



Science Over Stigma: Lessons and Future Direction of HIV-to-HIV Transplantation

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Abstract

Purpose of Review The HIV Organ Policy Equity (HOPE) Act permits transplantation from donors-with-HIV to recipients-with-HIV (HIV D +/R +). We assess HOPE implementation, summarizing progress and challenges at clinical, legislative, and community levels.

Recent Findings As of July 2021, there have been 300 kidney and 87 liver transplants within HOPE research studies in the USA. Early HIV D +/R + kidney transplant outcomes show excellent patient survival (100%) and graft survival (92%). The number of HOPE donors continues to grow annually but remains lower than projections. State-level policy restrictions are identified in 34 states; however, these do not seem to have impacted practice; 16 states have passed new legislation to facilitate HIV D +/R + transplantation. Stigma related to HIV and low donor registration rates pose additional barriers.

Summary Early outcomes of HOPE Act transplants are encouraging. Progress to reach full implementation and realize the full benefit of this innovation is ongoing.

Keywords HIV · HIV-positive donor · HIV Organ Policy Equity Act · HIV transplantation

Introduction

As of 2021, approximately 37.6 million individuals globally, and 1.2 million in the USA, are living with HIV infection [1, 2]. HIV is associated with increased risk of end-stage organ disease such as end-stage renal disease (ESRD) and end-stage liver disease (ESLD), both of which may require transplantation. Over the past two decades, solid organ transplantation (SOT) has become the treatment of choice for organ failure in persons living with HIV (PLWH), since mortality on

dialysis is higher, and pretransplant survival is shorter, for PLWH than for individuals without HIV [3–5]. As a result, the number of kidney and liver transplants performed in this population has steadily increased [6]. Still, PLWH in need of a kidney transplant experience an increased risk of waitlist mortality and decreased access to transplantation when compared to candidates without HIV [7•]. Kidney transplantation reduces this mortality by 79% [8]. Liver transplantation has also been shown to provide a survival benefit for those with decompensated liver disease and HIV [9]. Utilizing organs from PLWH might lessen this mortality further by increasing access to transplantation.

The practice of kidney transplantation using donors from PLWH was first pioneered in South Africa with excellent early outcomes [10]. This experience, as well as major advances in HIV medicine and transplantation, inspired the HIV Organ Policy Equity (HOPE) Act. The HOPE Act was signed into law in 2013, reversing the decades-long federal ban on the use of organs from donors with HIV, and calling for research criteria to study transplantation from donors with HIV to recipients with HIV (HIV D +/R +). This milestone represented the culmination of physicians', national transplant and AIDS advocacy

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groups’, US policymakers’, and healthcare officials’ joint efforts to improve access to transplants for vulnerable populations, expand the national donor pool, and address the organ shortage. Thereafter, three actions were taken to fulfill HOPE Act requirements—(1) in June 2015, the Department of Health and Human Services (HHS) revised the federal ban on recovery of organs from HIV D+ to allow transplantation within research protocols [11], (2) in November 2015, the Organ Procurement and Transplantation Network (OPTN) revised policies to permit the recovery of organs from donors with HIV pursuant to the criteria developed by the Secretary, and (3) in November 2015, the Secretary published research criteria relating to HIV D+ /R+ transplantation [12].

In this review, we discuss current implementation of the HOPE Act, summarize progress to date and remaining barriers including state-level regulations and community perceptions, and offer recommendations for the future.

Clinical Progress in HOPE Implementation

As of November 2017, 22 transplant centers in 15 states (10 of the 11 UNOS regions) had been approved to perform HIV-to-HIV transplants [13, 14]. Region 6, which comprises six states in the Pacific Northwest, was the only UNOS region without any HOPE-approved transplant centers [14, 15]. As of July 2021, 35 transplant centers in 21 states had been approved to perform HIV-to-HIV transplants; 19 of these centers are clustered in the eastern United States, and Region 6 still does not have any HOPE-approved transplant centers (Fig. 1) [16]. Thirty-three of these transplant centers have partnered to form the HOPE in Action Multicenter consortium, a collaborative performing multicenter studies (NCT02602262, NCT03500315, NCT03734393) to study outcomes of HOPE Act transplants.

