

Optimizing Utilization of Deceased Donor Kidneys

A National Forum to Increase
Transplant Opportunities

Oct. 21 and 28, 2021

Public (P)

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Executive summary

The Optimizing Utilization of Deceased Donor Kidneys project was initiated in September 2017, following discussions at the Canadian Society of Transplantation (CST) meeting in Halifax, Nova Scotia. At that meeting, the CST Kidney Group identified concern about the discard of donated kidneys and resulting underutilization. Participants noted that this issue may contribute to mistrust in the organ donation system and prolong waiting times for patients on the kidney transplant wait-list.

In response, Canadian Blood Services convened a project steering committee in 2019. The committee included representatives from organ donation organizations, administration, and clinical areas related to kidney transplantation, histocompatibility, pediatrics and ethics. The project's goal was to develop guiding principles and recommendations, and ultimately policies, to support the allocation of underutilized kidneys.

In October 2021, Canadian Blood Services held a two-day virtual forum that brought together donation and transplant professionals to discuss these issues. This report summarizes the forum's purpose and process, the current environment, and recommendations related to allocation guidelines and future research.

Background

Despite existing interprovincial organ sharing policies, many transplant programs struggle to allocate organs that cannot be matched to candidates on local wait-lists. As a result, some potentially transplantable organs are not utilized.

Typically, organs are first offered through the interprovincial Highly Sensitized Patient program supported by the Canadian Transplant Registry operated by Canadian Blood Services and then to local wait-lists. However, there is considerable variability in deceased donor acceptance thresholds across transplant programs (Vinson, 2023). This variability contributes to the underutilization of potentially transplantable organs.

In 2022, 327 people in Canada were removed from the kidney transplant wait-list. One-third of these removals were due to death (Canadian Institute for Health Information, 2021, 2023). These figures underscore the importance of identifying and utilizing every appropriate opportunity for transplant. Underutilization also risks eroding public trust in the organ donation system.

To address this issue, the project steering committee proposed establishing a new interprovincial program, supported by the Canadian Transplant Registry, to match organs that may not otherwise be utilized for transplantation with willing recipients across Canada. The

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proposed program would support the timely use of organs while tracking transplant outcomes to inform future system improvements.

Purpose of the forum

The purpose of the forum was to develop a framework for a system in which all donated organs are transplanted into a recipient.

The forum objectives were to:

- Review current organ utilization and best-practice research, including clinical and administrative allocation and assessment practices in Canada and internationally.
- Consult with patients, donation specialists, transplant nephrologists and surgeons, and other stakeholders.
- Build national consensus on criteria and tracking approaches for hard-to-place kidneys and the recipients who accept these organs.
- Develop consensus recommendations to inform interprovincial organ sharing policies for hard-to-place kidneys.
- Explore how a new interprovincial program, supported by the Canadian Transplant Registry, could advance kidney optimization and align with Canadian Blood Services' existing interprovincial organ sharing programs.

Approach

To support the development of scientifically rigorous and patient-vetted best-practice recommendations, a multidisciplinary, pan-Canadian steering committee was established. Committee membership included nephrologists specializing in adult care, surgeons, a bioethicist, a machine learning expert, organ donation organization administrators and histocompatibility lab directors (Appendix A).

The steering committee met monthly throughout the process to provide oversight, guide evidence, review and shape the forum agenda. As part of the preparatory work, pre-forum webinars were held on Oct. 13 and Oct. 14, 2021, to provide participants with shared background information and to inform the breakout discussions held during the virtual forum later that month.

This approach was designed to ensure that forum discussions were grounded in current evidence, reflected a range of clinical and system perspectives and incorporated patient experience alongside clinical and operational considerations.

Pre-forum presentations

Topics for the pre-forum webinars were selected by the steering committee to support a shared understanding of key issues and inform subsequent forum discussions.

The Oct. 13 webinar focused on deceased donor acceptance by on-call clinicians in Canada. Presentations addressed donor acceptance behaviours, donor audit findings related to kidney function and quality, and provincial data on rates of donor decline.

The Oct. 14 webinar focused on recipient-related considerations, including patient perspectives on accepting hard-to-place kidneys, evidence on transplant outcomes for extended criteria donors, and outcomes among recipients who received kidneys declined by other transplant programs.

Disparities in Deceased Donor Kidney Offer Acceptance: A Survey of Canadian Transplant Nephrologists, General Surgeons and Urologists

Presenter: Rahul Mainra

A survey examining increasingly complex potential deceased kidney donor cases was developed by a member of the steering committee, with input from the full project steering committee. Individuals who are on call at kidney transplant programs were invited to participate. Participant names were provided by transplant program heads.

The survey was open from July 22 to Oct. 4, 2021. Of the 179 individuals invited, 81 (45.3%) accessed the survey, representing 19 transplant centres across seven provinces. Participants were presented with between eight and 32 donor case scenarios, depending on their responses. The scenarios varied across 10 general factors:

- donor age
- donor sex
- determination of death type
- trauma or cerebrovascular accident
- creatinine (admission, peak, current, urine albumin-to-creatinine ratio [UACR])
- dialysis
- comorbidities (hypertension, diabetes)
- urine output
- biopsy
- smoking

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Overall, acceptance rates varied substantially across transplant programs. The most conservative transplant centre declined 60 per cent of donor cases, while the most aggressive centre declined 25 per cent. Donor age and determination of death type were the factors most often cited as reasons for organ decline.

