays, aucune ligne directrice n'existe quant aux greffes d'organes à des RÉ et aucune donnée empirique sur cette question ni sur les pratiques professionnelles en transplantation n'est disponible.

Objectif: Ce projet visait à colliger les données empiriques faisant état des pratiques et de l'avis des professionnels en transplantation au sujet des greffes d'organes à des RÉ.

Type d'étude: Étude par sondage.

Cadre: Un sondage en ligne mené auprès des membres de la Société Canadienne de transplantation.

Participants: Tous les membres de la Société canadienne de transplantation ont été invités à participer à l'étude entre avril et juin 2016.
Mesures: Des questions à choix multiples ont été développées pour connaître l'avis des participants sur différents scénarios fictifs dans lesquels un RÉ nécessitait une transplantation d'organe. Les questions visaient également à connaître l'expérience des répondants auprès des RÉ, leur connaissance des politiques pertinentes de leur organisation institutionnelle et de leur organisme de dons d'organe, de même que leur avis sur un quota. Deux questions sous forme d'échelle de Likert mesuraient le degré d'accord des répondants sur des énoncés liés à de possibles politiques et leur position (pour ou contre) sur des arguments à l'égard de la transplantation d'organes à des RÉ. Enfin, une question à développement portait sur les politiques du programme de transplantation au sujet des greffes d'organes à des RÉ.
Méthodologie: On a procédé par analyze statistique descriptive.
Résultats: Au total, 87 professionnels de la transplantation ont complété le sondage. Sur une période de quatre ans (2012-2016), 47,1 % des répondants avaient soit inscrit un RÉ sur la liste, soit pratiqué une transplantation chez un RÉ. Seuls 19,5 % des répondants ont déclaré que leur programme de transplantation comportait une politique sur la transplantation d'organes à des RÉ, alors que 59,7 % ignoraient si leur organisme de dons d'organes prévoyait une telle politique. Lorsque questionnés sur les possibles politiques, 47,5 % des répondants étaient en désaccord avec une politique qui refuserait la greffe aux RÉ, et 41,4 % étaient d'accord pour offrir la transplantation aux RÉ dans certaines circonstances, que l'organe soit essentiel ou non à la survie. Les participants s'entendaient sur plusieurs points: 1) la greffe ne devrait pas être offerte aux RÉ qui voyagent au Canada spécifiquement dans cet objectif; 2) les RÉ ne devraient pas être greffés avec des organes jugés inappropriés pour les citoyens Canadiens et; 3) aucun quota de transplantation ne devrait être établi pour les greffes aux RÉ. Les participants semblaient aussi plus enclins à proposer une greffe pour un organe vital, particulièrement aux enfants.
Limites: La principale limite de cette étude est le faible taux de réponse des professionnels de la transplantation.
Conclusion: Il s'agit de la première étude exposant l'avis des professionnels de la transplantation Canadiens à l'égard des greffes d'organes aux RÉ. Les résultats de cette étude serviront à l'élaboration de politiques sur l'accès aux greffes d'organes par des RÉ. D'autres études sont toutefois nécessaires pour connaître la position de divers intervenants clés sur le sujet, de même que pour analyzer les enjeux légaux, éthiques et économiques, en vue d'élaborer les futures politiques.

Keywords
transplantation, medical ethics, survey

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What was known before

There were no empirical data on Canadian transplant professionals' practices and perspectives about transplantation for FNs.

What this adds

This study showed that 47% of transplant professionals had to deal with situations of listing or performing transplantation for an FN. However, few respondents were aware of any guideline on this topic and opinions were divided around policy options. Further studies are needed to clarify the diverging opinions and develop national guidelines.

Introduction

The provision of medical care, particularly organ transplantation, to foreign nationals (FNs) is a complex issue. Foreign nationals include non-citizens and non-Canadian residents, including undocumented residents, temporary workers, and visitors to Canada. Offering organ transplantation to FNs raises numerous ethical issues due to the shortage of organs. In Canada, at the end of December 2016, more than 4 000 patients were waiting for a deceased-donor organ transplant. During the same year, 2 835 organ transplants were performed.[1] Various arguments are used to support or oppose organ transplantation for FNs, such as justice, reciprocity, and physicians' duties

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toward vulnerable populations.[2-6] It is beyond the scope of this article to review these arguments in detail.