There has also been increased engagement of Organ Procurement Organizations (OPOs) to evaluate HOPE donors. In 2017, only 16 out of 58 OPOs had evaluated a HOPE



Fig. 1 2021 HOPE implementation

donor [14]. As of July 2021, 46 of 58 OPOs have evaluated HOPE donors. Together, efforts of transplant centers and OPOs have led to a total of 300 kidney and 87 liver transplants within the HOPE in Action studies as of July 2021. The breakdown of transplants by organ (liver, kidney, simultaneous liver-kidney) and donor type (positive, false-positive, negative) are shown in Table 1. As of July 2021, there have been 144 true positive or false positive HOPE donors. Only kidney and liver transplants have been performed to date, as of October 2018. Heart and lung transplants are also approved [17] and anticipated in the future.

Clinical Risks Affecting Implementation of the HOPE Act

Several biologic issues specific to transplant recipients with HIV have been raised with respect to HIV D+/R+ transplantation. First, HIV superinfection, which occurs when a PWLH is infected with a second, distinct strain of HIV, has been considered a primary theoretical risk of HIV-to-HIV transplantation [18]. The concern has been that if a donor is infected with drug-resistant HIV, this could lead to HIV breakthrough in the transplant recipient if their antiretroviral therapy (ART) is not active against the donor's HIV strain [19]. Interestingly, a 2018 survey, designed to assess knowledge and attitudes surrounding HIV-to-HIV transplantation at US transplant centers, revealed that a majority (72.5%) of respondents perceived the risk of HIV superinfection to be clinically manageable [7•].

Table 1 General Overview of HOPE Implementation to Date

	March 2016–July 2021
HOPE approved transplant centers	35
OPOS that have evaluated HOPE donors	46
HOPE donors	144
Transplants within HOPE studies	<i>Kidney only</i> , 286 True positive, 128 False positive, 63 Negative, 95 <i>Liver only</i> , 73 True positive, 39 False positive, 13 Negative, 21 <i>Simultaneous Liver Kidney (SLK)*</i> , 14 True positive, 7 False positive, 3 Negative, 4

*Each SLK is counted as 2 organ transplants

Second, there have been concerns that the risk of organ rejection could be increased with use of an organ from a donor with HIV. Compared to recipients without HIV, several studies have found higher rates of organ rejection than expected in both kidney [20, 21] and liver transplantation [22, 23].

Finally, another theoretical risk of HIV-to-HIV kidney transplantation that has been raised is the possibility of HIV-related organ disease in the allograft. In a study by Canaud et al., which included 19 HIV D−/R+ kidney transplants, HIV infection of podocytes was observed in 5 recipients despite the fact that plasma HIV RNA was undetectable. This small group of patients experienced nephrotic-range proteinuria, progressive focal segmental glomerulosclerosis, and subsequent renal dysfunction, raising caution [24]. Some surmised that this phenomenon might occur particularly if kidneys from donors with HIV were utilized. Similarly, since HIV has been identified as a risk factor for non-alcoholic fatty liver disease and non-alcoholic steatohepatitis [25], concerns about higher rates of fibrosis or steatosis in liver allografts from donors with HIV has also been raised as a concern.

First Outcomes of HIV D+/R+ Kidney Transplantation

In the USA, the first prospective multicenter pilot study of HIV-positive deceased donor to HIV-positive recipient kidney transplantation was recently published. Conducted between March 2016 and July 2019, this pilot study including 75 kidney transplant recipients with HIV, comparing outcomes between HIV D+/R+ and HIV D−/R+. This study demonstrated that overall transplant and HIV outcomes were excellent [26•]. There were no deaths or differences in 1-year graft survival (91% D+ vs. 92% D−), 1-year mean estimated glomerular filtration rate (63 mL/min D+ vs. 57 mL/min D−), HIV breakthrough (4% D+ vs. 6% D−), infectious hospitalizations (28% vs. 26%), or opportunistic infections [26•].

With regard to HIV superinfection, HIV breakthrough was quite rare. In a related study from the HOPE in Action group, virologists performed in depth phylogenetic analyses of donor and recipient virus and found no evidence of HIV superinfection in recipients [27]. Similarly, in a long-term study of HIV D+/R+ kidney transplant recipients in South Africa, superinfection was not identified [28]. These results suggest that loss of HIV suppression, as a result of donor-derived HIV superinfection, is not a major clinical concern in carefully monitored recipients with HIV on ART.

