WTC 2025
World Transplant Congress
San Francisco, USA | August 2-6

Beyond the Horizon: Pioneering Thoracic and Living Donor Transplants for HIV+ Individuals

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AST AMERICAN SOCIETY OF TRANSPLANTATION | ASTS American Society of Transplant Surgeons | TTS The Transplantation Society

Disclosures

I have financial relationship(s) with:

Grant support, Merck

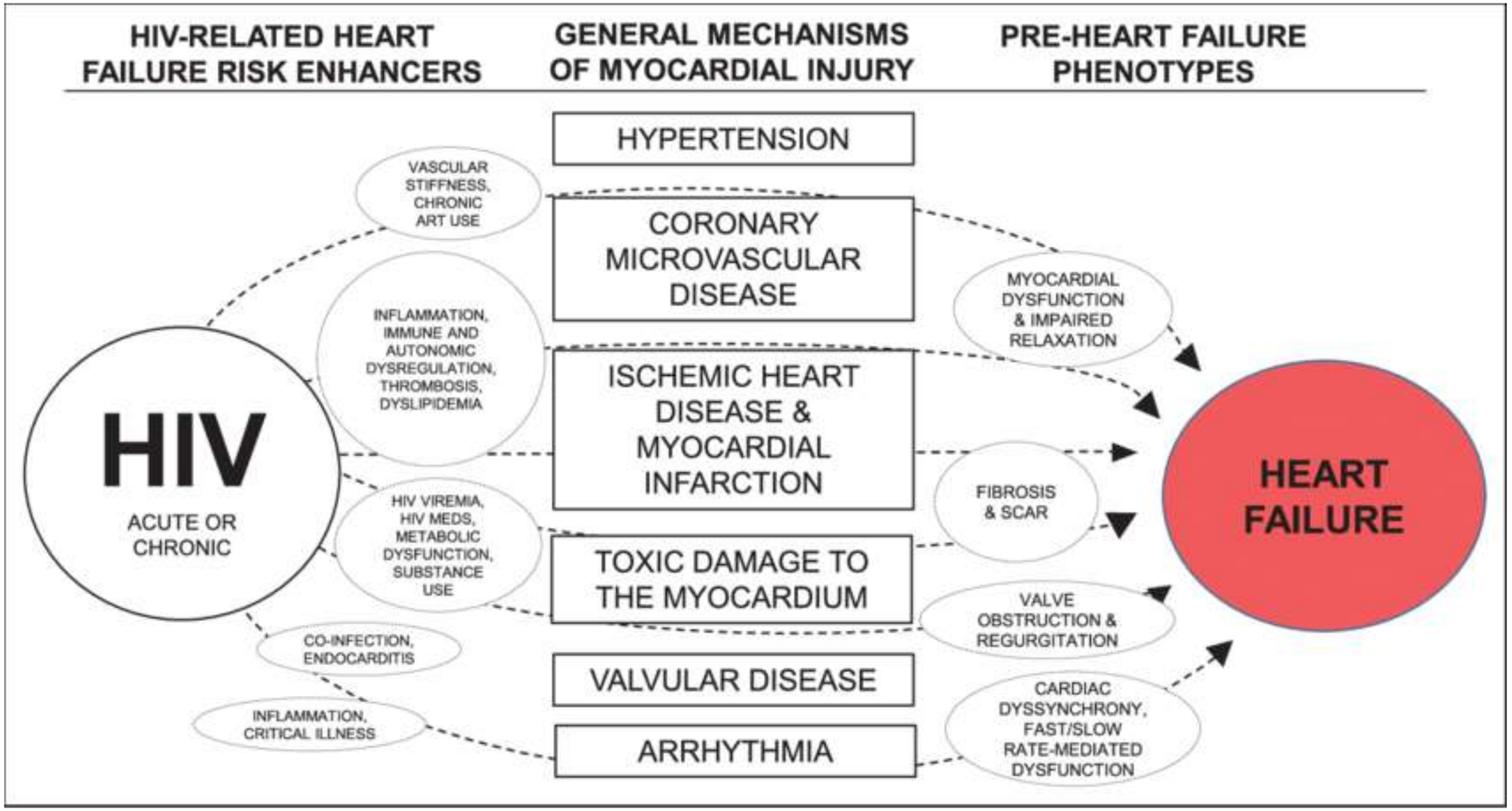
AND

My presentation does not include discussion of off-label or investigational use of pharmaceuticals.

Overview

- HIV D-/R+ heart transplantation
- HIV D-/R+ lung transplantation
- HIV D+/R+ heart transplantation
- HIV D+/R+ lung transplantation
- Living donor kidney and liver transplantation

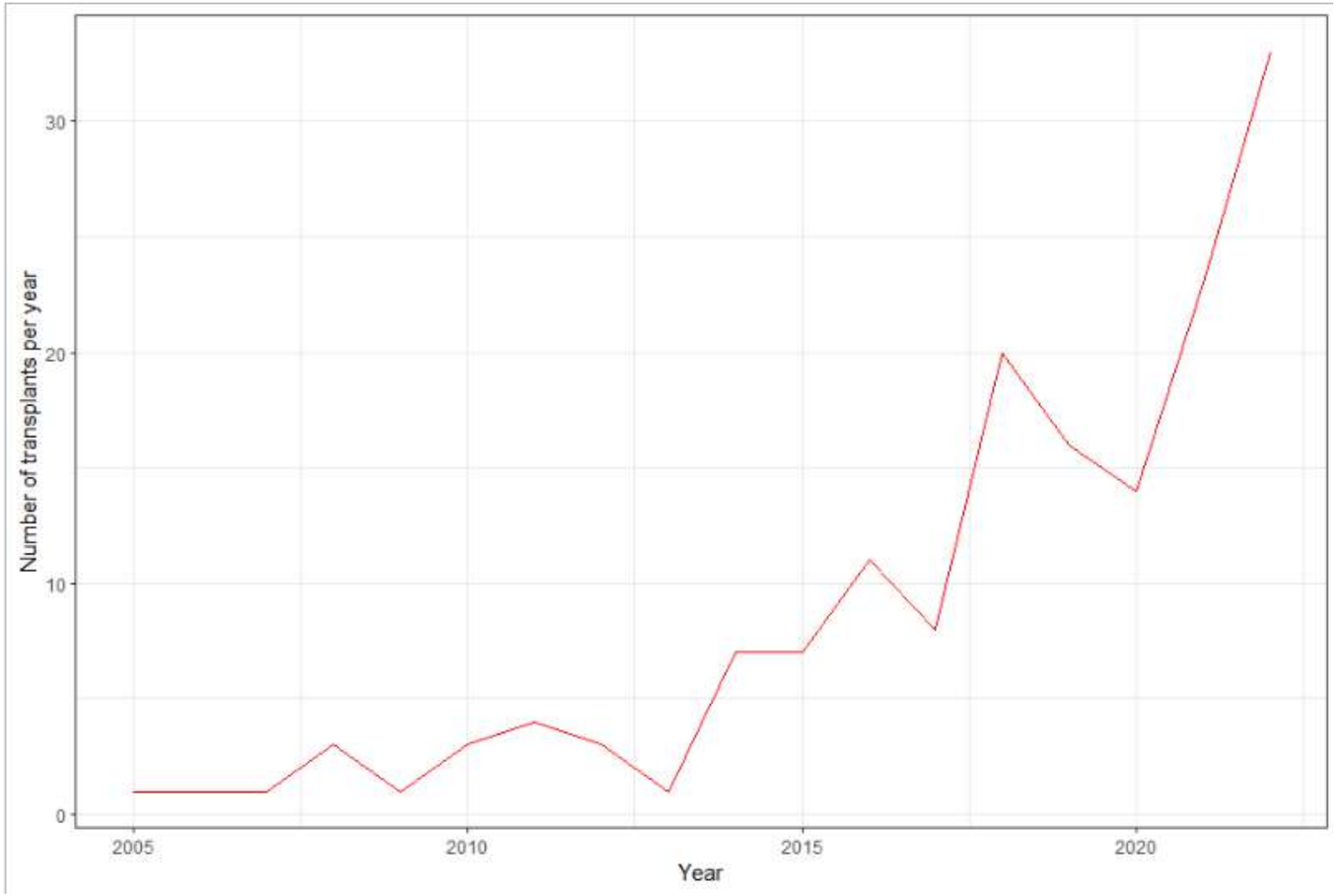
HIV doubles the risk of advanced heart failure



Circulation. 2019 Jul 9;140(2):e98-e124.

Until very recently, few centers willing to offer heart transplant to PLWH

- Over 158 HIV D-/R+ heart transplants to date performed in US as of 2023, including 2 heart-lung recipients
  - Half of transplants performed at 16 centers; most have performed none
  - The UNOS database reached this number of D-/R+ kidney transplants in 2006 and D-/R+ liver transplants in 2009
  - Currently 30+ transplants/year



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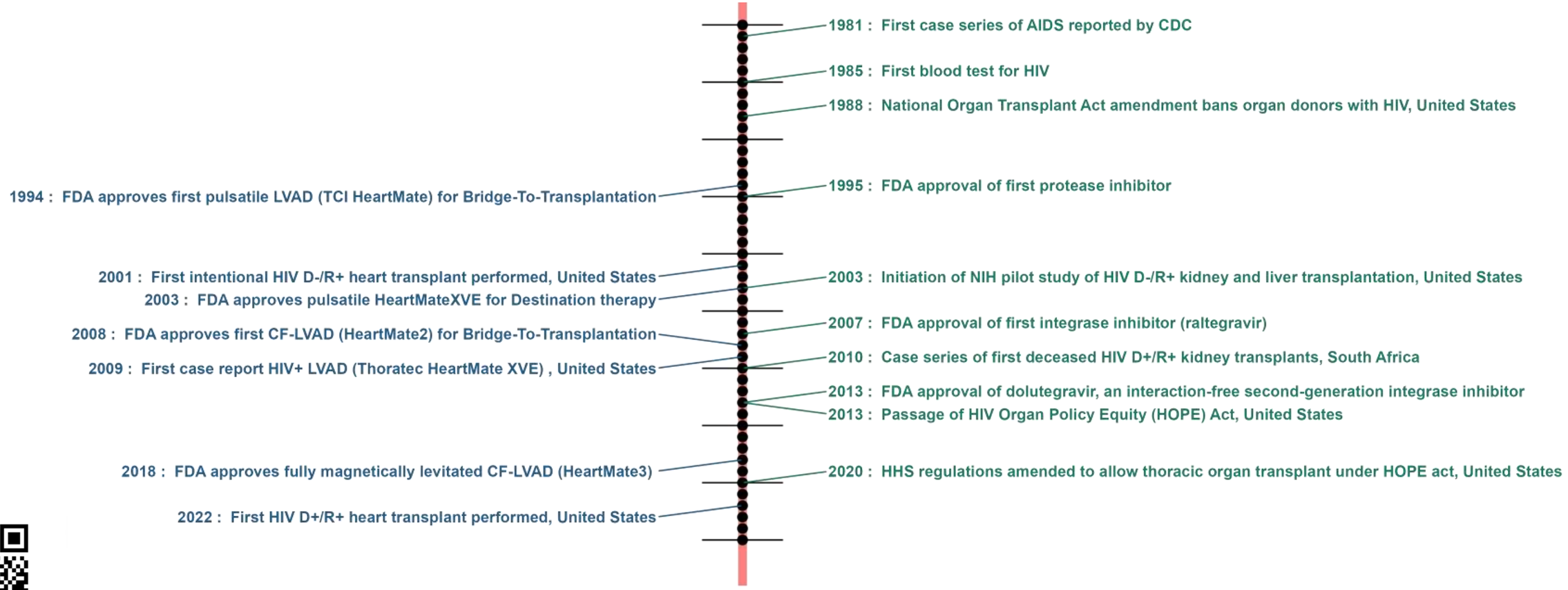
Progress in advanced heart failure care for PLWH has tracked general advances in HIV care



https://www.jhltonline.org/article/S1053-2498(23)01869-7/fulltext

HIV D-/R+ heart outcomes in the United States

No difference

- Survival
- Malignancy
- Graft vasculopathy

Higher rates in PLWH

- Acute rejection prior to primary discharge (38.7% versus 17.7%)
- Antirejection treatment administration (26.7% versus 10.4%)