Note: For the publication associated with this presentation, see Vinson et al., 2023.

Manitoba Deceased Donor Declines 2018–2020: Potential for Expanding the Donor Pool

Presenter: Aaron Trachtenberg

Organ declines in Manitoba over a three-year period were analyzed following an adult donor audit, with a focus on donors declined due to kidney function and donor quality. This analysis was part of a quality improvement initiative aimed at expanding the deceased donor pool.

In Manitoba, the allocation schema in place at the time of the forum used the Kidney Donor Profile Index (KDPI) to allocate organs to certain recipients based on age. Donors with a KDPI greater than 85 were used only in specific circumstances.

If donors with a high KDPI (greater than 85) or acute kidney injury were utilized at a rate of 40 per cent for single kidney transplants, the province would see an estimated increase of about 50 additional transplants per 1,000 notifications. This change would represent a roughly 50 per cent increase over current rates. The number of actual transplants performed would likely increase by 25 per 1,000 notifications, or a 25 per cent increase from baseline.

Expanding the use of kidneys from these donors, **in appropriate circumstances**, represents a potentially significant increase in the number of transplants performed through the Transplant Manitoba Adult Kidney program.

Note: For the publication associated with this presentation, see Trachtenberg et al., 2024.

Organ Decline in Ontario: 2017–2020

Presenter: Darin Treleaven

In general, donors who are older (55.9 versus 46.8 years of age), have pre-existing conditions (hypertension, diabetes), and whose death is determined by circulatory criteria are more likely to have their kidneys declined for transplant compared with donors whose kidneys are accepted. One-half of these declined donors had a KDPI greater than 80.

Among donors with high creatinine levels at the time of organ offer, donors tended to be younger (52 versus 65.2 years of age) and more likely to be male (76% versus 58%). If kidneys

from both high-KDPI and high-creatinine donors were utilized, assuming a 50 per cent consent rate and a 28 per cent organ decline rate, more than 100 additional recipients would have received a transplant over the study period.

Qualitative Study on Patient Perspectives on Expanding Donor Access

Presenter: Holly Mansell

To understand patient perspectives on receiving transplants from donors with perceived lower kidney function, a qualitative study was undertaken. Wait-listed transplant candidates and recipients who had previously received a kidney transplant from donors described as “marginal” or “extended criteria” were interviewed. Sixteen interviews were conducted with participants from two provinces (Saskatchewan and Manitoba).

Interview responses were consistent across four themes:

- **Patient awareness and understanding:** Participants described their understanding of the transplant process, including the general risks and benefits of transplantation and those associated with receiving a kidney with lower function.
- **Desire for information:** Participants expressed a desire for clear, understandable information about the quality of organs offered for transplant and expected transplant outcomes.
- **Desire for freedom from dialysis:** Participants were generally older but described dialysis as a barrier to activities that contribute to quality of life.
- **Trust:** Participants expressed trust in their care teams and a desire for viable organ offers to be presented through shared decision-making.

Due to the small sample size and participant demographics, these findings may not apply in other provinces.

Note: For the publication associated with this presentation, see Rosaasen et al., 2022.

Systematic Reviews Examining the Use of Extended Criteria Renal Transplants

Presenter: Joanna Dionne

The steering committee used the grading of recommendations, assessment, development and evaluation (GRADE) approach. Actionable questions were developed to guide a literature review using the population, intervention, comparator, outcome (PICO) framework. Evidence addressing each question was prepared by a consultant, Joanna Dionne, and presented during the pre-forum webinar.

Note: For the publication associated with this presentation, see Dionne et al., 2025.

The Use of Expanded Criteria Donors, High KDRI and Various Kidneys Nobody Wants: The McGill Experience

Presenter: Jean Tchervenkov

The proportion of transplant candidates aged 65 to 74 has increased steadily since the early 2000s. In contrast, the average deceased donor age in Canada is 44 years, compared with 57 years in Europe.

The McGill program has experience using kidneys with higher KDPI values and kidneys declined by other transplant programs. Program data shows that kidneys with slow graft function following transplant have similar long-term outcomes compared with kidneys that demonstrate immediate function.

The overall death-censored graft survival rate at 10 years post-transplant is, on average, 84.9 per cent. Survival rates vary by KDPI category: 90.4 per cent for KDPI less than 64, 84.2 per cent for KDPI 65 to 84, and 75.6 per cent for KDPI greater than 85. These transplants occurred primarily in older recipients, with a median age at transplant of 58 years.

Forum overview

On Oct. 21 and 28, 2021, the virtual forum was held, engaging pan-Canadian representatives from ethics, legal and critical care, as well as organ donation and adult and pediatric transplant programs. Eighty-four registrants attended the forum (Appendix B).

Breakout discussion format

Breakout discussions were used to support focused dialogue on key issues related to the utilization of deceased donor kidneys and opportunities to improve transplant outcomes across

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Canada. Breakout group membership was selected to reflect a broad range of experience and perspectives across the kidney donation and transplantation process.