Also reassuring, in this first HOPE in Action HIV D+/R+ kidney transplantation study, there was no evidence of HIV-related kidney disease in the allograft, as had been

observed in the Canaud study. Furthermore, HIV-related kidney disease was not reported in earlier studies of HIV D−/R+ transplantation in the USA [20] or in South African studies of HIV D+/R+ transplantation [29]. Long-term graft function will need to be monitored within the HOPE in Action study to further assess this risk.

Rejection may be a remaining challenge for HIV D+/R+ kidney transplantation. In the HOPE in Action pilot, 1-year rejection rates were higher for D+ recipients than for D− recipient (50% vs. 29%) [26•]. Overall, the proportion of recipients with rejection was lower (21%) in those who received antithymocyte globulin (ATG) for induction [26•]. This observation aligns with other studies of HIV D−/R+ kidney transplantation, which have suggested that lymphocyte depleting regimens may be protective in this population [30, 31].

The published experience of HIV D+/R+ liver transplantation remains small and includes 3 successful international case reports with limited follow-up [32–34]. More data are needed and published studies from the HOPE in Action Multicenter Consortium are anticipated in the near future.

The coronavirus disease 2019 (COVID-19) outbreak posed a new threat to transplant recipients with HIV. The Centers for Disease Control (CDC) has classified both SOT recipients and PLWH as high-risk populations, more likely to develop severe case of COVID-19 [35, 36••]. The first report of COVID-19 in the HOPE in Action Consortium noted a high mortality in kidney and liver transplant recipients with HIV [36••]. Between March 20, 2020, and September 25, 2020, there were 11 cases of COVID-19 among the 291 kidney and liver transplant recipients within the HOPE in Action Multicenter Consortium [36••]. Ninety-one percent of these cases resulted in hospitalization and 36% resulted in death [36••]. Larger studies in this population are needed to determine whether this increased risk holds up over time.

There remains further ground to cover to realize the projected potential of HOPE implementation. Though there have been 144 HOPE donors to date, prior studies from Boyarksy and Richterman projected up to 300–500 potential HOPE donors each year [37, 38]. In the first 2 years of HOPE implementation, organs were recovered from only 56 HOPE donors [39]. In the next section, we review the remaining challenges, specifically the nascency of HIV-to-HIV transplantation, legal barriers, and community and societal perceptions, and provide suggestions for moving forward.

Current Challenges

Nascency of HIV-to-HIV Transplantation

The field of transplantation is constantly evolving with new technology, procedures, and regulatory changes.

However, the newest scientific advancements and clinical innovations are often slow to gain acceptance and disseminate. This process has been described as the diffusion of innovation theory and can apply to new health care practices [40]. In the case of HIV D+/R+ transplantation, we are likely still in the early adoption phase. As more HIV D+/R+ transplants are performed and reported in the medical literature and public arena over time, we anticipate to see further expansion of this transplant innovation to a larger majority.

Legal Barriers to HOPE Act Implementation

The passage of the HOPE Act represented a long-overdue movement to align outdated HIV law and policy with scientific evidence and advancements in ART that substantially improved the life expectancy of PLWH. However, even after changes to federal policy, certain state-level regulations remain that could potentially restrict HIV-to-HIV transplantation [13]. Each state's organ and tissue donation laws for PLWH (Table 2) fall into one of the following categories—(1) laws that allow the use of organs and tissue from PLWH through an explicit HOPE Act exception, (2) laws that allow the use of organs and tissue from PLWH for transplant and/or research only under certain circumstances, (3) laws that prohibit organ donation from PLWH in all circumstances, and (4) laws that are silent regarding organ and tissue donation from PLWH.

Five states allow the use of organ and tissue donations from PLWH for transplant and research through an explicit HOPE Act exception and eleven states allow the use of organ and tissue donations from PLWH, under certain circumstances (Table 2). These eleven states contain laws that generally prohibit PLWH from donating organs and tissue for transplantation or research but for the following exceptions—(1) a research and informed consent exception, (2) a research and informed consent exception provided the transplant is necessary to save a life, (3) a research and informed consent provided the organ or tissue's HIV infected status is disclosed on the consent form, (4) an exception that allows an organ to be transplanted without the donor first being tested for HIV (because of exigent circumstances) provided the recipient gives informed consent, (5) a research exception only, and (6) an informed consent exception only.

These research and consent exceptions are often ambiguous. For example, in states where a research exception applies, the relevant terms (i.e. “medical research” or “research purposes”) are rarely defined. Other states, such as Florida and Kentucky, apply an exception where the transplant “is necessary to save a life,” but this is not defined. However, 6 of these 11 states have been participating in HOPE Act studies, indicating that in practice this has not been an issue.