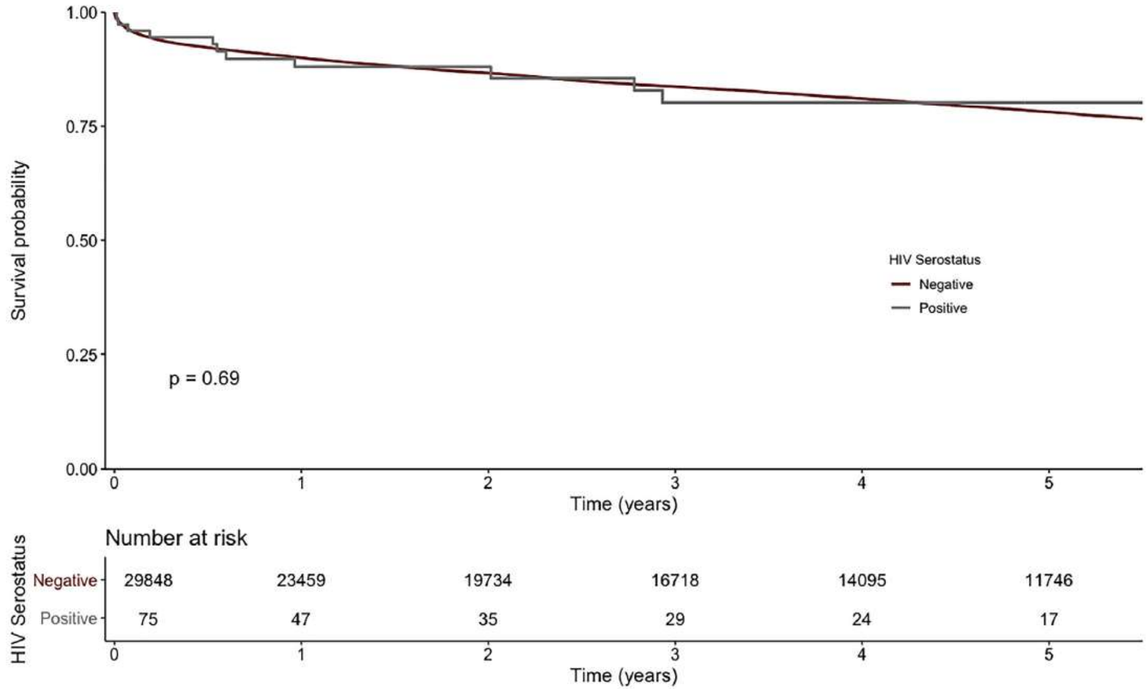


Figure 1. Kaplan-Meier curve for orthotopic heart transplant patients stratified by recipient HIV status: negative (red line), or positive (gray line). The P value represents the two-sided log-rank test. Numbers at risk are provided at the bottom of the graph.

Ann Thorac Surg. 2021 May;111(5):1465-1471.

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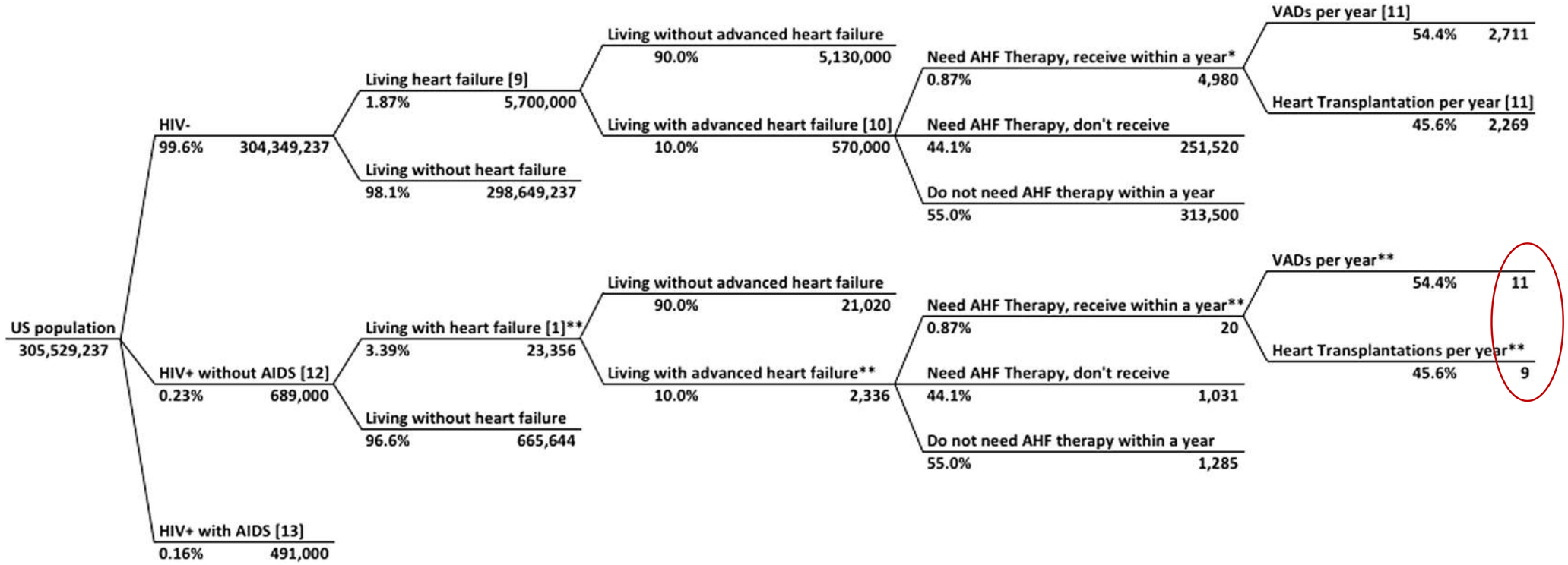
Experience outside of the United States limited to case reports or case series

- Koval *et al* included international cases in a seminal series of 21 cases
- Other individual case reports from Taiwan and Europe
  - Acceptable survival rates
  - High rates of rejection (>60%)

Heart Lung Transplant. 2019 Dec;38(12):1296-305.

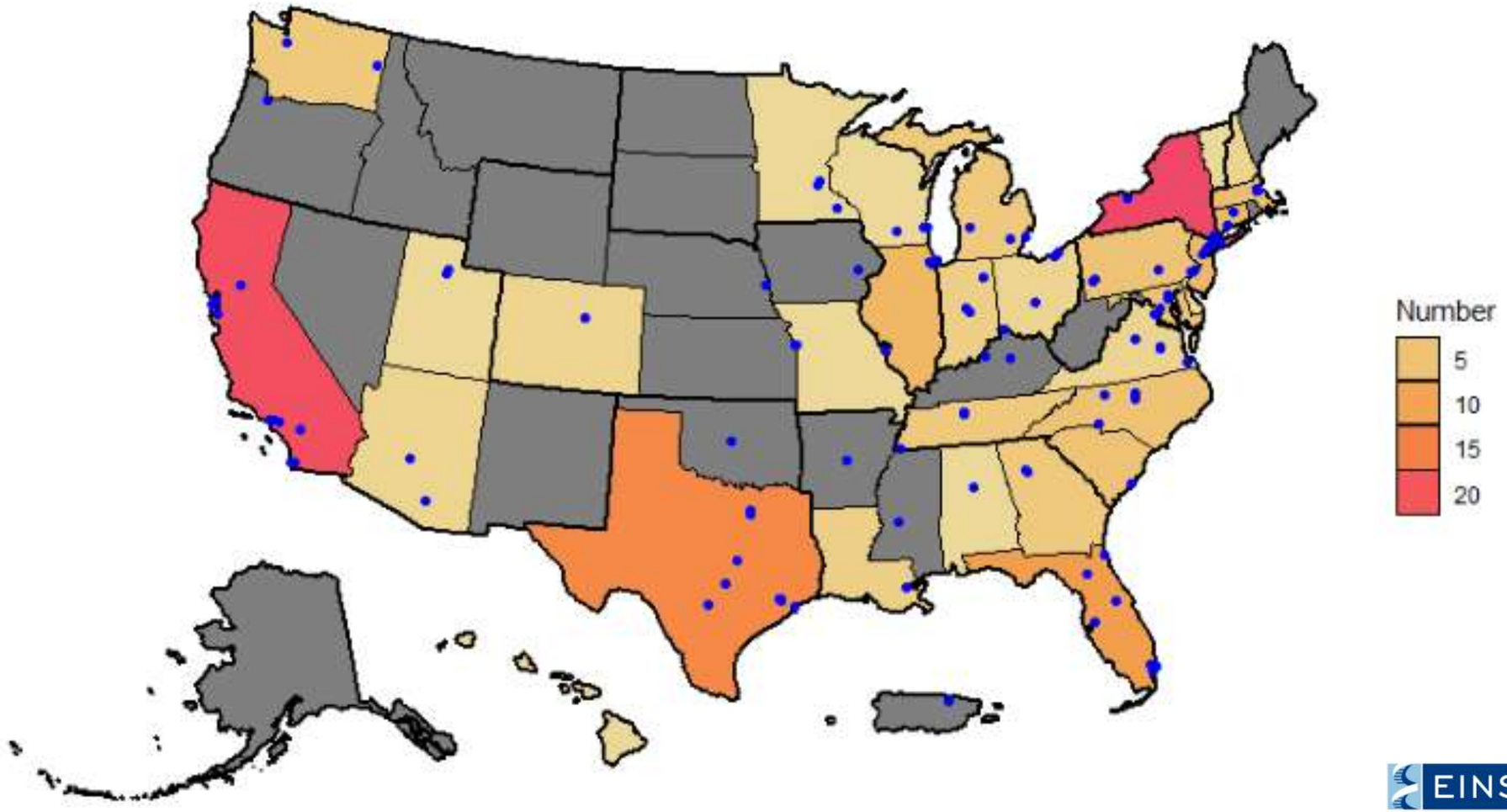
Microbiol Immunol Infect. 2022 Oct;55(5):982-984.

Does the current rate and pattern of transplant in the United States meet the need?



J Heart Lung Transplant. 2014 Sep;33(9):924-30.

Does the current rate and pattern of transplant meet the need?