The issue of offering organ transplantation to FNs became particularly significant in Canada when the federal government made major cuts to the Interim Federal Health Program (IFHP; 2012–2016), which covers the costs of medication and hospital care for refugee claimants, resettled refugees and certain persons detained under the *Immigration and Refugee Protection Act*. During this period, it was difficult to wait-list persons covered by the IFHP, particularly in the case of kidney transplantation, a non–life-saving transplantation. In 2016, the Canadian federal government restored funding to the IFHP, which facilitates organ transplantation for these categories of persons.[7] However, the issue of offering transplantation to FNs remains relevant because (1) the surge of refugee claimants having crossed illegally into Canada in the summer of 2017 following changes to American foreign policy[8,9]; 2) recent humanitarian crises which have triggered mass migration; and 3) the ongoing requests received by Canadian transplant programs to offer transplantation to FNs. Europe has also been facing similar questions about offering dialysis and kidney transplantation to migrants as a result of their migrant crisis.[10,11]

There are currently no national guidelines on providing organ transplants to FNs, and no data are available on Canadian transplant professionals' perspectives on transplantation for FNs. A Canadian policy and national guidelines specifically addressing transplantation for FNs are necessary to provide guidance to transplant professionals and maximize justice and fairness in organ allocation. The development of a national policy should be informed by stakeholders' perspectives and research serving to more effectively delineate the magnitude of the issue and test several policy options.[12] The aim of this study was to gather empirical data on Canadian transplant professionals' perspectives and practices regarding transplantation for FNs. The results of this study provide guidance for future policy development and are relevant to any jurisdiction grappling with the issue of transplantation for FNs.

Materials and Methods

A bilingual (French and English) online survey was conducted with Canadian transplant professionals. A review of literature and ethical analysis published by two of the authors (M.C.F. and R.G.) guided the development of the survey questions.[2-4]

The survey began with six fictitious clinical scenarios in which an FN needed a transplant. For each scenario, respondents had to choose from the following five options: (1) to list the patient (with or without urgent status, depending on the case); (2) to refuse to list the patient; (3) to offer the transplant only when the patient had a living kidney donor (in cases of kidney and liver transplantation); (4) to list the patient, but prioritize nationals over FNs; (5) to offer or not to offer a left ventricular assist device, in the case of a heart transplant. Following these scenarios, there were nine short-answer and multiple-choice questions exploring the transplant professionals' experiences with FNs, their attitude toward FNs in need of transplantation, their knowledge about relevant institutional and organ donation organization (ODO) policies, and their perspectives on a quota. Additionally, there were two questions with a five-point Likert scale (*strongly disagree, disagree, neither agree nor disagree, agree*, and *strongly agree*) to measure respondents' agreement with statements related to possible policy options and arguments for and against transplantation for FNs. Finally, there was one open-ended question about the content of transplant programs' policies on transplantation for FNs. Refer to the supplementary file for the survey questions.

The survey was administered and hosted by the Population Research Laboratory at the University of Alberta. The survey questions were pre-tested, in French and English, by four non-transplant professionals from our research team and a research assistant from the Population Research Laboratory. The persons who pre-tested the survey were asked to complete it and provide written and oral feedback on the wording and understandability of the questions and on the online format. Recruitment was done through the Canadian Society of Transplantation (CST), a professional organization for physicians, surgeons, scientists, and allied health professionals working in the field of transplantation, which distributed and promoted the survey invitation via e-mail to its 352 members. The survey was available from April 11 to June 30, 2016. Three follow-up e-mail reminders were sent by the CST. Given that the survey was administered by the CST, we had no means of tracking non-respondents. There was no incentive offered to participants. Based on the respondents' answers to the survey questions, descriptive statistical analysis was performed to examine the prevalence of the respondents' choices. The Research Ethics Board of the Center hospitalier de l'Université de Montréal approved the survey and all the participants provided informed consent before answering the survey. We used the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).[13]

Results

Characteristics of Survey Respondents

In total, 87 responses were received (24.7% response rate). Of the participants, 56.7% were transplant physicians, and almost all respondents were working in university hospitals. Among the participants, 53.4% reported being specialized in kidney transplantation. Table 1 summarizes the demographics of the survey respondents.

Table 1. Survey Respondent Characteristics.

Characteristic	N = 87 (%)
Sex	61 (70.1)
Female/male	33 (54.1)/ 28 (45.9)
Age	59 (67.8)
<30	1(1.7)
30-39	11 (18.6)
40-49	24 (40.7)
50-59	15 (25.4)
>60	8 (13.6)
Profession	60 (69.0)
Transplant physician	34 (56.7)
Transplant surgeon	9 (15.0)
Transplant coordinator	6 (10.0)
Transplant nurse	4 (6.7)
Pharmacist	1 (1.7)
Researcher	1 (1.7)
Other	5 (5.7)
Years of practice	59 (67.8)
<10	18 (30.5)
10-19	22 (37.3)
20-29	7 (11.9)
>30	12 (20.3)
Practice setting	59 (67.8)
University hospital	57 (96.6)
Other	2 (3.4)
Language of practice	59 (67.8)
English/French	52 (88.1)/7 (11.9)
Organ of expertise	58 (66.7)
Kidney	31 (53.4)
Multi-organ	10 (17.2)
Liver	7 (12.1)
Lung	6 (10.3)
Heart	2 (3.4)
Pancreas	1 (1.7)
Other	1 (1.7)
Province of practice	59 (67.8)
Ontario	21 (35.6)
Prairies	16 (27.1)
Quebec	11 (18.6)
British Columbia	8 (13.6)
Atlantic provinces	3 (5.1)