Each topic was assigned to a single breakout group to allow a wider range of issues to be explored over the course of the two-day forum. Following each breakout discussion, a designated group speaker presented a summary of the discussion to all forum participants.

The following 10 topics were discussed:

- definition of a medically complex donor
- required donor data for listing
- process to follow when a kidney is declined at the time of offer
- communication of risk and benefit to patients
- program principles
- relisting and other system supports following a failed transplant
- recipient eligibility
- allocation and ranking
- dual kidney transplantation
- transplant outcome measures

Plenary Presentation (Day 2): Predictive and Decision-Making Tools

Presenter: Héloïse Cardinal

On Day 2, Héloïse Cardinal presented on shared decision-making between patients and transplant teams, with a focus on how machine learning may support clinical decision-making.

Machine learning can support clinical teams in analyzing the many factors involved in deciding whether to accept or decline a kidney offer, particularly for organs that may be underutilized. One component of this work involves a qualitative assessment of perspectives from key opinion leaders, kidney transplant candidates and transplant recipients on the use of clinical decision-making tools.

A second component focuses on the use of machine learning to improve graft survival predictions by better identifying interactions between donor and recipient characteristics. The model also estimates the time to the next organ offer and the mean Kidney Donor Risk Index (KDRI) of the anticipated offer.

Note: For the publication associated with this presentation, see Jalbert et al., 2023.

Breakout discussion summaries and recommendations

The following section summarizes the breakout discussions and outlines the steering committee decisions and final forum recommendations related to the proposed program for underutilized kidneys.

Group 1: Identification of Deceased Donors at Risk of Underutilization

Key questions

- What phenotype defines this type of donor?
- What term could be used to label this type of donor?

Discussion

Participants agreed that age ranges, used in conjunction with other donor characteristics such as the KDPI, could help inform a framework to support consistency in decision-making. Suggested upper age limits were 80 years for donors following death determination by neurologic criteria (DNC) and for those who donated following medical assistance in dying (MAID). An upper age limit of 75 years was discussed for donors following death determination by circulatory criteria (DCC). The lower age limit for any interprovincial program would align with the maximum age currently used for deceased donation within provincial allocation systems.

Participants noted that further discussion is required on estimated glomerular filtration rate (eGFR) cutoffs in relation to acute kidney injury (AKI) in these donors. As a result, no eGFR cutoff was proposed.

Group members expressed concern that the KDPI has not been validated for the donor population in Canada. Participants felt that the KDPI alone is not predictive of transplant success and that reliance on this metric could contribute to the loss of potentially transplantable kidneys. From a surgical perspective, participants did not recommend size or body mass index (BMI) limitations for donors. These factors were viewed as more appropriately addressed during recipient matching at the time of the offer.

There was a lot of discussion on terminology to describe donors with kidney function concerns. Participants emphasized the importance of using neutral language, given the role terminology plays in framing discussions with patients. While “medically complex” was seen as clinically accurate, participants involved in the pre-forum qualitative work noted a preference for terminology that donor families and potential transplant candidates could more readily

understand. Participants also discussed whether a term applicable across organ types should be considered, to support potential future expansion of this work beyond kidney transplantation.

Steering committee decision

No limits will be placed on which donors may be entered into the proposed program. Instead, eligibility will focus on the underlying reason for kidney decline, specifically concerns related to kidney function.

Recommendations

1. Data required for transplant programs to calculate the KDPI should be collected; however, the KDPI should not be used as part of donor allocation.
2. Eligible donors for inclusion into the program are those that are declined by the ODO's provincial transplant programs for reasons related to potential graft longevity.
3. No upper donor age restrictions should be applied.
4. No specific label should be used to describe these donors. The focus should remain on the individual organ and the potential for expanded transplant opportunities for selected transplant candidates.

Group 2: Donor Data Required at the Time of Kidney Offer

Key question

- The following data elements were discussed:
 - date of birth
 - ethnicity and race
 - death declaration type
 - cause of death
 - exceptional distribution donor status and rationale
 - medical and social history (substance use, smoking history, cancer history, hypertension and duration, kidney disease and duration, diabetes and duration)
 - serology (CMV, EBV, hepatitis B core antibody, hepatitis B surface antigen, hepatitis C antibody)
 - ABO
 - HLA
 - creatinine ($\mu\text{mol/L}$)

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- urinalysis (protein)
 - height
 - weight
 - BMI
- Are these data fields sufficient for initial screening of a deceased donor for this program?

Discussion

Participants discussed which information should be available within the Canadian Transplant Registry at the time of offer and which elements could be accessed later through the donor chart. Participants felt that “ethnicity” is an outdated concept and that “race” is the more appropriate term. However, if race-based organ quality formulas are not being used, this information was not viewed as necessary for clinical decision-making.

In general, participants supported the inclusion of other data elements listed, with the addition of multiple creatinine values, including baseline and terminal measurements, as well as urine output. Participants also recommended that the reason for previous declines of an organ not be automatically provided to subsequent transplant programs.

Participants agreed that any imaging available at the time of offer should be shared. If additional imaging is requested by a transplant program and the offer is ultimately declined, that imaging should be made available to subsequent programs.

Steering committee decision

The steering committee agreed with the proposed data elements but decided that reasons for previous declines should be provided only when requested by a transplant program. This approach was intended to support transparency while reducing the potential for bias in decision-making at the time of offer.