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ISHLT guidelines have evolved to support heart transplant in PLWH

- Pre-2014: HIV considered an **absolute** contraindication
- 2014-2024: HIV considered a **relative** contraindication
- 2024-present: Well-controlled HIV no longer an impediment to cardiac transplantation

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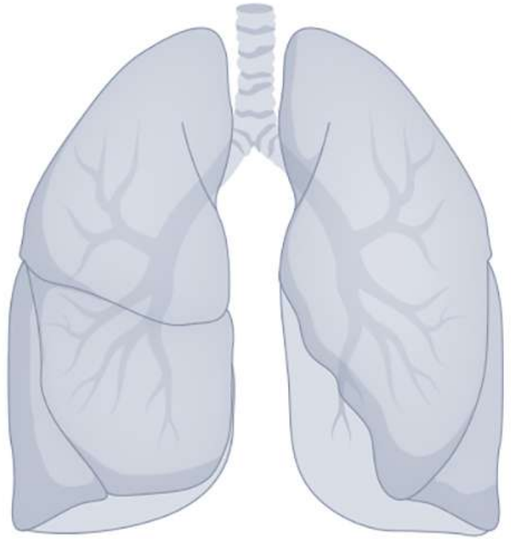
HIV is a risk factor for end-stage lung disease

Structural and immunological alterations

- Impaired airway epithelial integrity
- Pulmonary surfactant alterations
- Immune dysregulation
- Lymphocytic alveolitis
- Local and systemic chronic inflammation
- Oxidative stress
- Lung protease and antiprotease imbalance
- Accelerated cell senescence
- HIV persistence in the lung
- ART effects?

Acute and chronic lung disease



Microbiological exposures

- Microbial translocation
- Altered lung and gut microbiota
- Recurrent lung infections
- Microbial translocation
- *Pneumocystis* colonization
- Viral co-infections (HBV, HCV)

Environmental exposures

- Cigarette smoking
- Biomass fuel burning
- Occupational exposures
- Air pollutants
- Inhalation and/or injection of illicit drugs
- Malnutrition
- Low socioeconomic status

Nat Rev Dis Primers. 2023 Jul 27;9(1):39.

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Accelerated COPD development in PLWH who smoke

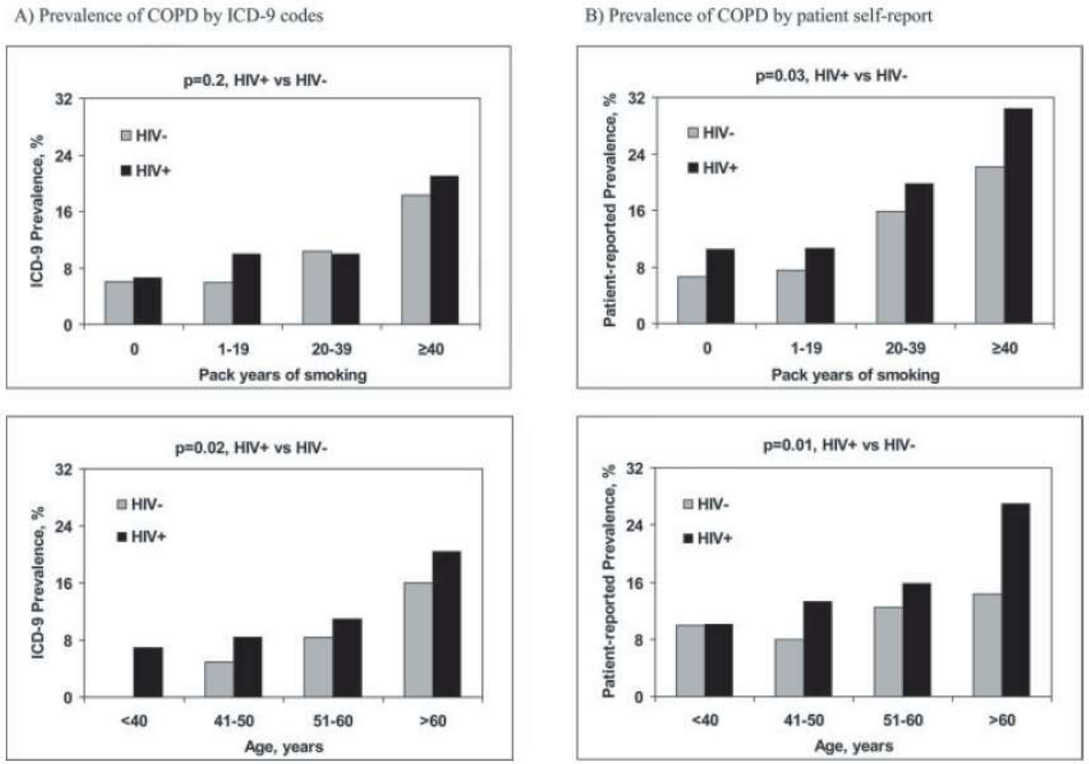

FIGURE 1. Prevalence of COPD among HIV-positive and HIV-negative subjects stratified by number of pack-years of smoking or age. *Left top* and *bottom*, *A*: the prevalence of COPD as diagnosed by ICD-9 codes. *Right top* and *bottom*, *B*: the prevalence of COPD as diagnosed by patient self-report. The p values are given for the likelihood of COPD in HIV-positive subjects vs HIV-negative subjects adjusted for either age or smoking group. HIV+ = HIV-positive; HIV− = HIV-negative.

- Younger age
- Lower pack-year history

Table 3—*Predictors of COPD in HIV-Positive and HIV-Negative Subjects

Predictors	COPD Diagnosis	
	ICD-9 Codes	Patient Self-Report
HIV status	1.47 (1.01–2.13)†	1.58 (1.14–2.19)†
Age, per 10 yr	1.57 (1.29–1.87)†	1.17 (1.00–1.37)
Black	0.77 (0.53–1.13)	0.63 (0.46–0.87)†
Hispanic	1.13 (0.67–1.90)	0.80 (0.50–1.27)
Smoking, per 10 pack-yr	1.12 (1.07–1.18)†	1.16 (1.11–1.22)†
IDU	1.44 (0.99–2.12)	1.56 (1.13–2.16)†
Alcohol abuse	2.24 (1.54–3.25)†	1.52 (1.09–2.12)†

*Values are given as the OR (95% CI).
†Significant at $p \leq 0.05$.

CHEST 2006; 130:1326 –1333.

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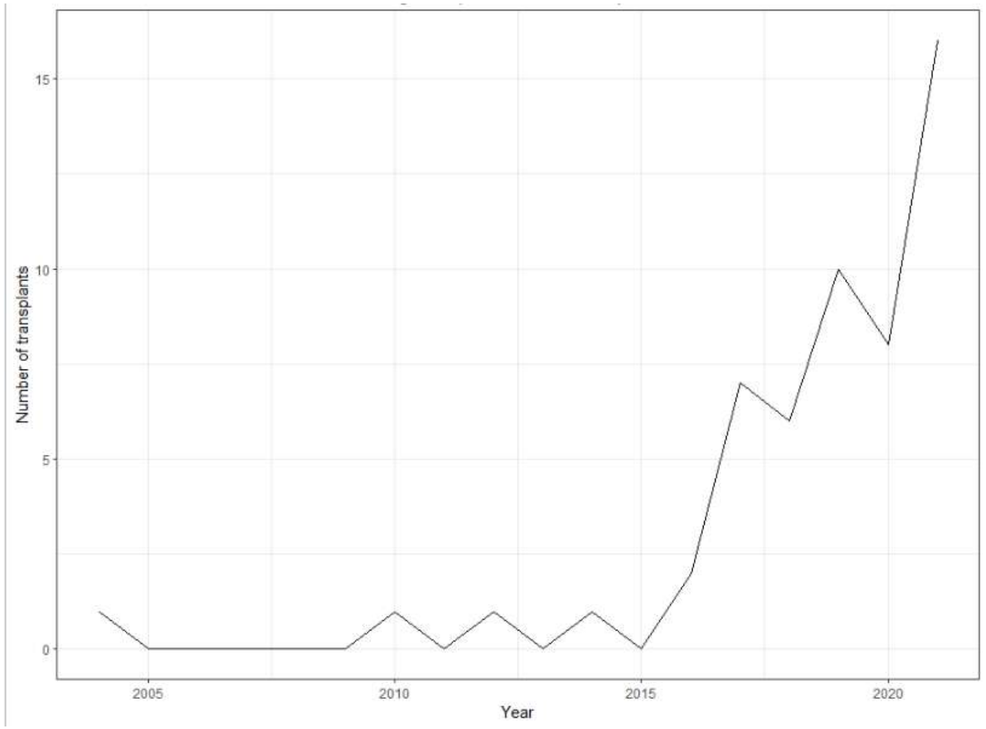
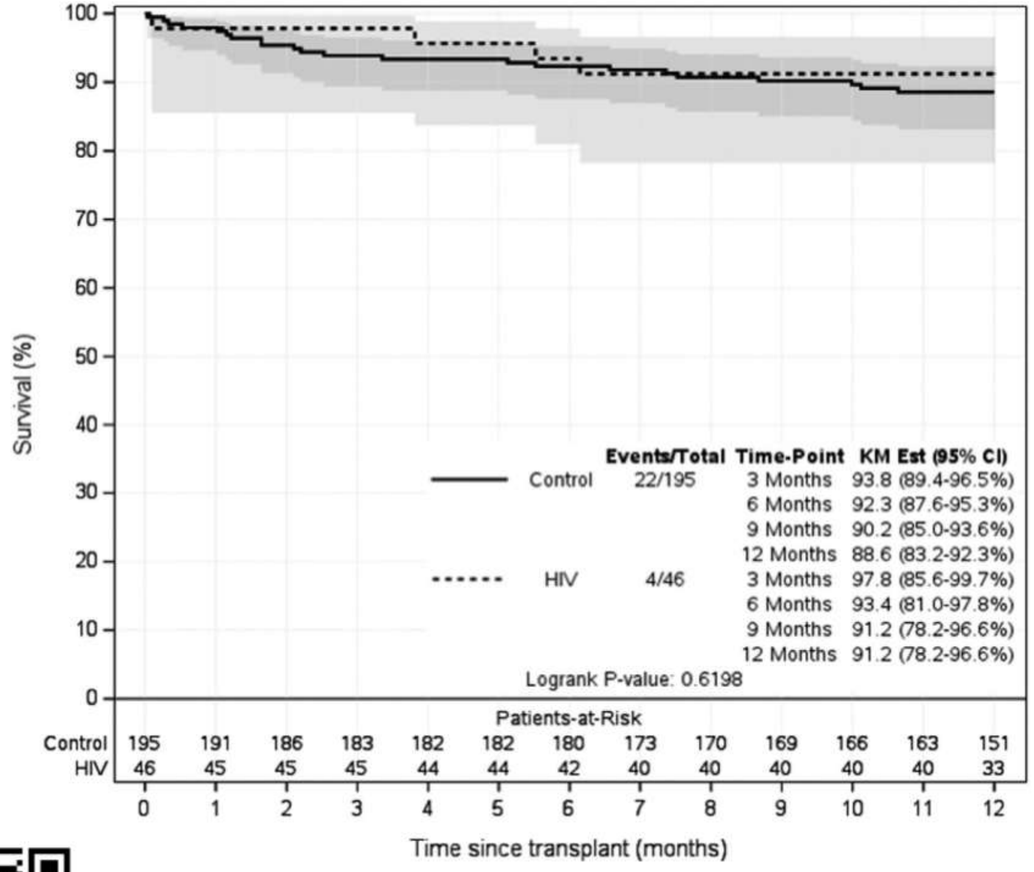
HIV D-/R+ lung transplant