Experience and Policy Knowledge

Between 2012 and 2016, 47.1% of the participants experienced situations involving listing FNs for transplantation. This was nevertheless a rare phenomenon, occurring fewer than five times over 3 years for the 73.8% of participants who reported experiencing such situations. The most frequent situation involved an FN residing in Canada and requiring a kidney transplantation.

There was no single approach to managing requests from FNs: 21.8% consulted others (bioethicists, colleagues, etc); 12.6% made decisions on a case-by-case basis; 12.6% referred to an institutional policy; and 10.3% referred to an ODO policy. That being said, 59.8% did not know if their ODO had a policy on this issue, and 19.5% were aware of a policy in their institution. In an open-ended question, 15 participants provided details on their policy or practices. Three mentioned that they would agree to perform living kidney transplantation for FNs if they had a suitable living organ donor and if the FN could pay for the procedure. Four answered that they would also offer transplantation with a deceased-donor organ if the patient had health coverage enabling them to pay for the procedure, the follow-up and the immunosuppressive medication. For four other participants, the decision to transplant or not is beyond the scope of their transplant program and is a governmental decision. Finally, four participants mentioned that their transplant programs do not offer transplants for FNs. Table 2 summarizes the participants' past experience and policy knowledge.

Clinical Case Scenarios

When questioned about different clinical case scenarios, the participants had different answers depending on whether or not the situation was life-threatening. Many respondents would list an FN in urgent need. Thus, 47.1% of the participants would list an undocumented resident with an urgent status with acute myocarditis, a child who is a non-citizen and non-resident (NC/NR) requiring an urgent heart transplant (50.6%) and a temporary worker with fulminant hepatic failure requiring an urgent liver transplant (56.3%). When the cases described patients in need of kidney transplantation, participants were less inclined to list them. Only 26.4% would list an adult asylum seeker on hemodialysis, and 12.6% would list a 5-year-old FN whose parents are rejected asylum seekers. That being said, some of the participants (17.2% for the adult patient and 20.7% for the pediatric patient) would agree to perform a living-donor kidney transplant if the patient had a suitable donor. For the patient requiring liver transplantation and traveling to Canada for a transplant, a third of respondents would refuse to list, while 28.7% would perform the transplantation if the patient had a suitable living donor. For each clinical scenario, between 1.1 and 12.6% (depending on the scenario) of the respondents chose the option of prioritizing nationals over FNs. Table 3 summarizes the different attitudes of the participants.

Arguments for and Against

Opinions were divided regarding the arguments for and against transplantation for FNs. Figure 1 summarizes the results for each statement. A large proportion of participants were neutral to the arguments (neither agreed nor disagreed with the statements, ranging between 19.7 and 41.0%). There were four statements for which more than 50% of the

Table 2. Past Experience and Decision-Making of Transplantation for FNs.

Issues	N (%)
Between 2012 and 2016, have you or members of your transplant program been confronted with situations involving listing and performing transplantation for FNs?	N = 87
Yes/No/NA	41(47.1)/27(31.0)/19(21.9)
How many times, in the past 3 years, have you been confronted with situations in which FNs required an organ transplant? (answered only if the respondent answered yes to the previous question)	N = 42
<5 times	31 (73.8)
5-10 times	7 (16.7)
Do not know	4 (9.5)
How many times, in the past 3 years, have you been confronted with the scenarios below?	N = 87
FNs residing in Canada requiring acute emergent organ transplant?	
Never	19 (21.8)
<5 times	10 (11.5)
>5 times	1 (1.1)
NA	57 (65.5)
FNs residing in Canada requiring life-sustaining organ transplant (heart, liver, and lung) but not in emergent situation.	
Never	18 (20.7)
<5 times	11 (12.6)
>5 times	1 (1.1)
NA	57 (65.5)
FNs residing in Canada requiring kidney transplantation.	
Never	12 (13.8)
<5 times	18 (20.7)
>5 times	4 (4.6)
NA	53 (60.9)
FNs not residing in Canada requiring organ transplantation.	
Never	17 (19.5)
<5 times	13 (14.9)
>5 times	3 (3.4)
NA	54 (62.1)
What do you do when FNs request organ transplantation?	N = 87
I make the decision on a case-by-case basis	11 (12.6)
I refer to an institutional policy	11 (12.6)
I refer to an organ donation organization policy	9 (10.3)
I consult others (ie director, colleague, bioethicist, etc)	19 (21.8)
It has never happened	12 (13.8)
Do not want to answer	5 (5.7)
NA	20 (23.0)
Does your program have a policy regarding the transplantation of FNs?	N = 87
Yes/No/Don't know	17 (19.5)/24 (27.6)/26 (29.9)
NA	20 (23.0)
Do you know if your ODO has a policy regarding wait-listing and transplanting FNs?	N = 87
Yes/No/Don't know	6 (6.9)/10 (11.5)/52 (59.8)
NA	19 (21.8)