Recommendations

1. Collect categories of ‘Race’ and ‘Indigenous History’ as per current guidelines. Do not use for allocation purposes.
2. Collect baseline and terminal creatinine values.
3. Collect urine output and vital sign data, and document pertinent medical/surgical history and infectious disease testing.
4. Only provide reasons for prior declines to other transplant programs when requested.
5. Any imaging available at the time of offer should be shared with subsequent programs if the offer is declined.

Group 3: Accountability Process

Key questions

- Reviewing the generic list currently used for donor medical decline reasons in the Canadian Transplant Registry (provided for review), to support transparency and detailed reporting, consider the following reasons:
 - abnormal test results
 - ABO-identical donor preferred
 - donor age
 - donor medical history
 - donor quality
 - donor size
 - donor social history
 - high medical risk
 - organ anatomical damage or defect
 - organ declined on visualization in the operating room
 - organ not as described
 - organ test results unacceptable
 - organ test results unavailable
 - positive serology
- To ensure every medically suitable organ is considered for transplant, transplant programs and the system need to be transparent and accountable for their processes. To support these principles, reasons for organ offer declines should be recorded. With which reasons do you agree? Are there others to add?
- A review of current Canadian program processes revealed that most programs do not require a multi-step review process for declined offers. What responsibility do we have to ensure organs are being utilized? Should programs require more than one clinician to review a deceased donor kidney offer before it is declined?
- What process would you recommend for local or national review of these declines?

Discussion

Participants noted that the current decline functionality within the Canadian Transplant Registry allows the selection of multiple decline reasons. This functionality makes it difficult to identify the primary reason an organ was declined. Participants supported the need for more specific and

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detailed reporting, similar to existing referral processes for donor identification. Clear definitions for decline reasons and national harmonization of the offer management processes were viewed as essential to support transparency and trend analysis.

Participants agreed that patient involvement is critical and that education about organ offers should occur early in the transplant assessment process. Participants also emphasized the importance of providing resources to on-call clinicians so that organ acceptance decisions are not made in isolation. The organ acceptance decision-making process was viewed as inherently multidisciplinary and should include histocompatibility laboratory personnel.

Participants agreed that each transplant program should establish a quality assurance process in which all organ offers and declines are reviewed regularly. To encourage changes in local organ acceptance practices, participants supported a two-person review process for kidney offers originating from the Canadian Transplant Registry. Under this approach, each kidney offer to a local recipient would be reviewed in detail by at least two clinicians, preferably a transplant nephrologist and a surgeon, before the offer is declined for a specific transplant candidate.

Participants also agreed that a minimum measure of kidney function should be identified to support national comparisons of performance. However, deliberations did not result in agreement on a specific measure or threshold. Participants noted that there is currently substantial variability in acceptance practices across Canada (Vinson, 2023). Establishing national benchmarks for offer acceptance was viewed as an important step toward greater consistency and standardization.

Steering committee decision

The steering committee agreed that the current list of decline reasons available in the Canadian Transplant Registry is too generic and should be structured using a hierarchical approach. Decline reasons should be grouped according to the stage of process at which the decline occurred (i.e., donor-related or recipient-related). Potential new decline reasons discussed included AKI, unacceptable risk of malignancy or infection, and multiple donor comorbidities.

The steering committee also agreed that a two-person decline process should be implemented for participation in the Canadian Transplant Registry and that local reviews of declined offers should occur weekly. Clinicians with experience in long-term kidney transplant outcomes should be included in these discussions. Canadian Blood Services should regularly report information on declined offers and, where applicable, outcomes for kidneys that were subsequently transplanted. Transplant program teams must be prepared to receive this feedback from Canadian Blood Services and incorporate it into ongoing practice.

The steering committee will use the published clinical practice guideline and related evidence to inform development of benchmarks for acceptable kidney function (Dionne et al., 2025).

Recommendations

The following recommendations are intended to guide the operation of a new interprovincial organ sharing program but may also inform practices at the local transplant program level.

1. Decline reasons must be recorded for every organ offer. Decline reasons recorded in the Canadian Transplant Registry should follow a hierarchical structure, with an overarching category and a more specific reason.
2. Any declined organ offer must follow, at minimum, a two-person decline process. These individuals should have medical and surgical expertise and experience with long-term transplant outcomes.
3. Canadian Blood Services will provide an annual report on organ offer declines and outcomes for any kidneys that are subsequently transplanted.

Group 4: Candidate Education — Communicating Risk and Benefit to Recipients

Key questions

- Potential transplant candidates should receive standardized information about receiving an organ from a deceased donor at risk of underutilization.
 - What should be included?
 - What is the best method to use to communicate this information (e.g., booklets, videos)?
 - When should this information be provided?

Discussion

Participants were provided with a list of information identified as important through qualitative interviews with transplant candidates and recipients (Rosaasen et al., 2022). Participants agreed that candidates should receive baseline education about post-transplant expectations, including differences between kidneys from standard donors and donors with reduced kidney function, as well as potential impacts on wait-list duration.