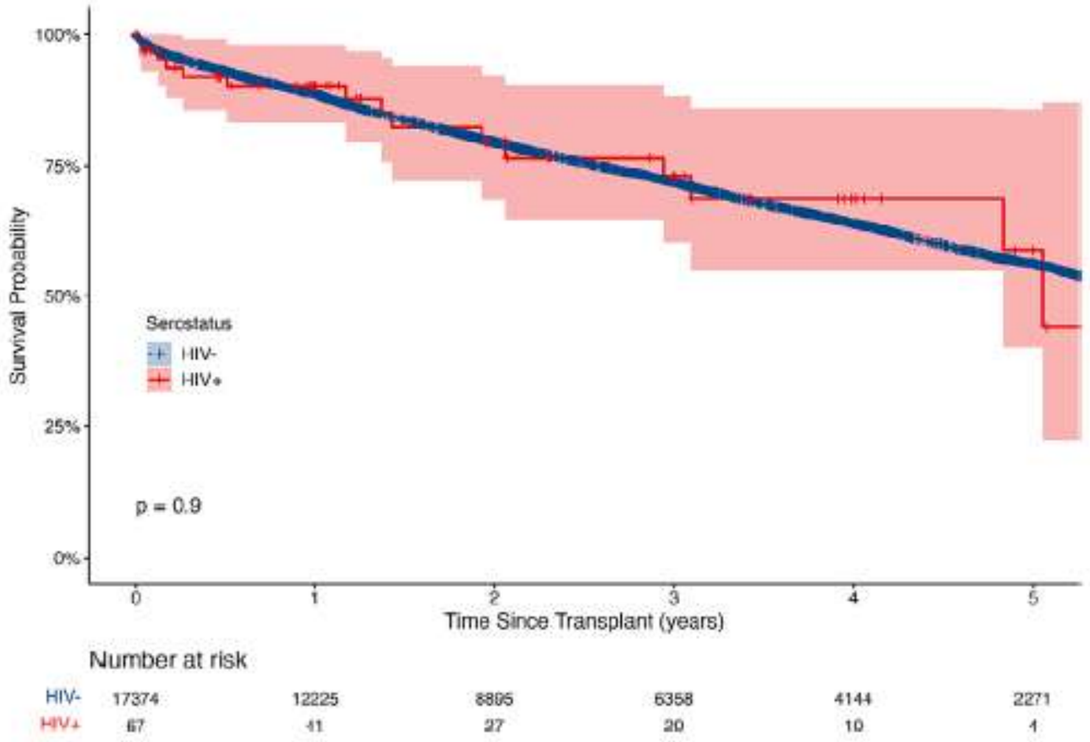
- As of 2023, 70 HIV D-/R+ lung transplants to date performed in US as per the SRTR, including the two aforementioned heart-lung transplants
  - The UNOS database reached this number of D-/R+ kidney transplants in 2004 and D-/R+ liver transplants in 2005
- Well over half performed since 2019
- Four centers responsible for 50+% of transplants
- Recipient selection criteria an open question



ATC 2023, abstract 193

Equivalent survival in lung transplant recipients with HIV

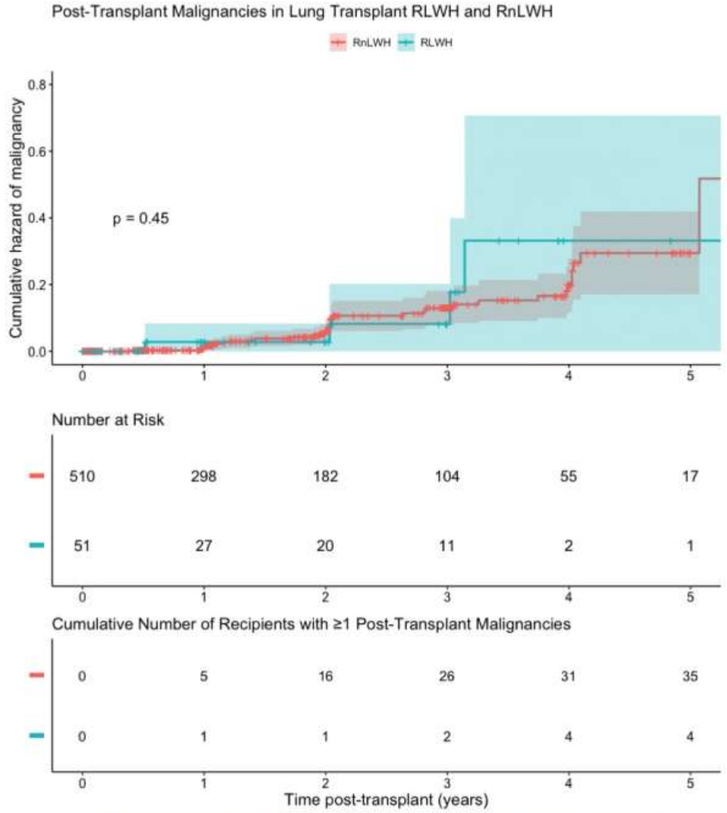




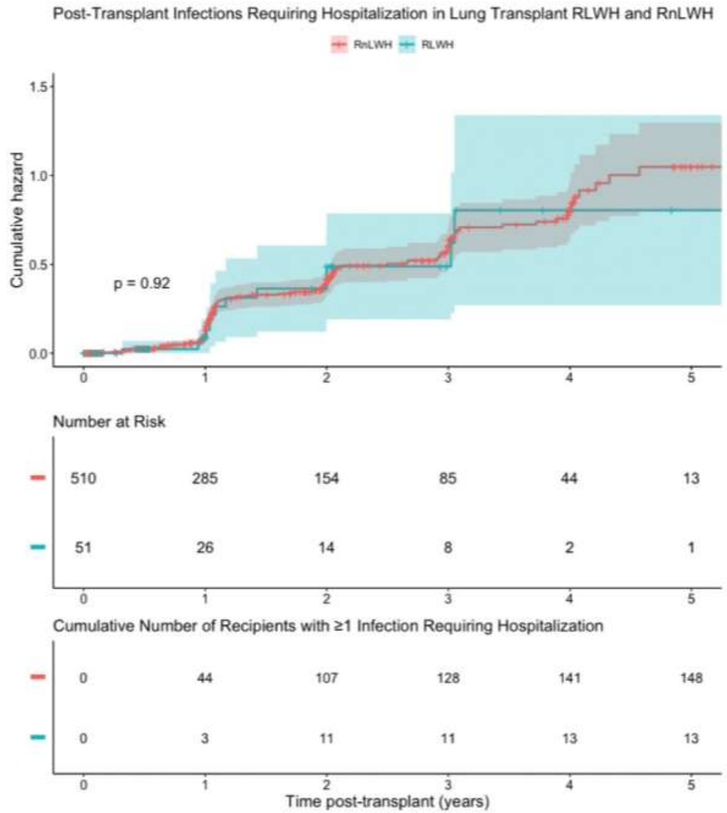
Transplantation 2024. Apr 1;108(4):1015-1020

Clin Transplant 2024 Jan;38(1):e15246.

Equivalent malignancy rate and infection hospitalization rates in lung tx recipients with HIV



	RLWH	RnLWH	p
Malignancy	4 (7.8)	35 (6.9)	0.45
De novo tumor	3 (5.9)	30 (5.9)	
Recurrence of pre-transplant tumor	0 (0)	1 (0.2)	
Lymphoma	1 (2.0)	4 (0.8)	



	RLWH	RnLWH	p
Recipients with ≥ 1 infection requiring hospitalization	13 (25.5)	148 (29.0)	0.92
Recipients with ≥ 2 episodes of infection requiring hospitalization	3 (5.9)	43 (8.4)	0.76

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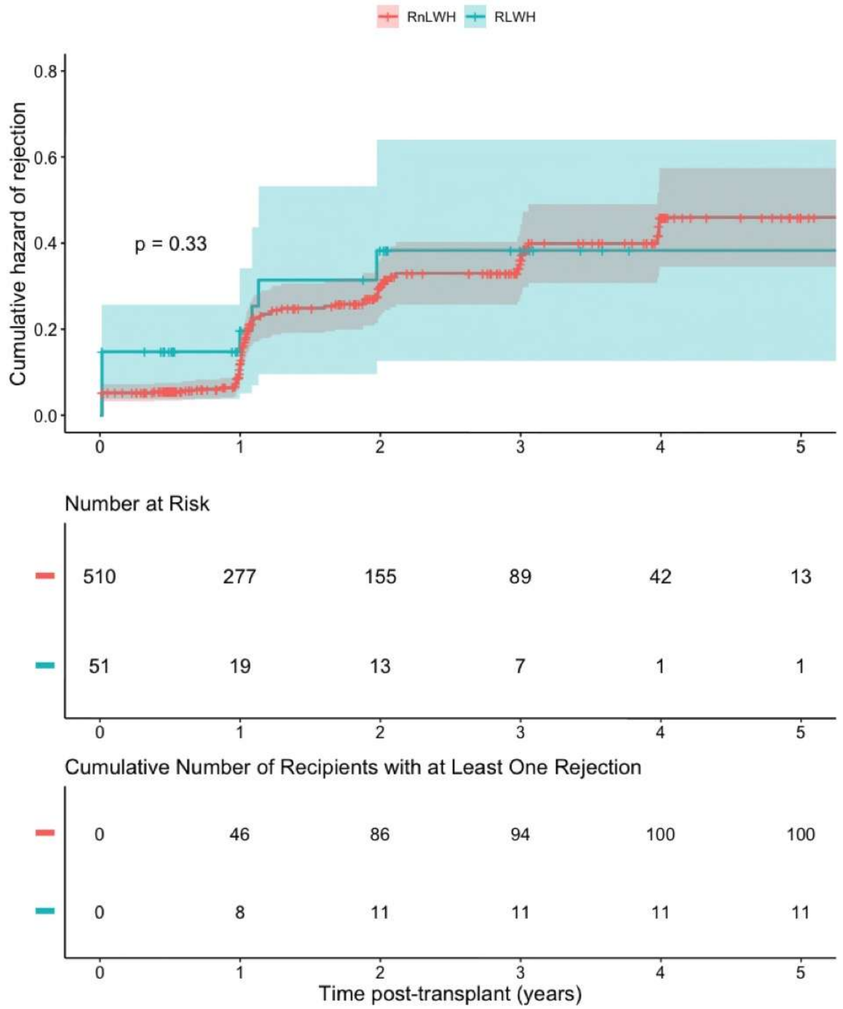
Increased rejection during the initial hospitalization in lung transplant recipients with HIV



	RLWH	RnLWH	p
Recipients with ≥1 episode of acute rejection requring changes in IS	11 (21.6)	100 (19.6)	0.33
Recipients with acute rejection during index admission	7 (13.7)	26 (5.1)	0.022
Recipients with two or more episodes of rejection	4 (7.8)	19 (3.7)	0.24

Immunosuppressant	RnLWH	RLWH	p
n	47	440	
Corticosterioids	44	387	0.338
Basiliximab	41	361	0.373
Thymoglobulin	0	24	
Rituximab	1	2	
Alemtuzumab	0	19	