Note. FN = foreign national.

respondents agreed: (1) the decision to wait-list FNs does not depend on whether they contribute to the deceased-donor organ pool (59.7% agreed); (2) if Canada agrees to offer transplantation to FNs, there is a risk it will become a transplant destination (59.0% agreed); (3) deceased-donor organs belong to Canadian residents and citizens (52.4% agreed); and (4) FNs traveling to Canada for organ transplantation should not have access to organ transplantation (50.0% agreed). There were only two statements for which more than 50% of respondents disagreed: (1) FNs should not have access to organ transplantation because they do not contribute to Canada's economy (61.7% disagreed); and (2) transplantation for FNs will reduce organ donation rates in Canada (58.1% disagreed).

Table 3. Attitudes Toward Different Clinical Case Scenarios of Foreign Nationals and Access to Transplantation.

Clinical cases scenarios	N =87 (%)
Mr A is a 50-year-old end-stage renal disease patient receiving hemodialysis treatment in a hospital. He is an asylum seeker waiting for his immigration decision. He has no medical or psychological contraindications to receiving a kidney transplant. What would you do?	
I would list him	23 (26.4)
I am uncertain what I would do	22 (25.3)
I would refuse to list him	18 (20.7)
I would transplant him if he had a potential living kidney donor	15 (17.2)
I would list him but I would prioritize nationals over Mr A	4 (4.6)
I do not want to answer	3 (3.4)
NA	2 (2.3)
Mrs B is a 30-year-old undocumented resident living in Canada for the last 5 years. She presents at your hospital with an acute myocarditis requiring urgent heart transplantation. She is in the intensive care unit. What would you do?	
I would list her with an urgent status	41 (47.1)
I am uncertain what I would do	16 (18.4)
I would list her with an urgent status but I would prioritize nationals over Mrs B	11(12.6)
I would not list her, but would offer a ventricular assist device	7 (8.0)
I would refuse to either list her or offer a ventricular assist device	2 (2.3)
I do not want to answer	1 (1.1)
NA	9 (10.3)
C is a 4-year-old child. His parents are undocumented residents and he is not a Canadian resident or citizen. He presents at your hospital with acute heart failure unresponsive to all pharmacologic therapy requiring urgent heart transplantation. What would you do?	
I would list him with an urgent status	44 (50.6)
I would list him with an urgent status but I will prioritize nationals over C	13 (14.9)
I am uncertain what I would do	8 (9.2)
I would not list him, but would offer a ventricular assist device	3 (3.4)
I do not want to answer	2 (2.3)
I would list him without an urgent status but I would prioritize nationals over C	1 (1.1)
I would refuse to either list him or offer a ventricular assist device	1 (1.1)
I would list him without an urgent status	1 (1.1)
NA	14 (16.1)
D is a 5-year-old child receiving chronic hemodialysis. She is not a legal citizen or resident. She has no medical contraindications for a kidney transplant. Her parents are rejected asylum claimants waiting for the decision regarding deportation to their country of origin. What would you do?	
I would refuse to list her	21 (24.1)
I am uncertain what I would do	21 (24.1)
I would transplant her if she had a potential living kidney donor	18 (20.7)
I would list her	11 (12.6)
I would list her but I would prioritize nationals over D	1 (1.1)
NA	15 (17.2)
Mr E is a wealthy 60-year-old man with hepatic failure secondary to hepatitis B. He lives in a country where there are no liver transplantation facilities. He heard about your liver transplantation program and has contacted you to find out whether you would agree to wait-list him for a deceased donor liver transplant, given that this procedure is not available in his country. He says he is able to pay for the entire procedure. What would you do?	
I would refuse to list him	29 (33.3)
I would transplant him if he had a potential living donor	25 (28.7)
I am uncertain what I would do	7 (8.0)
I would list him but I would prioritize nationals over Mr E	4 (4.6)
I would list him	3 (3.4)
NA	19 (21.8)
Mr F is a temporary migrant worker from Mexico working here in the agriculture sector for the summer season. During his stay in Canada, he develops fulminant liver failure following mushroom poisoning. He is in the intensive care. He requires a liver transplant. What would you do?	
I would list him with an urgent status	49 (56.3)
I am uncertain what I would do	9 (10.3)
I would list him with an urgent status but I would prioritize nationals over Mr F	7 (8.0)
I would not list him	2 (2.3)
I would transplant him if he had a potential living donor	2 (2.3)
I do not want to answer	1 (1.1)
NA	17 (19.5)