Table 2 State policy table—this table offers a further breakdown of the relevant state laws affecting organ and tissue donation and transplantation among PLWH. [Note: states with pending legislation are bolded]

State law is silent on the use of organs/tissue from PLWH for transplant and research*	State law prohibits the use of organ/tissue from PLWH for transplant in all circumstances	State law allows the use of organ/tissue from PLWH for transplant and research through an explicit HOPE Act exception	State law allows the use of organ/tissue from PLWH for transplant and/or research only under certain circumstances	Pending legislation
1. Alabama [†]	1. Idaho	1. California	1. Florida ^{§§}	1. GA S.B. 164 was introduced March 2021 to “provide for the modernization of HIV related laws to align with science to ensure that laws and policies support current understanding of best public health practices for preventing and treating HIV.” ^{††}
2. Alaska	2. Kansas	2. Delaware	2. Georgia ^{**}	2. MI H.B. 4521 , introduced March 2021, would amend Mich. Comp. Laws, Ann. § 333.9123 to permit organ donation and transplantation from PLWH with the recipient’s informed consent, absent exigent circumstances
3. Arizona	3. South Carolina	3. Illinois	3. Kentucky [§]	
4. Arkansas [†]		4. Oklahoma	4. Michigan ^{††}	
5. Colorado [†]		5. Virginia	5. Minnesota ^{##}	
6. Connecticut [†]			6. Mississippi ^{§§}	
7. Hawaii			7. Missouri	
8. Indiana [†]			8. North Carolina ^{***}	
9. Iowa [†]			9. Ohio ^{†††}	
10. Louisiana [†]			10. South Dakota ^{###}	
11. Maine			11. Tennessee	
12. Maryland [†]				
13. Massachusetts [†]				
14. Montana				
15. Nebraska				
16. Nevada				
17. New Hampshire				
18. New Jersey [†]				
19. New Mexico				
20. New York [†]				
21. North Dakota				
22. Oregon				
23. Pennsylvania [†]				
24. Rhode Island				
25. Texas [†]				
26. Utah				
27. Vermont				
28. Washington				
29. West Virginia				
30. Wisconsin				
31. Wyoming				

*Because, in these states, the donation and transplantation of organs from PLWH is not expressly prohibited, the sanctioning of HOPE Act participation may be reasonably inferred where indicated

[†]It may be reasonably inferred that donation from PLWH is allowed based on the enrollment of HOPE Approved Transplant Centers

^{††}There is some indication that Iowa legislators’ silence constitutes quiet acceptance of organ/tissue transplants from PLWH, as the legislature explicitly repealed a former statute criminalizing organ/tissue donation from PLWH

[§]State law generally prohibits organ and tissue donations from PLWH but includes (1) a research exception and (2) an informed consent exception where the transplant is necessary to save a life

^{§§}State law generally prohibits organ and tissue donations from PLWH but includes a research exception

^{†††}State law generally requires that all organs and tissue be tested for HIV prior to transplant and prohibits the use of HIV infected organs and tissue for transplant but includes an exception that allows an organ to be transplanted without first being tested for HIV (due to time constraints and exigent circumstances) provided the recipient’s informed consent has been obtained

^{##}State law generally prohibits organ and tissue donations from PLWH but includes (1) a research exception and (2) an informed consent exception provided the organ or tissue’s HIV infected status is disclosed on the consent form

^{###}State law generally prohibits organ and tissue donations from PLWH, but includes an informed consent exception

^{***}State law generally prohibits organ and tissue donation from PLWH but includes (1) a research exception and (2) an informed consent exception

^{††††}State law generally prohibits organ and tissue donation from PLWH, but provides an exception for emergencies, provided the recipient’s informed consent is obtained

^{###}State law generally prohibits organ and tissue donation from PLWH, however, there is an indirect exception if the recipient consents, as it is an affirmative defense if the recipient knew of the donor’s HIV status, and that infection could result from exposure, but consented anyway

Another remaining question is how the legal status of transplantation from donors with HIV would change if and when HIV D+/R+ transplantation moves outside of research protocols into clinical practice. The HOPE Act contains a mandate that requires the HHS to review outcomes to determine whether HIV D+/R+ transplants may continue, within or outside of research [12]. This change, if it occurs, could theoretically affect states such as Georgia and Missouri that only allow HIV D+/R+ under research exception only.