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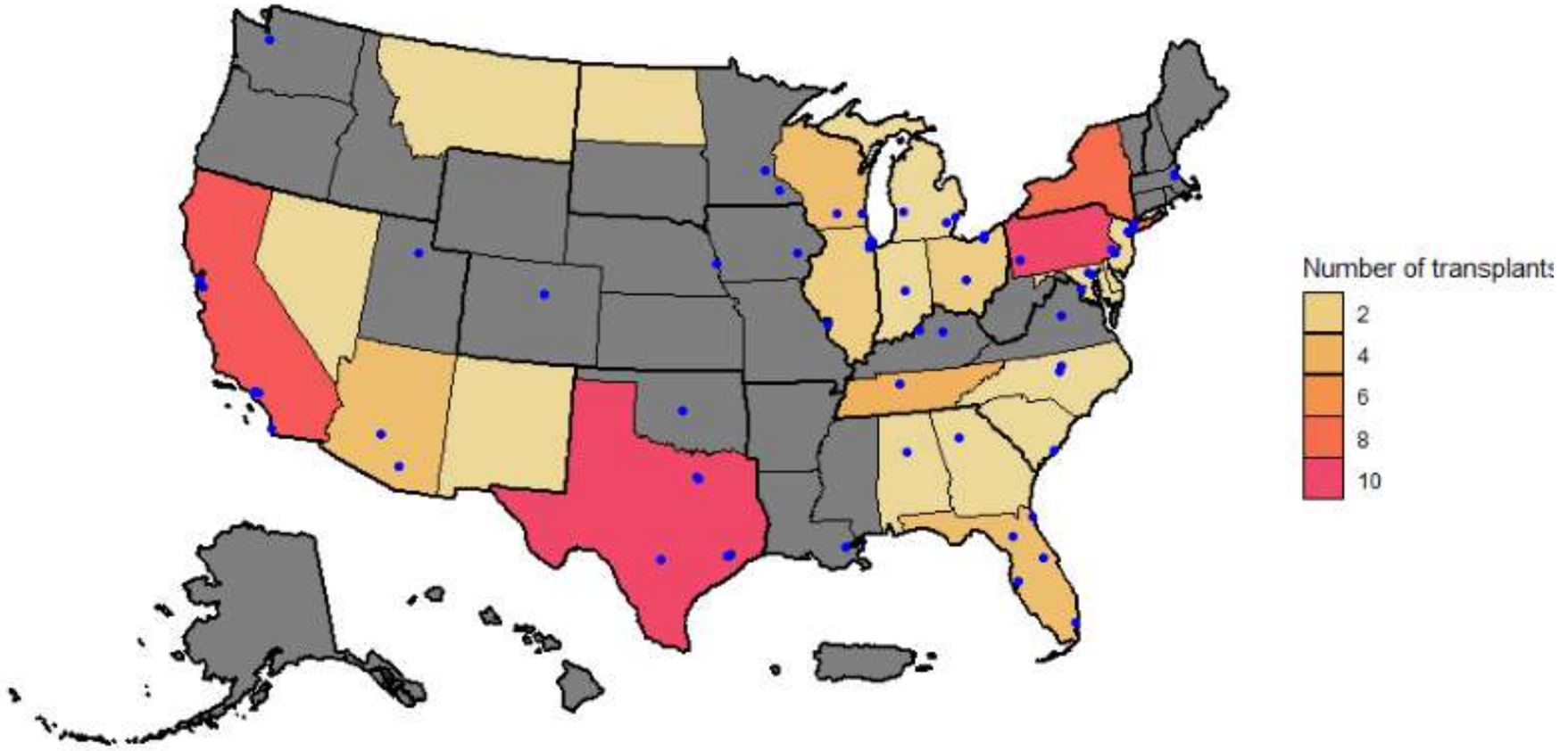
Similar outcomes in European experience (case series without control)

Post-operative outcome		
Infections requiring hospitalisation during first year (n=20)	8 (40)	
Acute cellular rejection (n=19)	7 (37)	
Antibody-mediated rejection (n=19)	2 (11)	
Chronic lung allograft dysfunction at last follow-up (n=19)	5 (26)	
Malignancy (n=21)	3 (14)	
Estimated glomerular filtration rate ($mL \cdot min^{-1}$ per 1.73 m^2)		0.02
Before transplantation	90 (80–111)	
After transplantation[+]	73 (53–90)	

Eur Respir J. 2022 Jul 13;60(1):2200189.

The geography of HIV D-/R+ lung transplant in the US



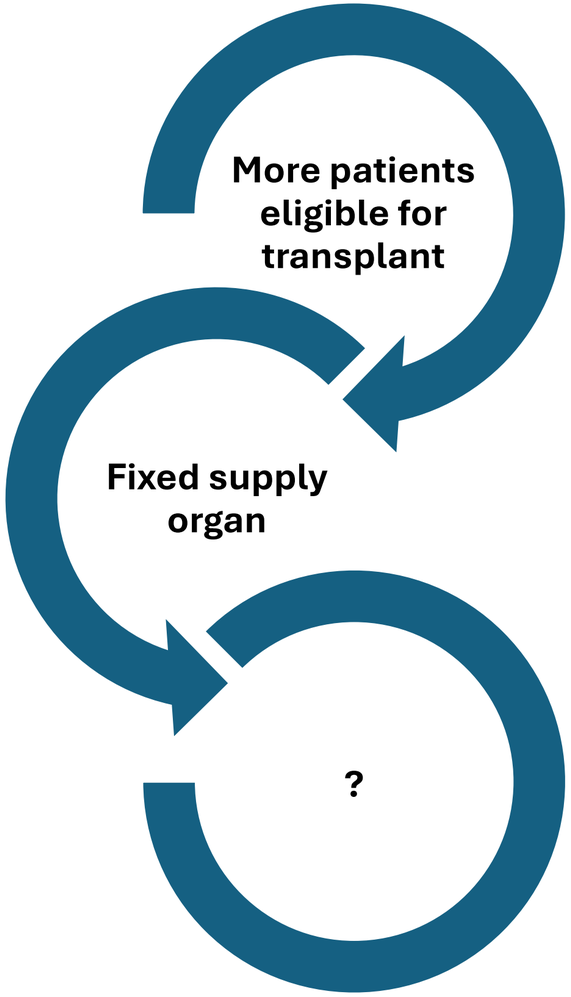
ATC 2023, abstract 279

Pre-transplant and post-transplant management

- Prophylactic and other management strategies typically the same regardless of HIV status unless history of OI
  - PJP prophylaxis a traditional exception
- Data from kidney suggest better outcomes in PLWH who receive lymphocyte depleting therapy as induction, but relevance to thoracic transplant?
  - Protocol biopsies
  - Non-invasive rejection monitoring
- Lessons from kidney and liver emphasize the importance of close teamwork:
  - Transplant team
  - Transplant ID
  - HIV specialists if Transplant ID lacks familiarity with modern antiretroviral regimens
  - Pharmacy

Am J Transplant. 2016 Aug;16(8):2368-76.

Increasing the donor supply

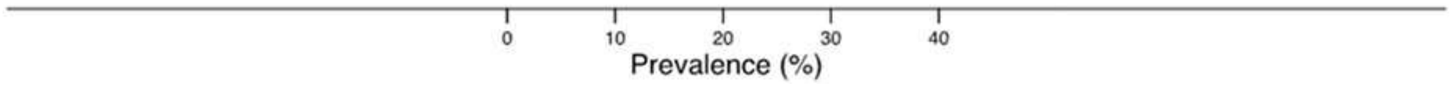


HIV D+ donors: what are the concerns for heart?

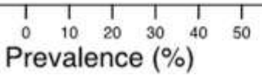
Systolic dysfunction/HFrEF	Diastolic dysfunction/HFpEF	Premature coronary artery disease
• Cumulative viremia • Nadir CD4 count	• Age • Traditional risk factors • Nadir CD4 count?	• Cumulative viremia • Tobacco • Inflammation • Specific ARVs?

High prevalence of cardiac disease in multiple studies globally

Outcome	Studies	N	Cases	Prevalence (95% CI)	I2 (95% CI)
LVSD	26	5862	1294	12.30 (6.40, 19.70)	99% (98%, 99%)
DCM	17	3304	380	12.00 (7.60, 17.20)	93% (91%, 95%)
DD (All)	20	3959	1265	29.30 (22.60, 36.50)	96% (95%, 97%)
DD (Advanced)	11	2537	285	11.60 (8.50, 14.70)	84% (73%, 90%)
PH	14	6779	1132	11.50 (5.50, 19.20)	99% (98%, 99%)
RVSD	10	1418	108	8.00 (5.20, 11.20)	70% (43%, 84%)



Subgroup	Studies	Participants	Prev. (95% CI)	P-value
Pub. year				
< 1996	5	425	19.37 (10.02, 28.71)	0.19
1996-2004	5	1763	20.34 (-6.71, 47.39)	.
>=2004	16	3674	9.69 (6.59, 12.80)	.
Study region				
N. America/ Eur.	16	4307	13.77 (5.57, 21.98)	0.78
Africa	5	674	17.22 (7.08, 27.35)	.
Asia	5	881	10.34 (7.16, 13.52)	.
CD4 count				
<390	7	829	11.67 (6.40, 16.94)	0.87
>=390	8	3513	13.91 (1.01, 26.82)	.
% AIDS				
< 51%	6	1322	7.92 (1.67, 14.17)	0.03
>= 75%	4	475	22.63 (12.98, 32.28)	.
% ART				
< 81%	5	1183	12.35 (4.91, 19.79)	0.06
>= 81%	7	1730	4.86 (1.88, 7.84)	.
Study size				
N<= 129	13	1163	12.88 (8.05, 17.71)	0.84
N>129	13	4699	14.45 (5.21, 23.69)	.
Study quality				
< 8	14	2695	19.40 (6.75, 32.06)	0.03
>=8	11	3083	7.48 (4.19, 10.77)	.
Average age				
< 39 years	13	2838	20.37 (7.50, 33.23)	0.01
>= 39 years	11	2871	6.87 (3.53, 10.22)	.
% Male				
< 75%	11	2804	17.54 (3.79, 31.28)	0.29
>= 75%	13	2904	10.53 (6.77, 14.28)	.



JACC Heart Fail. 2019 Feb;7(2):98-108.