Participants agreed that this education should be provided while candidates are on the wait-list and should clearly describe differences in expected outcomes based on donor characteristics. Consistent language was viewed as essential, along with tailoring information to individual patient factors. Participants emphasized that patient perspectives on what constitutes a successful outcome should be incorporated into this approach.

The intent of this education is to help candidates understand the uncertainty associated with transplant outcomes and how that uncertainty relates to the opportunity to receive a transplant

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sooner. Participants noted that tracking patient outcomes will be critical to keeping educational materials current as the program evolves.

In addition to existing transplant education tools, participants identified infographics as a preferred method for communicating complex information. Education should be provided early in the waiting journey and reinforced over time.

Steering committee decision

The steering committee agreed that patient education materials should clearly explain how organs offered through this program differ from those traditionally considered standard. This includes explaining that donors may be older and that kidneys may have reduced function compared with historical donor profiles.

The committee agreed that transplant outcome data should be shared with patients and linked to common donor characteristics, to provide a benchmark for understanding expected outcomes. The goal of the proposed program is to better align graft survival with patient survival.

Education about this program should be provided only to transplant candidates whom their care teams identify as likely to benefit from this type of transplant, and should be introduced early in the transplant assessment process. Education materials should include a realistic comparison of expected patient outcomes with transplantation versus remaining on dialysis.

Recommendations

1. Patient education materials should include information about the range of organs likely to be offered and identify circumstances in which candidates may benefit more from transplantation than from continued dialysis.
2. These education materials should be provided only to transplant candidates whom their care teams identify as likely to benefit from this type of transplant.
3. As with existing interprovincial organ sharing programs supported by the Canadian Transplant Registry, consent will be required for candidates to be entered into this program.
4. Language used in patient education materials should be neutral and non-biased. Terms such as “extended criteria” or other language that implies reduced organ quality should be avoided.
5. The benefit of transplantation will be patient-specific and should be weighed heavily in shared decision-making.

Group 5: Program Principles Guiding Allocation of Underutilized Organs

Key question

- Certain principles guide optimal policy evolution for organ donation. Are each of the following principles addressed within the proposed program? Provide an example and, if not, explain why.
 - medical need — access to support health and life
 - utility — optimal use of a limited resource
 - fair access — equitable access to a limited resource
 - balance of competing principles
 - transparency
 - accountability
 - any medically suitable organ not transplanted is a loss for donors, recipients and families, and health-care systems

Discussion

Participants reviewed the principles used for the Highly Sensitized Patient and Kidney Paired Donation programs and compared them with the intended purpose of the proposed program for underutilized kidneys. Participants agreed that the principles guiding allocation should be applied consistently at both local and national levels.

Patients emphasized that any increased risk of early patient mortality associated with these transplants needs to be clearly communicated to patients participating in this program. Medical urgency, which is primarily applied to candidates with limited access to dialysis, is currently used at both local and interprovincial levels to prioritize allocation. Participants agreed that accommodating medical urgency would not be a foundational principle of the proposed program.

Utility, defined as the optimal use of a limited resource, was viewed as a critical principle. Participants noted that some transplant candidates may benefit more from receiving kidneys of this type than from remaining on a local transplant wait-list for longer periods.

Participants also discussed fair access and how fairness should be defined in the context of offering organs to a specific group of transplant candidates rather than the entire wait-list. Transparency in decision-making was viewed as essential, particularly with respect to expected patient outcomes and the role of waiting time in allocation decisions. Participants noted that

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dialysis waiting time may be less influential for this program than it is within existing provincial allocation systems.

Steering committee decision

The steering committee agreed with the recommendations from the breakout discussion. The committee emphasized the importance of full transparency about short-term morbidity and the increased risk of early patient mortality associated with these transplants (Wolfe et al., 1999).

During the plenary discussion, forum members agreed that the principle of utility, in this context, reflects the goal of transplanting patients sooner and reducing time on dialysis. Utility was viewed as particularly important at a population level, and the program is intended to support this objective. The overarching goal is to ensure that every medically suitable kidney is used nationally.

Fairness, in this context, was defined as allocation based on objective medical criteria and free from considerations such as ethnicity, income or other subjective factors. Allocation decisions should be guided by objective clinical criteria that are clearly articulated in policy. Participants reiterated that any medically suitable organ not transplanted is a loss for donors, recipients and families, and health-care systems.

Recommendations

1. The program must uphold the principle of transparency by providing clear information about expected short-term outcomes following transplantation with these organs.
2. The program must uphold the principle of utility by balancing immediate and long-term patient needs with the overall impact on the population of people with kidney failure.
3. The program must uphold the principle of fair access through eligibility and ranking criteria that are clearly defined and objectively based on medical considerations. (These criteria are detailed in the recommendations related to allocation.)

Group 6: Program Guarantees — Relisting and Other System Supports After Suboptimal Function (eGFR ≤ 20ml/min)

Key questions

- Do we need to have assurances or guarantees for candidates participating in this program?
- If yes, what should these be?

Discussion

Participants agreed that the purpose of this program is to improve access to transplantation, with the understanding that reduced graft longevity may be expected. Participants felt that an

assurance of relisting a candidate at the same priority held before transplantation would be reasonable in cases of primary non-function.

Participants also emphasized that candidates will need to consent to receiving these organs with a clear understanding of the expected transplant outcomes. Primary non-function will need to be clearly defined and standardized within the program to support consistent application of this approach.