Only three states, Idaho [41], Kansas [42], and South Carolina [43] explicitly prohibit organ and tissue donations from PLWH under all circumstances (Table 2). In these states, it is a felony for PLWH who know their HIV status to donate organs for transplantation. Despite these laws, a case search of the legal databases WestLaw, LexisNexis, and HeinOnline yielded no cases to date in which PLWH were prosecuted for donating organs for transplantation [13]. Furthermore, with these statutes, it is unclear which parties would be liable for an illegal HIV D+/R+ transplant, since there is not specific reference to transplant professionals, donors, or decedents. As such, it seems unlikely that these prohibitions would be used to prosecute in the future.

The remaining 31 states (Table 2) are silent and do not explicitly address the possibility that organs and tissues from PLWH can be used for transplantation. Thus, members of the PLWH community, transplant physicians, transplant centers, and OPOs are left to determine how to move forward with research in these states. Of note, however, is the fact that there seems to be a high level of HOPE approved transplant center and OPO participation in these states. Twelve of the thirty-one silent states have a HOPE approved transplant center(s). Additionally, in a 2018 survey of 58 OPOs, all

55 responding OPOs reported support for the HOPE Act and research related to HIV D+/R+ transplantation [44]. In our opinion, the high level of OPO and transplant center participation in these states lead us to conclude that the permissibility of HOPE Act participation may be reasonably inferred (Table 3).

Social Barriers Affecting Implementation of the HOPE Act

Stigma, Attitudes, and Beliefs

HIV-related stigma has existed since 1980s, when the epidemic was officially reported in the USA and been documented extensively since. In 1981, the *New York Times* published an article entitled “Rare Cancer Seen in 41 Homosexuals” and at this point, the term “gay cancer” entered the US vernacular [45]. Several years later, in 1988, Congress amended the National Organ Transplant Act (NOTA), criminalizing the use of organs from donors “infected with the etiologic agent for AIDS” [46]. Between 1987 and 1997, only 32 kidney transplants were performed among PLWH in the USA with low rates of patient and graft survival [47]. Additionally, a 1997 survey of 248 renal transplant centers in the USA revealed that a majority of the 148 responding providers would not refer PLWH for kidney transplantation [48]. In 2003, a survey of transplant surgeons demonstrated that, even with effective ART, still only 33% supported SOT among PLWH [49].

Although SOT is now considered the standard of care for PLWH and ESRD, several recent studies have shown that

Table 3 Table of HOPE Act approved transplant centers in states where law is silent

States where the law is silent on the use of organs/tissue from PLWH for transplant and research	Permissibility of HOPE Act participation may be reasonably inferred from the enrollment of HOPE Act approved transplant center(s)
Alabama	University of Alabama Hospital
Arkansas	University of Arkansas Medical Sciences Hospital
Colorado	University of Colorado Hospital/Health Science
Connecticut	Yale New Haven Hospital
Indiana	Indiana University Health
Louisiana	Ochsner Foundation Hospital
Maryland	(1) Johns Hopkins Hospital and (2) University of Maryland Medical System
Massachusetts	Massachusetts General Hospital
New Jersey	Saint Barnabas Medical Center
New York	(1) Montefiore Medical Center, (2) Mount Sinai Medical Center, (3) New York-Presbyterian/Columbia, (4) New York-Presbyterian/Weill Cornell and (5) NYU Medical Center
Pennsylvania	(1) University of Pittsburgh Medical Center and (2) The Hospital of the University of Pennsylvania
Texas	(1) Methodist Dallas Medical Center and (2) UT Southwestern Medical Center/William P. Clements Jr. University Hospital

PLWH are less likely to be successfully referred and listed for kidney transplant with psychosocial factors and systemic barriers likely playing a role [50, 51].

Deceased donor evaluation may also be impaired by stigma and community perceptions. In a study investigating HOPE Act barriers experienced by OPOs, 20 OPO staff members participated in in-depth interviews [52••]. The interviews revealed high levels of knowledge about the HOPE Act, with many respondents having evaluated referrals of HIV-positive donors and approached families for authorization [52••]. However, several OPOs were not evaluating known HIV-positive cases, and although HIV-positive status was not an official rule-out, some OPO staff members reported looking for ways to rule out HIV-positive donors [52••]. Fear of infection was reported as a major barrier, and some interviewees described stigmatizing beliefs about HIV in interactions with OPO and hospital staff, such as assuming HIV was a fatal disease or that PLWH were more likely to be homeless or have disrupted families [52••].