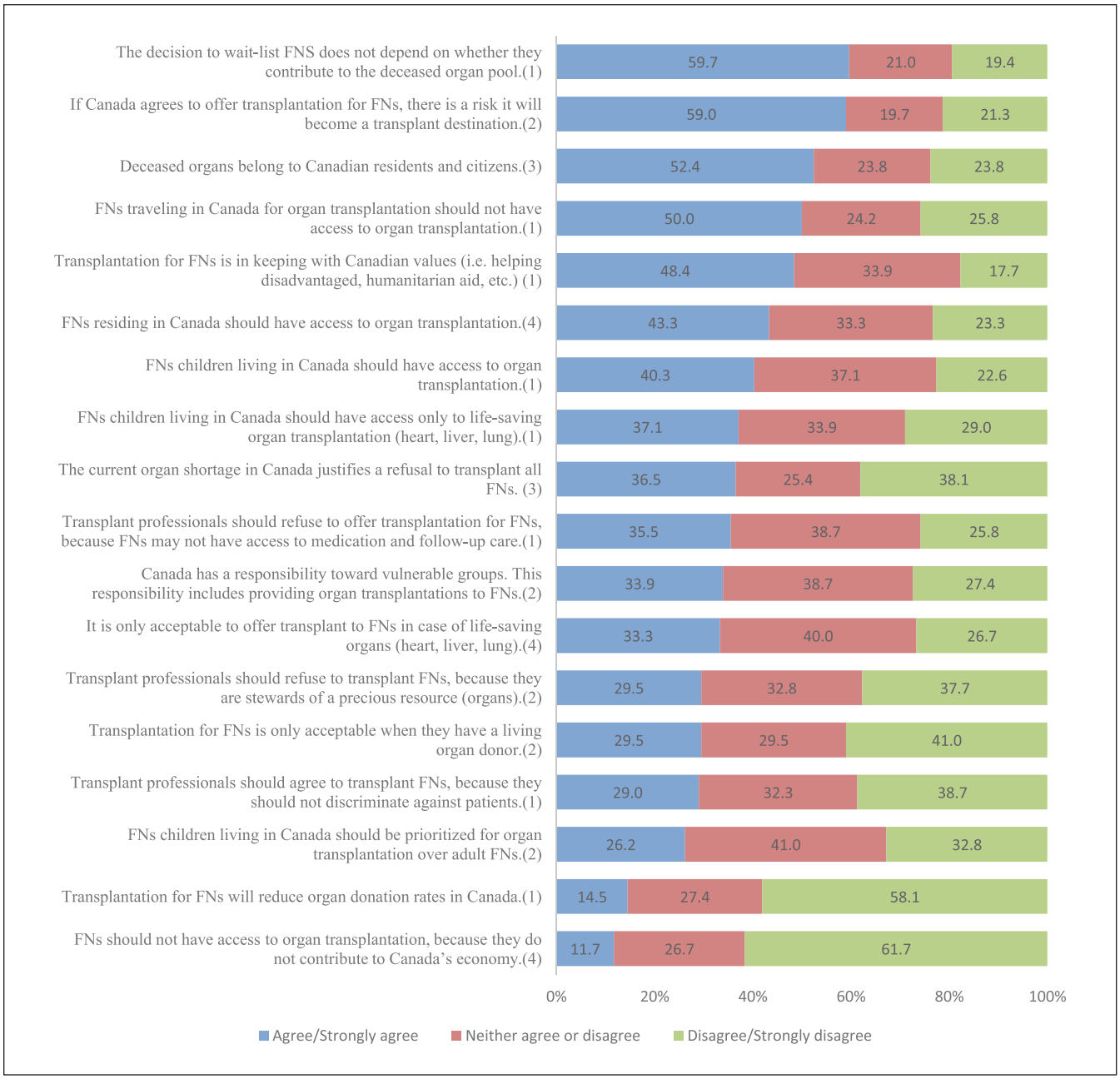

Figure 1. Arguments in favor and against transplantation of FNs.
Note. 1. N total = 62, 25 missing answers. 2. N total = 61, 26 missing answers. 3. N total = 63, 24 missing answers. 4. N total = 60, 27 missing answers. FN = Foreign National.