Steering committee decision

The steering committee agreed that relisting would not be offered as a specific guarantee under this program, as relisting following graft failure is already standard practice within local transplant programs. However, interprovincial organ sharing policies must clearly describe transplant expectations associated with participation in the program and explicitly define primary non-function.

Recommendations

1. Interprovincial organ sharing policies must clearly define outcome expectations related to suboptimal function.
2. Within the program, suboptimal function will be defined as failure to achieve an eGFR greater than 20mL/min/1.73m² within the first 90 days post-transplant. If suboptimal function occurs, the recommendation to local transplant programs is that the patient be returned to the waitlist at the same priority held prior to transplant, as if the transplant had not occurred.

Group 7: Recipient Characteristics

Key question

- What are the characteristics of recipients who would benefit more from receiving a kidney at risk of discard than from remaining on dialysis?

Discussion

Participants agreed that older transplant candidates, generally those aged 65 to 70, are more likely to benefit from these types of organs. Participants noted the need to balance patient-acceptable outcomes with the potential costs and consequences of a failed transplant after a relatively short period, such as two to three years.

Participants emphasized that the recipient age should not be considered solely in chronological terms. Physiological age was viewed as equally important, and comorbidities should be taken into account when assessing suitability for this type of transplant.

Steering committee decision

The steering committee agreed that physiological age is an important consideration when determining access to this program and that, if used, it must be clearly defined and applied transparently within interprovincial organ sharing policies (Artz, 2016).

The steering committee also agreed that pre-emptive access for transplant candidates aligns with the goals of the proposed program and should be permitted. The expected benefit for participants is a reduction in waiting time for transplantation compared with remaining on the provincial wait-list for a standard kidney (Kadatz et al., 2023).

Recommendations

1. The definition of “pre-emptive” used by local transplant programs should be standardized in line with the current policy threshold for kidney interprovincial organ sharing (eGFR less than 15) (Canadian Blood Services, 2024).
2. All adult transplant candidates aged 19 and older can be eligible for entry into the program, provided they are listed for a kidney transplant with their local transplant program. However, consideration of the transplant’s reduced longevity must be imperative in the decision to include potential candidates.

Group 8: Allocation and Ranking

Key question

- What are the key indicators for the allocation algorithm used interprovincially for these kidneys?

Discussion

Participants agreed that recipient characteristics should be the main factors used in allocation and tie-breaking decisions. Geography was viewed as an important consideration, as limiting cold ischemic time is critical for these organs and for transplant outcomes.

Participants agreed that this program is not intended to serve medically urgent or highly sensitized candidates, as these groups are already addressed through other programs. The same principle applies to prior living kidney donors and pediatric candidates. Participants noted that candidates most likely to benefit from these organs tend to be older and have more comorbidities, and that transplantation earlier in the dialysis course may offer more benefit for this group. This approach differs from current local allocation practices.

Steering committee decision

The steering committee agreed that the proposed program should focus on older candidates with comorbidities who are less likely to receive a standard kidney. As a result, no priority would be applied for pediatric candidates, prior living kidney donors, medically urgent candidates, or candidates who are highly sensitized.

The committee also acknowledged that cold ischemic time is influenced by total travel time rather than geographic distance alone (Placona et al., 2021). Following focused deliberation, the committee agreed that allocation decisions should prioritize equity in relation to dialysis time rather than attempting to operationalize utility at the level of individual organs.

Recommendations

1. Because this proposed program is intended for a specific group of candidates, it should be implemented as a distinct program supported by the Canadian Transplant Registry. It should have its own eligibility criteria and matching and allocation processes, separate from the existing deceased donor kidney program.
2. Pediatric candidates (younger than 19 years of age) should not be eligible for the proposed program.
3. Allocation principles should attempt to maximize short term graft survival (2-5 years). The following factors can be ranked to achieve this goal (not listed in priority order):
 - Negative virtual crossmatch
 - Time spent on dialysis or wait-time eligibility for pre-emptive candidates
 - cPRA < 94.5%
 - Distance from ODO to limit cold ischemic time
 - Zero class II antigen mismatch

Group 9: Graft Function

Key questions

- Consider the following processes used to maximize outcomes:
 - cold perfusion pumps or machine perfusion preservation
 - standardized immunosuppressive regimens
 - dual kidney transplantation
 - regional allocation to mitigate cold ischemic time

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- What are the key indicators for the allocation algorithm used interprovincially for these kidneys?
- How can graft function be maximized?

Discussion

Participants discussed logistical challenges associated with shipping kidneys using cold perfusion pumps. Not all transplant centres have equal access to these devices, and there are currently no standardized parameters governing their use. Participants expressed concern that transplant programs might rely on pump readings to assess organ quality, despite uncertainty about how those readings should be interpreted.

In light of these concerns, participants supported the use of perfusion pumps where available but agreed that their use should not be mandatory.

Participants also discussed the potential advantages of standardized immunosuppressive regimens. However, they noted that many other donor- and recipient-specific factors influence immunosuppression decisions. Based on available evidence, participants agreed that there is currently insufficient data to support a single standardized regimen (Szumilas et al., 2023).