Despite modern advances in HIV treatment and management and continued global action to reduce HIV-related stigma, HIV-related stigma persists today, even in countries that have superior HIV management and prevention programs as well as an outspoken and dedicated activist community [46]. In a recent interview study of recipient experiences with HIV D +/R + transplantation, participants reported concerns about stigma both within the health-care system and in society at large [53]. Some participants believed that transplant candidates living with HIV were treated differently than transplant candidates not living with HIV, and others were concerned about the increased risk of HIV status disclosure during the transplant process [53]. Thus, stigmatizing attitudes and beliefs surrounding PLWH and HIV D +/R + transplantation could restrict HOPE Act implementation by impacting PLWH's willingness to donate organs, PLWH's willingness to accept organs from other PLWH, provider's willingness to refer PLWH for transplant, etc. Ultimately, one of the greatest barriers to using donated organs from PLWH may be societal [54]. Despite this, the interviews with recipients of HIV D +/R + transplants also found that some participants believed that HIV D +/R + transplantation could help combat stigma against PLWH, particularly by allowing PLWH to register as organ donors [53]. As HIV D +/R + transplantation expands, great care should be paid to patient's concerns regarding privacy and stigma, while recognizing that HIV D +/R + transplantation may be an opportunity to reverse social stigma against PLWH.

Educational Barriers

Successful implementation of HIV D +/R + transplantation under the HOPE Act requires awareness and support

from OPOs, transplant centers, and the PLWH community. Renewed educational efforts are necessary to better inform OPOs, transplant centers, and members of the PLWH community of the legality of HIV D +/R + transplantation under the HOPE Act, the HOPE Safeguards and Research Criteria, and the outcomes of HIV D +/R + transplants.

The first survey of PLWH conducted in the USA following the HOPE Act showed a high willingness to donate (79.8%) but a lack of knowledge regarding the HOPE Act (24.6%) among the PLWH community (79.8%) [52••, 55]. Rasmussen et al.'s 2018 survey of 104 transplant center surgeons, physicians, nurses, pharmacists, and administrators demonstrated that 21.4% of transplant center staff were unaware of the research protocols (pursuant to HHS criteria) required to perform HIV-to-HIV transplantation under the HOPE Act [7•]. 56.2% of respondent transplant center staff reported no plans to perform HIV D +/R + transplants. Unsurprisingly, centers without plans to implement HIV D +/R + protocols were more likely to believe that PLWH would be unlikely to accept HIV + donor organs than centers with HIV D +/R + in place [7•].

Both of these studies underscore the need for community-level education to ensure that PLWH know that they may legally donate an organ and that the registration process is the same. Addressing these and any other educational barriers that may arise can help reduce HIV-related stigma, improve public perception and attitudes surrounding HIV-to-HIV transplantation, and increase HOPE Act support and participation.

Social Progress

A 2018 survey of 114 US transplant centers regarding planned practice of HIV D +/R + transplantation showed promising results. Fifty transplant centers (43.8%) reported that their centers were planning to perform HIV D +/R + transplants [7•]. Also, reassuring was the finding that of respondents, 104 (91.2%) were aware that HIV D +/R + was legal. Of the centers planning HOPE protocols, overall knowledge of HIV D +/R + transplants reported in peer-reviewed publications was high. Still, though many of the transplant center programs developing HOPE protocols reported plans to perform HIV D +/R + kidney (98.0%) and liver (68.0%) transplants, few centers reported plans to perform pancreas and heart transplants.

Still, other recent studies indicate high willingness among PLWH to accept HIV + organs [55]. One survey found that respondents from transplant centers that had already performed a HOPE transplant were more willing to accept HIV + deceased donor organs [55], suggesting that PLWH's willingness to accept HIV + organs will likely increase as more HIV D +/R + transplants are performed.

Recommendations for the Future

Below are several recommendations to ensure successful and complete HOPE Act implementation (Box 1).