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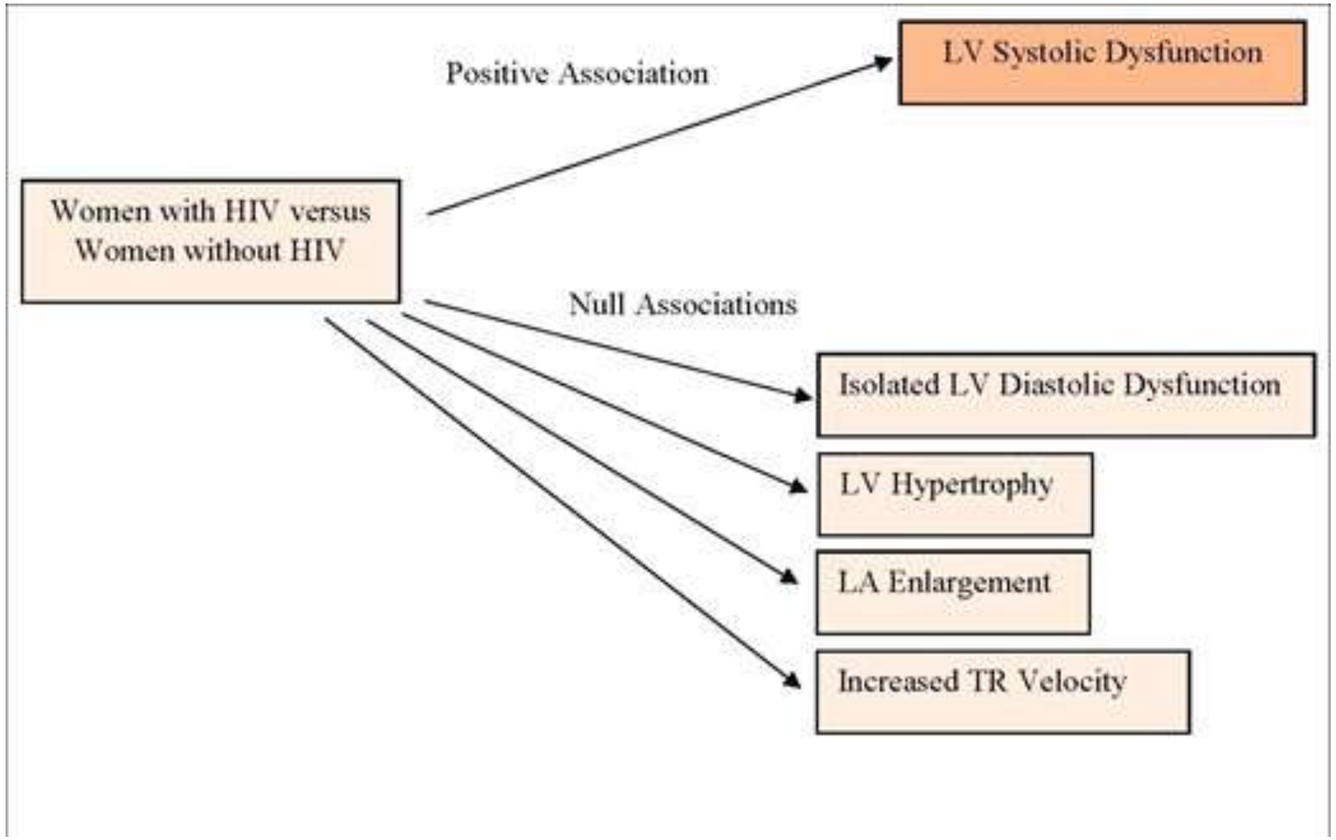
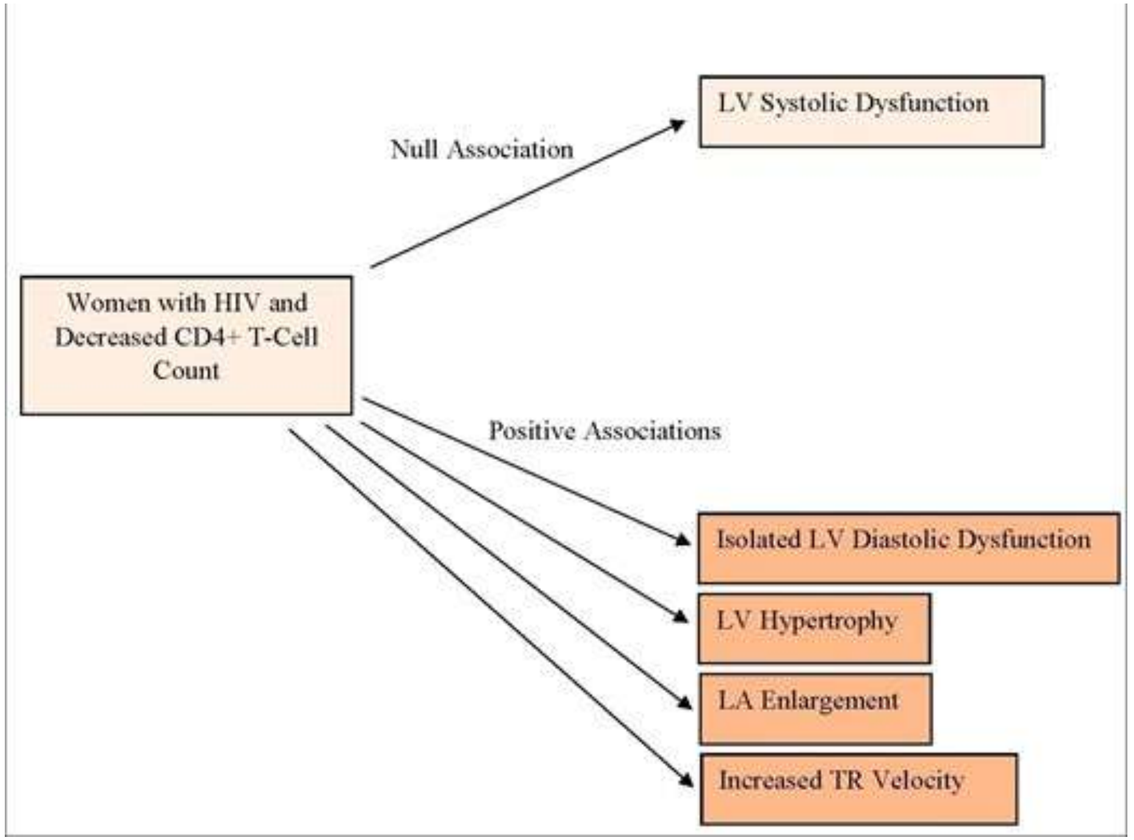
Systolic and diastolic dysfunction in women with HIV

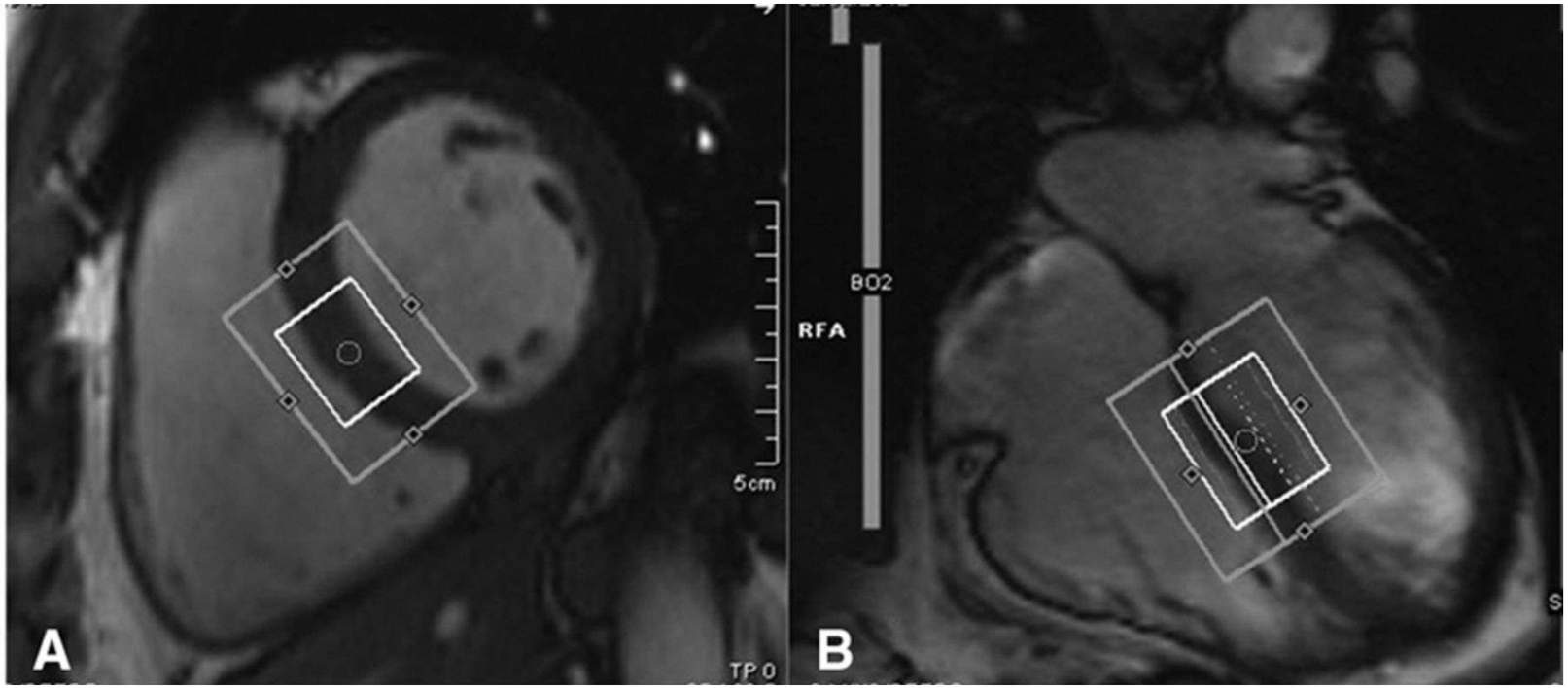




Clin Infect Dis. 2023 Jan 13;76(2):210-219.

Most people with HIV have abnormal cardiac MRI findings

Myocardial fibrosis in 76% of asymptomatic PLWH compared with 13% of control subjects (P<0.001)



Circulation. 2013 Aug 20;128(8):814-22.

HIV D+/R- heart transplants in the ARV era

Chicago, 2006	Survived three years Death due to non-adherence	Mild rejection treated with oral prednisone
Taiwan, 2012	Well-functioning graft four years post transplant	Moderate rejection Coronary allograft vasculopathy

Am J Transplant. 2011 Jun;11(6):1218-25.

ATC 2016, abstract C292

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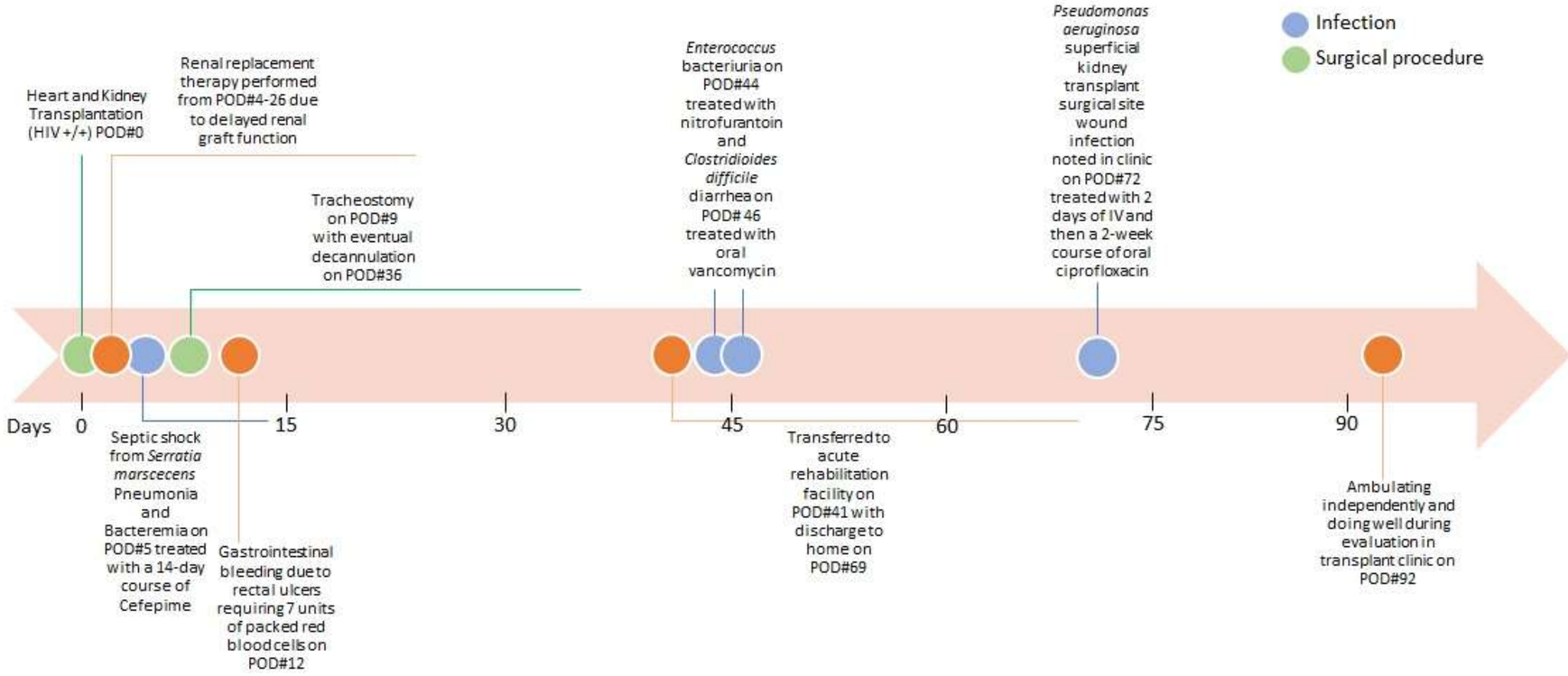
HIV D+/R+ transplant

- Six transplants performed at 3 centers in the United States, 2022-2025
- All recipients alive and well



J Heart Lung Transplant. 2023 Mar;42(3):406-408.