Policy Options

Opinions were also divided regarding the different policy options. Between 6.9 and 32.8% of the respondents neither agreed nor disagreed with the policy options presented. Most participants disagreed with the option of offering transplantation for FNs traveling to Canada: (1) 93.1% disagreed with transplantation for FNs traveling to Canada with organs that are not suitable for Canadian patients; (2) 79.3% disagreed with transplantation for FN children traveling to Canada for a non–life-sustaining organ; (3) 70.7% disagreed with transplantation, with a quota, for FNs traveling to Canada; (4) 69.0% disagreed with offering transplantation of any organ for FNs traveling to Canada; (5) 62.1% disagreed with offering life-sustaining organ transplantation for FNs traveling to Canada; (6) 62.1% disagreed with offering organ transplantation for FN children traveling to Canada.

Participants also disagreed with some policy options regarding FNs residing in Canada. As for FNs traveling to Canada, most participants disagreed (77.6%) with offering transplantation for FNs residing in Canada with organs that

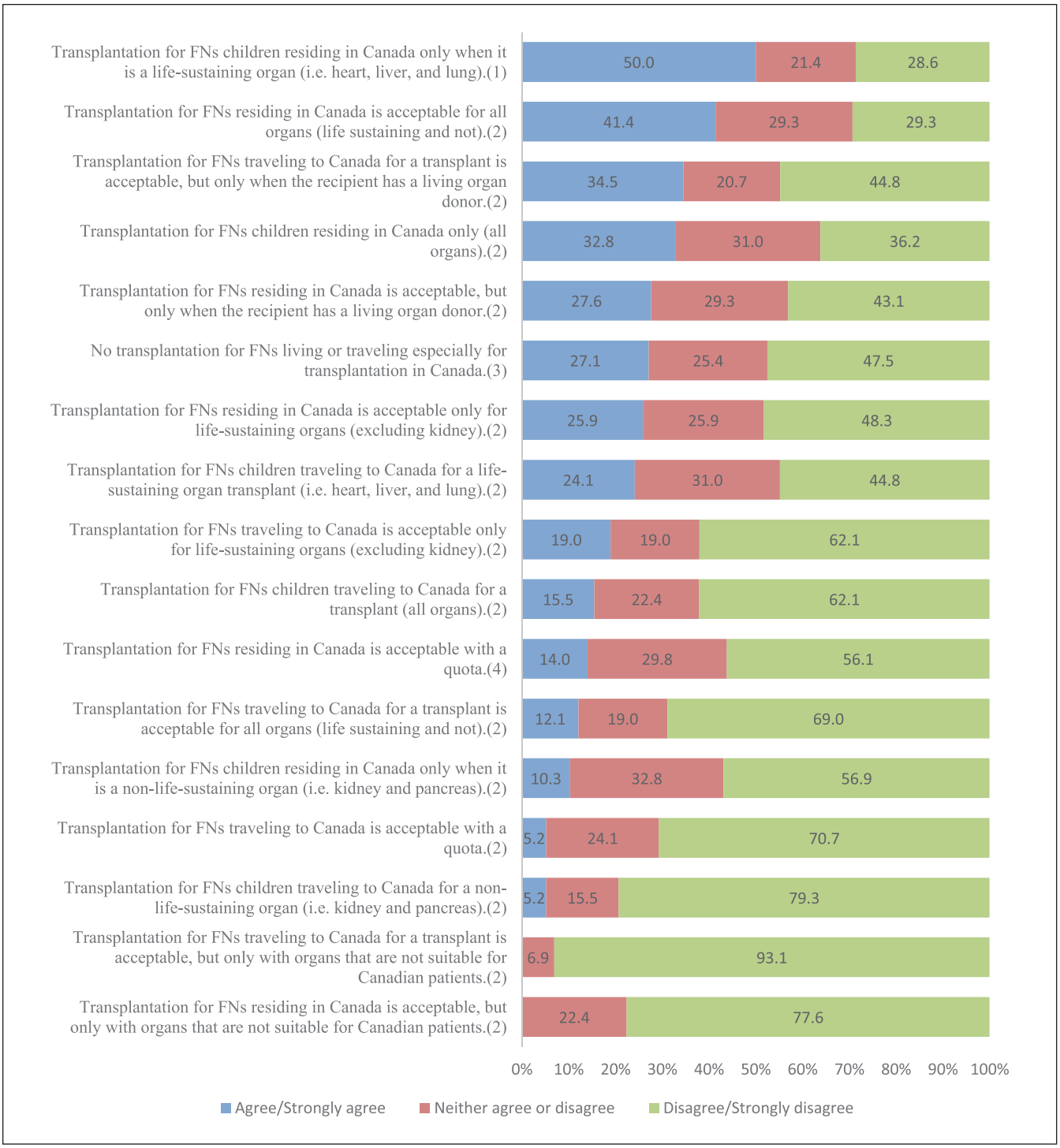

Figure 2. Attitudes toward different policy options.
Note. 1. N = 56, 31 missing answers. 2. N = 58, 29 missing answers. 3. N = 59, 28 missing answers. 4. N = 57, 30 missing answers. FN = Foreign National.

are not suitable for Canadian patients. In addition, 56.9% of the participants disagreed with offering non–life-sustaining organ transplantation to FN children residing in Canada. The idea of a transplantation quota for FNs residing in Canada was also unpopular (56.1% disagreed).