To help limit cold ischemic time, participants noted that transplant programs may need to determine which donor programs they will accept organs from. Transplant surgeries may also need to be prioritized for operating room access, and transplant candidates should be admitted as early as possible to allow for timely pre-operative assessment.

Participants discussed the use of dual kidney transplantation in cases involving low-functioning donor kidneys. Evidence supporting this approach was not viewed as compelling (Snanoudj et al., 2017), and it remains unclear whether similar outcomes could be achieved using a single kidney. Participants agreed that further research is needed to determine when dual kidney transplantation may be preferable to single kidney transplantation.

Steering committee decision

The steering committee agreed that the use of perfusion pumps use should be encouraged and, where possible, standardized (Tingle et al., 2019). To limit ischemic time, transplant surgeries should be prioritized regardless of whether a perfusion pump is used.

The committee agreed that dual kidney transplantation should not be a focus of the proposed program but may be considered as a final option to support the use of these organs. Further research is required before broader use can be recommended.

Recommendations

1. The use of kidney cold perfusion pumps is desirable but should not be required for the shipment of kidneys within this program.
2. Pump readings and printouts should not be used by transplant teams as a measure of organ quality.
3. Transplant programs should admit transplant candidates as early as possible for pre-operative assessments to help minimize cold ischemic time.
4. Standardized immunosuppression is not recommended due to insufficient supporting evidence. Programs may continue to follow centre-specific immunosuppression guidelines.
5. Initial allocation within this program should involve single kidneys. Dual kidney transplantation should be considered only as a final allocation option.

Group 10: Outcome Measures — Required Post-transplant Data

Key questions

- Consider the following outcome data collected for the interprovincial kidney sharing program:
 - cold ischemic time
 - dialysis in the first week, first month, first three months, six months and one year
 - serum creatinine measured just before transplant and at 24 hours, 48 hours, one month, three months, six months and one year post-transplant
 - eGFR at one month, three months, six months and one year post-transplant
 - rejection episodes, including number, date of first episode, biopsy-proven acute rejection within 90 days, biopsy date and results, and acute rejection therapy
 - graft function status, including date and cause of failure if the graft is not functioning
 - recipient survival status, including date and cause of death if applicable
 - whether the recipient is followed by another transplant program
 - whether the recipient is deemed lost to follow-up
- Which of these measures are critical to collect for these organs?
- Are there additional measures that should be collected, such as hospital length of stay or hospital readmission?
- What are the key indicators for the allocation algorithm used interprovincially for these kidneys?

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Discussion

Participants emphasized that outcome measures selected for this program should not duplicate the minimum data set developed by the Canadian Institute for Health Information. Participants noted that outcome measures specific to perfusion pump use may be valuable, although the specific data elements would require further discussion.

Participants agreed that measures identifying delayed graft function, such as the need for dialysis immediately following transplant, are critical for evaluating the success of the program. Graft failure and primary non-function will require clear definitions, and outcome analyses will require an appropriate comparator group. Participants suggested that this comparator group consist of patients who remain on the wait-list rather than those transplanted through the program.

Key data elements identified for this population included removal from the wait-list due to health decline, time spent on dialysis before transplant (measured in days), and death after transplant, with and without a functioning graft.

Participants emphasized the importance of patient-reported outcome measures, noting that the benefit of transplantation is patient-centred. Examples discussed included quality-adjusted life years (QALYs), hospital readmission rates and new hospital visits in the immediate and post-transplant period.

Participants also highlighted the importance of alignment across data sources to support feasible reporting. Common mechanisms for data collection, reporting and aggregation will be required. As mandatory outcome measures are expected to be addressed by the work undertaken by the Canadian Institute for Health Information, participants agreed that program recommendations should focus on program-specific outcome measures.

Steering committee decision

The steering committee agreed with the key points raised during the breakout discussion. Standardized definitions to support program evaluation will be required, and harmonization with other ongoing national initiatives, including those led by the Canadian Institute for Health Information, was viewed as essential.

In addition to outcome measures currently collected for the interprovincial Highly Sensitized Patient program, the steering committee agreed that patient-reported outcome measures, including QALYs, should be collected. Length of hospital stay following transplant was also identified as an important measure of patient morbidity for this program.

Recommendations

1. To monitor transplant outcomes of recipients within this program, the comparator group should consist of participants who have not been transplanted.
2. The impact of this program, particularly resource use, should be tracked and documented. Measures such as QALYs and EQ-5D scores that can be converted to utility measures should be included, where possible.
3. All attempts should be made to incorporate data linkage with the CanODT system and ensure that all relevant patient and donor related data are extracted specific to this program.

Conclusion

Over the course of the forum, participants identified key contributors to the underutilization of deceased donor kidneys in Canada, including variability in donor acceptance practices, limitations in current allocation processes, and the need for clearer communication with transplant candidates about risks and benefits.

Across breakout discussions, participants emphasized the importance of transparency, fairness, and utility in allocation decisions, as well as consistent data collection and outcome measurement to support system learning. Candidate education, participation in decision-making, and patient-centred outcomes, including reduced time on dialysis, were identified as central considerations.

The forum also highlighted the potential role of interprovincial collaboration in supporting more equitable access to transplantation for candidates who may benefit from kidneys at risk of underutilization. Consideration was given to an interprovincial program supported by organ sharing policies and the Canadian Transplant Registry. This approach was identified as one way to advance these objectives within the Canadian transplant system.