HIV D-/R+ vs HIV D+/R+ (submitted for publication)

	All Patients (n=10)	HIV (D+/R+) (n=4)	HIV (D-/R+) (n=6)	P value
Age at HT (y)	59 (55-62)	60 (54-67)	59 (55-61)	0.67
Female, n (%)	2 (20)	1 (25)	1 (16.7)	1.00
BMI (kg/m^2)	25.4 (23.5-26.6)	25 (23.1-26.9)	25.4 (23.6-26.0)	1.00
Diabetes Mellitus, n (%)	5 (50)	2 (50)	3 (50)	1.00
Total waitlist time (d)	77 (21-114)	68 (23-112)	77 (20-117)	1.00
Immunosuppression				
Induction				0.33
ATG + steroids, n (%)	2 (20)	0 (0)	2 (33.3)	
Basiliximab + steroids n (%)	2 (20)	2 (50)	0 (0)	
Maintenance				
Prednisone, n (%)	10 (100)	4 (100)	6 (100)	1.00
Mycophenolate mofetil, n (%)	9 (90)	4 (100)	5 (83.3)	1.00
Tacrolimus, n (%)	10 (100)	4 (100)	6 (100)	1.00
HIV and co-infections				
CD4+ T cell count	472 (356-652)	504 (314-661)	472 (389-618)	1.00
HIV RNA <20 (copies / ml), n (%)	6 (60)	3 (75)	3 (50)	0.57
HBV core IgG positive, n (%)	5 (50)	2 (50)	3 (50)	1.00
HCV Ab positive, n (%)	0 (0)	0 (0)	0 (0)	.
Toxoplasmosis IgG positive, n (%)	0 (0)	0 (0)	0 (0)	.
Ebstein Barr Virus IgG postive, n (%)	10 (100)	4 (100)	6 (100)	1.00
ARV therapy				1.00
Dolutegravir/FTC/TAF, n (%)	3 (30)	2 (50)	1 (16.7)	
Bictegravir/FTC/TAF, n (%)	5 (50)	2 (50)	3 (50)	
Dolutegravir/Rilpivirine, n (%)	1 (10)	0 (0)	1 (16.7)	
Raltegravir/FTC/TDF, n (%)	1 (10)	0 (0)	1 (16.7)	

- All adult HIV-positive recipients that underwent HTx at Montefiore from 2015-2025.
- Ten HIV-positive recipients underwent HTx, 3 of which received simultaneous kidney transplantation.
- Divided into two groups:
  - HIV D+/R+
  - HIV D-/R+
- Outcomes: Survival, graft function, rejection, infection and dd-cfDNA

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Donor Characteristics

	All Patients (n=10)	HIV (D+/R+) (n=4)	HIV (D-/R+)(n=6)	P value
Age at HT (y)	28 (26-31)	28 (27-30)	29 (25-36)	0.75
Female, n (%)	2 (20)	1 (25)	1 (16.7)	1.00
DCD Donor, n (%)	0 (0)	0 (0)	0 (0)	.
LVEF (%)	63 (55-65)	64 (57-73)	63 (55-65)	0.45
Ischemic time (h)	258 (200-343)	304 (194-353)	235 (200-260)	0.52
Donor cause of death, n (%)				1.00
Brain anoxia	5 (50)	2 (50)	3 (50)	
CVA / stroke	1 (10)	0 (0)	1 (16.7)	
Head Trauma	4 (40)	2 (50)	2 (33.3)	
HIV and co-infections				
HIV ab positive, n (%)	4 (40)	4 (100)	0 (0)	0.005
HIV NAAT positive, n (%)	2 (20)	2 (50)	0 (0)	0.13
HBV core IgG positive, n (%)	1 (10)	1 (25)	0 (0)	0.40
HBV sAg positive, n (%)	0 (0)	0 (0)	0 (0)	.
HCV NAAT positive, n (%)	1 (10)	0 (0)	1 (16.7)	1.00
HCV Ab positive, n (%)	1 (10)	0 (0)	0 (0)	1.00
Toxoplasmosis IgG positive, n (%)	1 (10)	0 (0)	0 (0)	1.00
Ebstein Barr Virus IgG postive, n (%)	9 (90)	4 (100)	5 (83.3)	1.00

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Outcomes

	All Patients (n=10)	HIV (D+/R+) (n=4)	HIV (D-/R+) (n=6)	P value
Alive at 3 months, n (%)	10 (100)	4 (100)	6 (100)	1.00
Severe PGD after HT, n (%)†	0 (0)	0 (0)	0 (0)	.
Normal heart graft function at 3 months, n (%)*	10 (100)	4 (100)	6 (100)	1.00
LVEF at 3 months (%)	60 (60-65)	60 (60-65)	63 (60-65)	0.71
Retrospective cross match positive after HT, n (%)**	2 (20)	1 (25)	1 (16.7)	1.00
Presence of donor specific antibodies, n (%)	4 (40)	1 (25)	3 (50)	0.57
Cell mediated rejection (ISHLT grade ≥2R)				
Patients with cell mediated rejection, n (%)	3 (30)	1 (25)	2 (33.3)	1.00
Episodes of cell mediated rejection	0 (0-1)	0 (0-0.5)	0 (0-1)	0.79
Antibody mediated rejection, n (%)	2 (20)	0 (0)	2 (33.3)	0.47
Infection episodes	0.5 (0-1)	0 (0-2.5)	1 (0-1)	0.49
CD4+ T cell count at 3 months	478 (178-527)	486 (316-580)	253 (178-527)	0.624
HIV viral load at 1 month after HT				0.13
Not detected, n (%)	8 (80)	2 (50)	6 (100)	
<20 RNA copies / ml, n (%)	2 (20)	2 (50)	0 (0)	
HIV viral load at 3 months after HT				0.44
Not detected, n (%)	8 (80)	3 (75)	5 (83.3)	
<20 RNA copies / ml, n (%)	1 (10)	1 (25)	0 (0)	
Donor derived cell free DNA (%)***				
1-month	0.26 (0.11-0.49)	0.14 (0.11-0.33)	0.28 (0.26-0.61)	0.15
3-month	0.16 (0.08-0.25)	0.14 (0.06-0.22)	0.36 (0.12-0.59)	0.35

- 100% survival in total cohort at median f/u of 1060 days (77-3630)
- HIV D+/R+: 312 days (77-1121)
- 70% of patients with ACR at 6 mos

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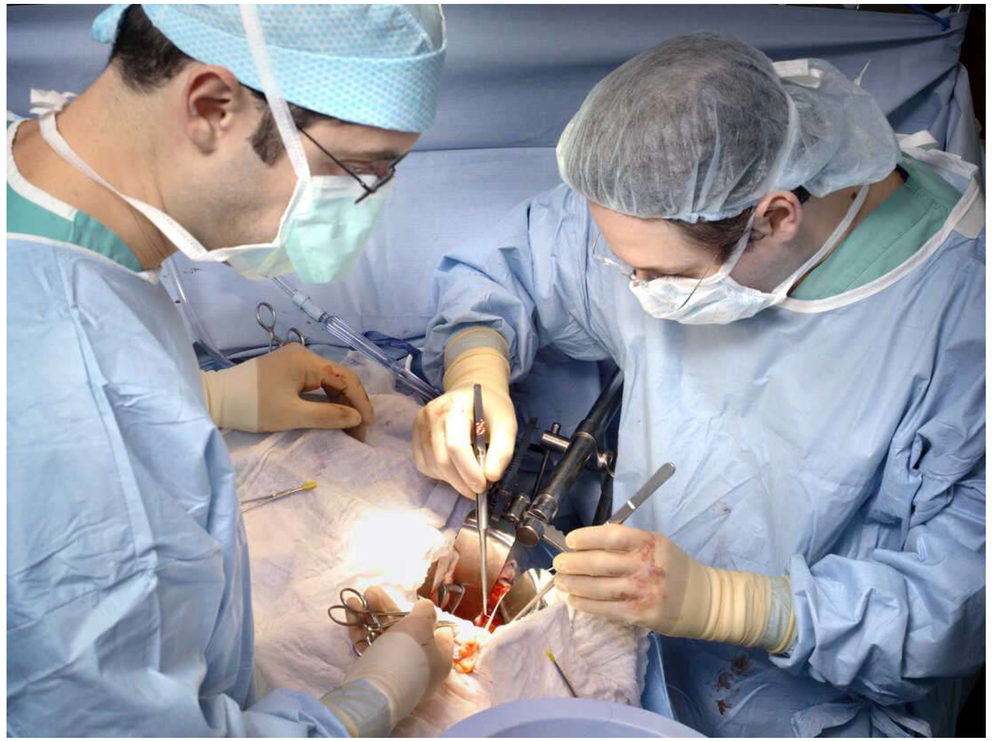
Work up of the HIV D+ donor

- Angiography indications for heart donors vary by center
  - **Age>40**
  - Hypertension
  - Diabetes
  - Tobacco
  - Hyperlipidemia
  - Family history of premature coronary artery disease
  - Cocaine use
- The extent to which these criteria could be relaxed for future transplants will need be determined
- Should HIV be an indication for, or affect the age limit for, angiography?