Box 1. Future recommendations to continue expanding the implementation of the HOPE Act on a national level

Elicit guidance from state attorneys general (in states that are “silent” on the use of organs/tissues from PLWH for transplantation and research) to allow HIV D +/R + transplantation

In states that prohibit the use of organs/tissues from PLWH for transplantation and research in all circumstances, strong advocacy efforts should be made to reverse such bans

Make HOPE educational materials more easily accessible and publicly available (i.e. outpatient HIV clinics, transplant centers)

Integrate donor registration cards in all outpatient HIV clinics

Educate national organ donation advocacy groups and national HIV advocacy groups (i.e. Center for HIV Law and Policy) on the HOPE Act and ways to improve community engagement

Provide OPOS, the OPTN, and other industry groups with HOPE training

Obtain Waivers by State Attorneys General and Increase Advocacy Efforts

As described above, the vast majority of state legislatures remain silent on the use of organs and tissue from PLWH for transplantation. In these states, and possibly even in states that prohibit organ and tissue donation from PLWH in all circumstances without exception, it would be beneficial to elicit guidance from state attorneys general to endorse the use of organ and tissue donation within the context of HOPE Act research and address any foreseeable legal barriers to full, national HOPE implementation.

To elicit guidance from attorneys general, a letter should be drafted: (1) explaining the changed federal status of the law regarding HIV-infected organ and tissue donation (i.e. the HOPE Act); (2) describing the state legislature’s failure to update state law to reflect the federal sanctioning of organ and tissue donation from PLWH within HOPE Act clinical research trials; (3) reviewing the current science surrounding HIV, outcomes of HIV-to-HIV-transplantation, and potential opportunities to increase the donor pool through HIV-to-HIV transplantation; and (4) requesting the state attorney general’s interpretation of state law, particularly whether state law allows organ and tissue donation from PLWH within a HOPE Act context. Ideally, the state attorney general would respond with a clear interpretation of state law and/or guidance about whether the state legislature’s silence is, in effect, permission to proceed with HOPE Act transplants.

In the three remaining states that completely prohibit the use of organs from donors with HIV, increased advocacy efforts should be implemented to reverse such bans.

Increase Availability and Accessibility of HOPE Educational Materials and Training Tools

Increasing the availability and accessibility of HOPE education materials would be extremely beneficial on the community-, OPO-, transplant center-, and advocacy group-levels. Targeted education efforts should ensure that members of the PLWH community are aware of the HOPE Act and how to register as a donor. Likewise, OPOs, transplant centers, and advocacy groups should be educated regarding HOPE protocols and should be trained and equipped with the skills necessary to work with vulnerable, stigmatized populations. OPOs especially play an essential role in realizing and communicating the full potential of the HOPE Act, as they are responsible for evaluating deceased donor referrals, making organ offers to transplant centers, and recovering organs [56].

Integrate Donor Registration Cards in all Outpatient HIV Clinics

A cross-sectional survey of 115 PLWH at a Johns Hopkins clinic revealed that while 80% were willing to be organ donors, only 22% were registered as such [57]. In 2018, Bhamidipati et al. observed a 34% increase in organ donor registration rates during a three-month period when donor registration cards were dispensed at outpatient HIV clinics [58]. Implementing this simple practice is one effective way of increasing HOPE Act awareness and donor registration rates among PLWH, while bridging existing knowledge gaps.

Conclusion

The passage of the HOPE Act marked an important step toward increasing the donor pool and increasing PLWH’s access to transplant. Though barriers remain, and progress is gradual, the field of HIV D +/R + transplantation is continuing to grow and evolve. Clinical and scientific data from the ongoing HOPE studies will continue to inform future efforts to ensure successful and complete HOPE Act implementation.

Abbreviations Anti-IL2R: Interleukin-2 receptor blocker; ART: Anti-retroviral therapy; ATG: Anti-thymocyte globulin; CKD: Chronic kidney disease; COVID-19: Coronavirus disease 2019; DOI: Diffusion of innovation; ESLD: End stage liver disease; ESOD: End stage organ disease; ESRD: End stage renal disease; HHS: Department of Health and Human Services; HIV +: HIV-infected; HIV D +/R +: HIV-positive donor to HIV-positive recipient; HIV D –/R +: HIV-negative donor to HIV-positive recipient; HOPE Act: HIV Organ Policy Equity

Act; NOTA: National Organ Transplant Act; OPO: Organ procurement organization; OPTN: Organ Procurement and Transplantation Network; PLWH: Persons living with HIV; SOT: Solid organ transplantation; SRTR: Scientific Registry of Transplant Recipients

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- Of importance
- Of major importance

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