The only proposed policy option with which 50% of participants were in agreement was transplantation for FN children residing in Canada exclusively when it is a life-sustaining organ such as a heart, liver, or lung. Figure 2 summarizes the results for each policy option.

Discussion

This is the first study assessing transplant professionals' perspectives on transplantation for FNs. One limitation of this survey is the low response rate among CST members and the small number of transplant surgeons who took part in the survey. In addition, only two-thirds of the respondents completed all the questions (57 of 87 respondents). CST membership is voluntary for transplant professionals; therefore, some transplant professionals may not have had the opportunity to participate. There may also be a selection bias where only participants with experience or an interest in this topic answered the survey. Participants constituted a relatively homogeneous group, sharing certain values. The results may have been different with participants from other groups living in Canada. The survey did not explore the rationale behind each statement or opinion, and it only represents transplant professionals' views. The opinions of other key stakeholders, such as policymakers, health administrators, and the lay public, should also be gathered to develop ethical guidelines on this issue. Another limitation of this study is that the questionnaire was developed for the purpose of this study, and its reliability and validity were not evaluated. Nonetheless, the data from this survey are important, given the absence of data concerning professionals' views on transplantation for FNs and transplant programs' policies and practices. This study highlights the need to pursue research in this field to develop a national policy to ensure that all FNs are treated equally and fairly across the country.

Although 47.1% of participants reported having dealt with situations involving listing and performing transplantations for FNs, it seems to be rare (fewer than five times over 3 years). That being said, there are no Canadian data about the citizenship or immigration status of transplant candidates. In Canada, when a person is admitted to a hospital with a life-threatening condition, there is an ethical and legal obligation to provide treatment regardless of the patient's immigration or residency status. Some FNs are therefore receiving dialysis in Canada because it was initiated as an emergency treatment. Although attempts are often made to return patients to their country of origin, it is not always possible. Since, in the aforementioned situation, discontinuing dialysis would result in the patient's death, kidney transplantation may be an attractive option given that transplantation is more effective and less expensive than chronic dialysis. In the United States, undocumented residents with end-stage renal disease (ESRD) are younger and have less cardiovascular morbidity than the American dialysis population. This population is willing to work, and around 60% of them have a potential living donor.[14]

In the United States, in 2012, the Organ Procurement and Transplant Network changed its policy to require status data on all transplant candidates listed and transplanted, including their citizenship and residency.[15] Between 2013 and 2016, 1.2% of all transplants performed in the United States involved NC/NR patients. In 2016, of the NC/NR kidney transplant patients, 81% did not specifically travel to the United States for a transplant, and all received deceased-donor kidneys of the same quality as those a citizen or resident would receive. In addition, in 2016, 1.3% of all wait-list patients in the United States were NCs/NRs.[16] A recent study showed that, between 2002 and 2016, 0.86% of the individuals listed for a liver transplant in the United States were NC/NR patients. These patients had post-transplant outcomes comparable to those of a US citizen or resident. The only difference was that NC/NR patients had a higher likelihood of being lost to follow-up.[17] It is unclear if the cause of loss to follow-up is secondary to patients returning to their country of origin or other circumstances.[17] Nonetheless, patients being lost to follow-up is particularly worrisome, given that medical follow-up is important for long-term transplant success.

Respondents lacked knowledge as to whether or not ODOs had policies regarding FNs. Trillium Gift of Life Network, a provincial agency that coordinates and supports organ and tissue donation and transplantation across Ontario, published guidelines in November 2016 after completing a survey on listing and organ allocation for transplantation of FNs.[18] Its position statement clearly states that deceased-donor organs are intended to serve Canadian residents and citizens, and that non-residents may have access to deceased-donor organ transplantation in life-threatening situations where there is no alternative treatment. In such cases, the decision to wait-list and transplant a non-resident should be made on a case-by-case basis by the transplant program.[18] Currently, no other provincial ODO has published a position statement on this topic, leaving transplant centers outside Ontario to decide whether or not to wait-list and transplant FNs. The lack of harmonized guidelines could lead to inequities, such as FNs having access to transplantation in one province while being denied it in another.