Together, the insights captured in this report provide a foundation to inform ongoing policy development, research and collaboration aimed at increasing transplant opportunities while respecting patient preferences and system-level priorities.

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Appendix A: Steering committee members

Rahul Mainra

Chair, Optimizing Utilization Steering Committee

Transplant Nephrologist and
Professor of Medicine
University of Saskatchewan
Saskatoon, Saskatchewan

Patricia Campbell

Transplant Nephrologist and
Medical Director
Edmonton Histocompatibility Lab
Edmonton, Alberta

Fatima Dharsee

Program Manager, Interprovincial Organ
Sharing
Canadian Blood Services
Ottawa, Ontario

Héloïse Cardinal

Transplant Nephrologist and
Associate Professor of Medicine
Université de Montréal
Montreal, Quebec

John Gill

Transplant Nephrologist and
Professor of Medicine
University of British Columbia
Vancouver, British Columbia

Aviva Goldberg

Pediatric Nephrologist and
Section Head, Pediatrics
Health Sciences Centre Winnipeg
Children's Hospital
Winnipeg, Manitoba

S. Joseph Kim

Transplant Nephrologist and
Associate Professor of Medicine
University of Toronto
Toronto, Ontario

Greg Knoll

Chair, Department of Medicine, University of
Ottawa
Head, Department of Medicine, The Ottawa
Hospital
Ottawa, Ontario

Steve Paraskevas

Transplant Surgeon and
Associate Professor of Surgery
McGill University
Montreal, Quebec

Clare Payne

Director, Transplant Services
Ontario Health Trillium Gift of Life Network
Toronto, Ontario

Aaron Trachtenberg

Nephrologist and Research Fellow, Clinical
Investigator Program
University of Manitoba
Winnipeg, Manitoba

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Jean Tchervenkov

General Surgeon and Professor of Surgery
McGill University
Montreal, Quebec

Darin Treleaven

Medical Director, Transplantation, Ontario
Health Trillium Gift of Life Network,
Toronto, Ontario
Medical Director, Transplantation, St.
Joseph's Healthcare, Hamilton, Ontario

Former Canadian Blood Services employees

Sean Delaney

Former Senior Adviser and Program Lead,
Interprovincial Organ Sharing
Canadian Blood Services
Edmonton, Alberta

Clay Gillrie

Former Associate Director, Interprovincial
Organ Sharing
Canadian Blood Services
Vancouver, British Columbia

Peter Nickerson

Former Medical Adviser, Organ and Tissue
Donation and Transplantation,
Canadian Blood Services
Dean and Vice-Provost, Health Sciences,
University of Manitoba
Winnipeg, Manitoba

Christina Parsons

Former Program Manager, Interprovincial
Organ Sharing
Canadian Blood Services
Edmonton, Alberta

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Appendix B: Participant list

Rahul Bansal	John Gill	Yigang Luo
Dana Baran	Jag Gill	Rahul Mainra
Mike Bentley	Simardeep Gill	Melanie Masse
Patricia Birk	Nessa Gogan	Philip McFarlane
Mohan Biyani	Aviva Goldberg	Caitlin Mills
Brian Blew	Sita Gourishankar	Mauricio Monroy- Cuadras
Tom Blydt- Hansen	Lakshman Gunaratnam	Ron Moore
Megan Brand	Abubaker Hassan	Istvan Mucsi
Noureddine Burka	Lorraine Hawrika	Peter Nickerson
Heidi Butler	Julie Ho	Michel Paquet
Patricia Campbell	Isabelle Houde	Steven Paraskevas
Marcelo Cantarovich	Ali Iqbal	Clare Payne
Lynne Cantin	Olwyn Johnston	Rinu Pazhekattu
Héloïse Cardinal	Sean Keenan	Paulina Pietrzak
Prosanto Chaudhury	Tammy Keough-Ryan	Ramesh Prasad
Sandra Cockfield	Paul Keown	Kathleen Ramos
Edward Cole	S. Joseph Kim	Christine Ribic
Suzon Collette	Greg Knoll	David Rush
Claude Daniel	Jehan Lalani	Shaifali Sandal
Fatima Dharsee	Ngan Lam	Ruth Sapir-Pichhadze
Joanna Dionne	Alain Landry	Cheeloong Saw
Marie-Chantal Fortin	Julie Lesage	Khaled Shamseddin
Michael Garrels	Max Levine	Ahmed Shoker
Rishi Ghosh	Robert Liwski	Abubaker Sidahmed

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Majid Sikosana

Aaron Trachtenberg

Chris Wiebe

Anton Skaro

Darin Treleaven

Kathy Yetzer

Breanne Spencer

Amanda Vinson

Seychelle Yohanna

Jean Tchervenkov

Eric Wagner

Jeff Zaltzman

LeeAnne Tibbles

Jinguo Wang

Anudari Zorigtbaater

Chia Wei Toeh

Matthew Weiss

Former Canadian Blood Services employees

Catherine Butler

Sean Delaney

Clay Gillrie

David Hartell

Lee James

Sarah Parfeniuk

Christina Parsons

Lindsay Wilson