Participants were more accepting of wait-listing and offering transplantation for life-saving organs for both adult and pediatric FN patients residing in Canada, which is easily understandable, given that not offering transplantation to these patients would lead to death. This is not the case, however, for kidney transplantation, which is not considered life saving. Renal-replacement therapy allows ESRD patients to survive, but with high mortality and morbidity.[19] The International Society of Nephrology and the European Renal Association—European Dialysis and Transplant Association surveyed their members on management practices for refugees with ESRD, including the option of renal transplantation. In this survey, 57.5% of participants reported listing a refugee for a deceased-donor kidney transplant when the refugee had obtained the legal permission to stay in the country permanently; 17.4% of participants listed refugees for a deceased-donor kidney transplant irrespective of their status; 15.1% never list refugees for a kidney transplant; and another 9.1% support living-donor kidney transplantation when a refugee has a living donor and the capacity to pay.[11]

Refusing to list and transplant FN children with ESRD is surprising given the deleterious impact of renal failure on

neurocognitive development and growth and the accepted priority most organ allocation policies grant to pediatric transplant candidates.[20,21] Moreover, arguments based on human rights,[22] the right to an open future,[23] and age-based justice[24,25] support offering kidney transplantation to children.

Not surprisingly, participants in this survey were reluctant to list patients traveling to Canada for a transplant. In a US study, Volk and colleagues[26] showed that 30% of survey participants disagreed with the idea of people traveling to the United States for a transplant, whereas 28% of participants felt that it would be acceptable under certain circumstances if the recipient is a child. In a recent article, Hartsock examined the issue of patients traveling to the United States to receive a liver transplant. According to the author, foreign patients traveling to the United States should only receive deceased-donor livers that are not suitable for a resident (citizen or not), given that listing and offering transplantation to patients traveling for transplantation undermines the justice and fairness of the allocation system and could compromise public trust in organ donation.[5] Another argument against listing and offering transplantation to FNs traveling to Canada for transplantation is that this violates the *Declaration of Istanbul*, which strives for jurisdictions to achieve self-sufficiency in organ supplies.[27] Permitting transplants for FNs traveling for transplantation could prevent some countries from developing an organ donation and transplantation infrastructure.

The decision as to whether or not to offer transplantation for FNs puts transplant professionals in a difficult position. Transplant physicians have an ethical and fiduciary duty to promote and consider the best interests of their patients.[28] Not providing organ transplantation to eligible patients who could benefit from it could go against a physician's duty. On the contrary, the transplant physician should not cause harm.[28] In case of FNs, if the physician is concerned that the patient does not have access to immunosuppressive drugs or follow up, the patient is at risk of losing the graft and even death. Two recent US studies have shown that kidney transplant recipients (adult and pediatric) who are undocumented immigrants have similar outcomes to US citizens when they have health insurance or access to immunosuppressive drugs. A pediatric study reported graft loss among recipients who were undocumented residents, when they reached 21 years of age, as they no longer had access to health coverage for immunosuppressive drugs.[29,30] Additionally, physicians are tasked with being stewards of resources. They must simultaneously pursue the best interests of their patients and act as gatekeepers for scarce resources, putting them in a challenging position in the absence of any policy.[28] There is therefore a clear need for national guidelines addressing transplantation for FNs.

A small majority of participants agreed with the statement that allowing transplantation for FNs increases the risk that Canada will become a transplant destination. There are limited empirical data to validate this statement. However, in 2016, California State extended medical coverage to children from low-income households, irrespective of immigration status, allowing kidney transplantation for children. This did not result in an increased influx of undocumented immigrants in this state.[30] Moreover, a previous study looking at the demographics of undocumented residents with ESRD needing hemodialysis in Houston, Texas has shown that the patients had spent more than 30% of their lifetime in the United States before needing hemodialysis, contradicting the notion that most of the undocumented residents moved to the United States to receive medical care.[31]

Conclusion

This is the first study to describe Canadian transplant professionals' perspectives on transplantation for FNs. This study highlights the need to develop national and ethical guidelines on access to transplantation for FNs. Study participants agreed that transplants should not be offered to FNs traveling to Canada specifically for transplantation, that FNs should not be transplanted with organs not suitable for Canadian citizens, and that there should not be a transplantation quota for FNs. Participants also seem more inclined to offer transplantation of life-saving organs, particularly for children. These results will be of interest for future policy development. However, further studies are needed to examine other key stakeholders' views, as well as legal, ethical and economic issues, to validate these findings and develop a sound and robust national policy.

List of Abbreviations

CST, Canadian Society of Transplantation; FN, foreign national; IFHP, Interim Federal Health Program; ODO, organ donation organization; NC/NR, non-citizen and non-resident.

Ethics Approval and Consent to Participate

The research ethics board of the Centre hospitalier de l'Université de Montréal approved the study and all participants provided consent to participate.

Consent for Publication

All authors have reviewed a final version of the manuscript and have consented to the publication.

Availability of Data and Materials

Data is available from the authors on request.

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Supplemental Material

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