Changing legal requirements in the United States wll improve access to HIV D+ heart transplantation in the United States

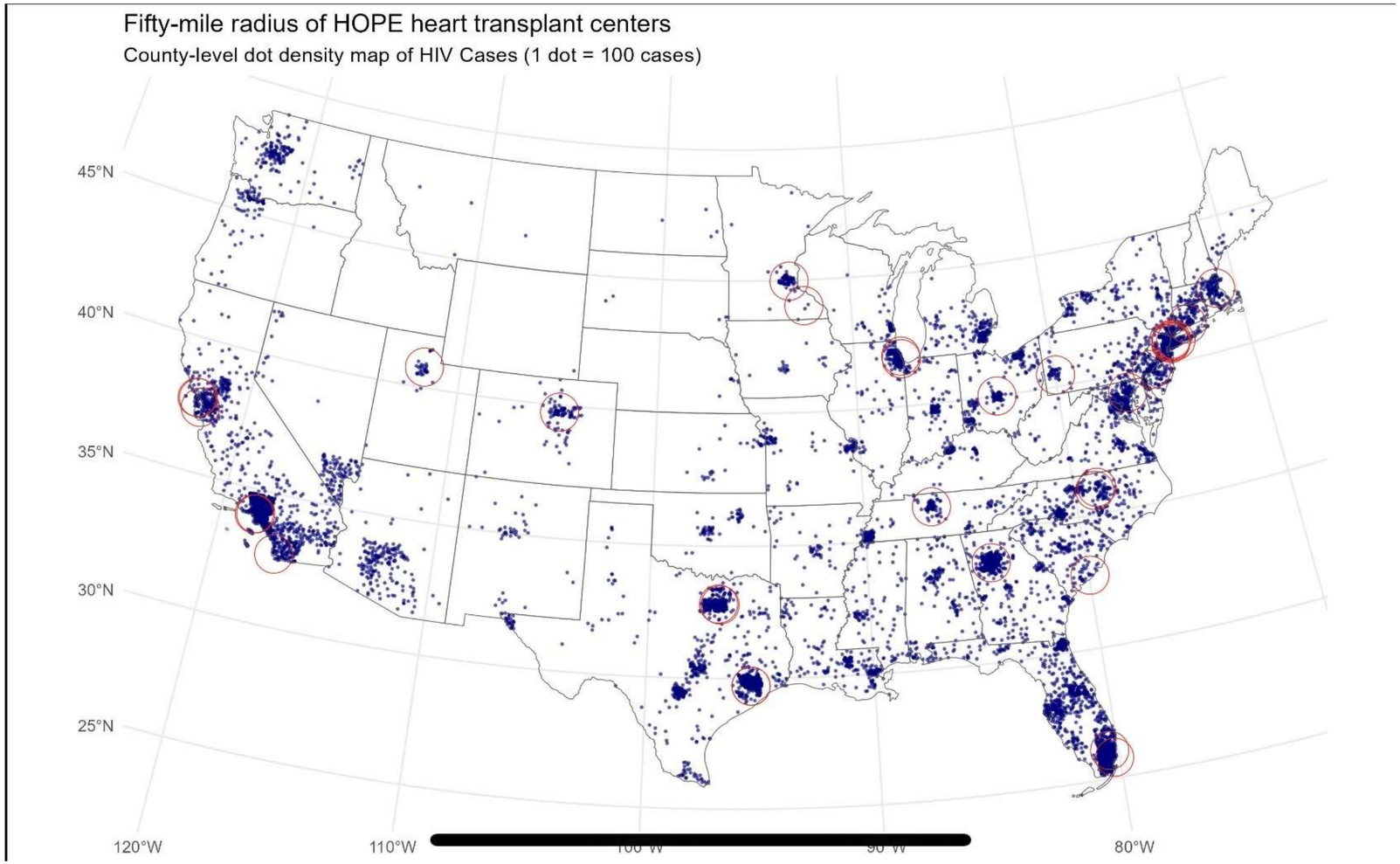


- United States: volume requirements replaced with proof of multidisciplinary expertise
  - Cardiology
  - Surgery
  - HIV/Transplant
  - Pharmacy
- Canada: “exceptional distribution” requirements
- Australia: First HIV D+/R+ transplant 2021 (kidney).

https://journals.lww.com/transplantjournal/toc/2023/10001

Next steps

- Multiple centers in the United States with pilot programs
- Application pending for a 25-center NIH-funded clinical trial to answer questions about long-term safety
- Target enrollment: 80 patients 2027-2032



HIV D+ lung experience limited to an inadvertent HIV D+/R- transplant

Taiwan, 2012	Well-functioning graft four years post transplant	No complications reported

ATC 2016, abstract C292

HIV D+/R+ lung transplant will pose unique challenges

- Effects on the lung that may not show up on pre-transplant workup:
  - Laboratory testing
  - Imaging
  - Biopsies
- Hidden opportunistic infections
  - PJP (?mitigated by prophylaxis?)
  - *Mycobacterium avium* complex
  - Tuberculosis
  - Endemic fungi

Evaluating the potential HIV D+ lung donor

- Prior infection
  - Opportunistic
  - Non-opportunistic
- CD4+ lymphocyte count
  - Current
  - Nadir
- Tobacco history
- Imaging findings
  - Emphysema
  - Lung nodule
  - Pulmonary hypertension

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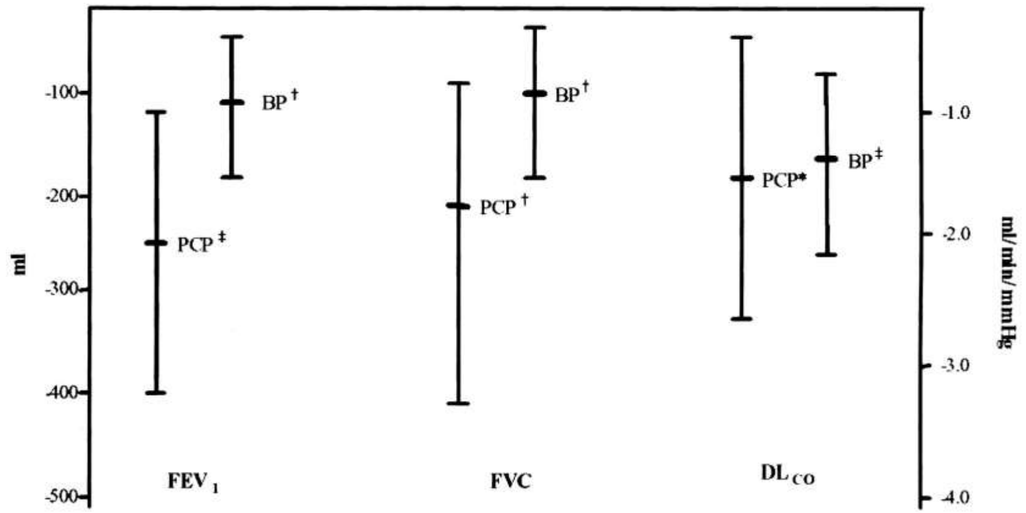
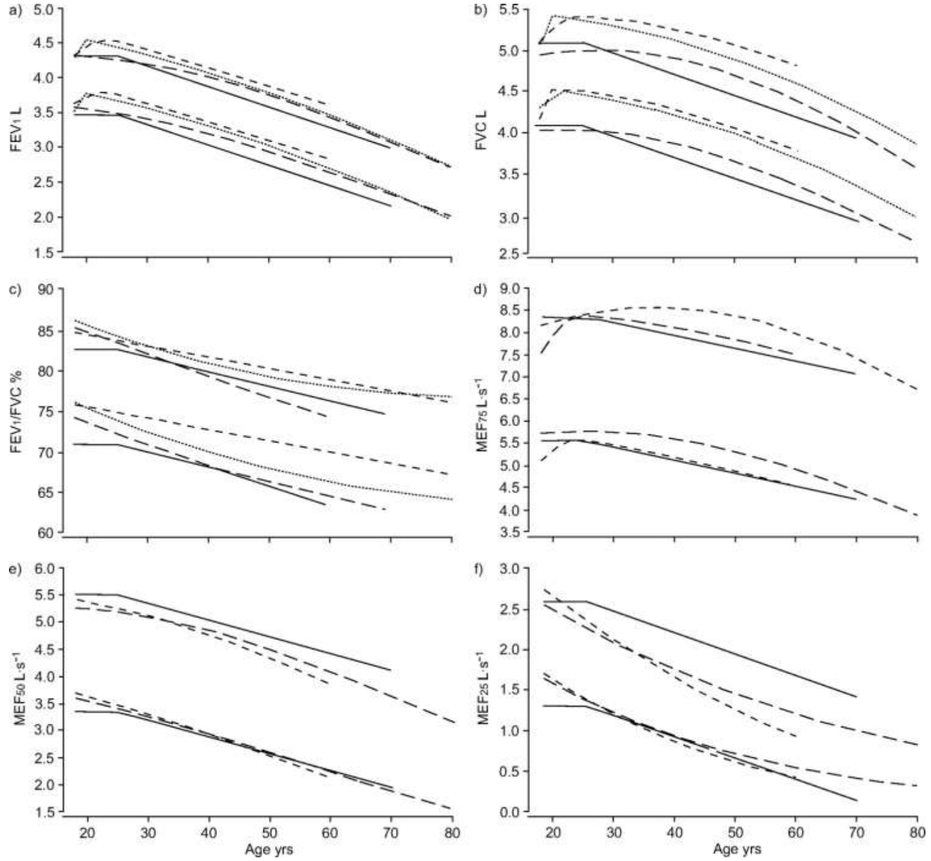
Long-term effects of pneumonia





- FEV_1 decrease after PJP the equivalent of aging ~8 years
- Decreases did not resolve with time in this pre-HAART era study

Am J Respir Crit Care Med. 2000 Aug;162(2 Pt 1):612-6.
European Respiratory Journal 2008; 31: 860-868.

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People with HIV are more likely to smoke and more likely to experience medical complications from smoking

- High prevalence of smoking
- 2-5 fold higher rates of lung cancer; association persists after controlling for smoking rates (VACS study 1.5-1.7 IRR).
- Again, cumulative time with low CD4+ lymphocyte count may be predictive

Clin Infect Dis. 2013 Mar;56(5):727-34.
Curr Opin HIV AIDS. 2017 Jan; 12(1): 31–38.
AIDS. 2012 May 15; 26(8): 1017–1025.

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Nodules are common in smokers with HIV

Table 2 Baseline results of selected American low-dose computed tomography lung cancer screening trials and the IELCAP trial

Variables	NLST (28,29)	ELCAP (30)	IELCAP (6)	Mayo[†] (31)	PLuSS[†] (5,32)
Participants					
Received CT screening	26,309	1,000	31,567	1,520	3,642
Age, mean (SD)[‡] or median (IQR)[§]	NA	67 (NA)[§]	62 (NA)[§]	59 (NA)[‡]	59 (NA)[‡]
Pack years, mean (SD)[‡] or median (IQR)[§]	NA	45 (NA)[§]	30 (NA)[§]	45 (NA)[§]	47 [33–62][§]
Nodule detection limit	≥4 mm	None reported[¶]	≥5 mm	None reported	None reported
Participants with lung cancer	270/26,309 (1.0%)[††]	27/1,000 (2.7%)	405/31,567 (1.3%)	31/1,520 (2.0%)	53/3,642(1.5%)
Participants with NCNs	7,041/26,309 (26.8%)	233/1,000 (23.3%)	4,186/31,567 (13.3%)	780/1,520 (51.3%)	1,477/3,642 (40.6%)

Transl Lung Cancer Res. 2017 Feb;6(1):42-51.

CD4 count and viral load are likely associated with chest CT findings

- EXHALE study (part of the VACS study):
  - noncalcified nodule>=4 mm in 55% of patients with CD4+ lymphocyte count<200/µL
  - 25% if CD4+ lymphocyte 200/µL or greater
- COCOMO study:
  - $CD4^+$ T lymphocyte count under 500 cells/µl and $CD4^+$ T lymphocyte nadir less than 200 cells/µl were each associated with increased odds of a positive image (OR) 2.32 (95% CI: 1.01–5.13, *P* = 0.04)
  - Previous history of PCP [OR 4.32 (95% CI: 1.34–11.9), *P* = 0.01] independently associated with abnormal CT chest

AIDS 2014, 28: 1007–1014.
AIDS 2017, 31: 1973-1977.

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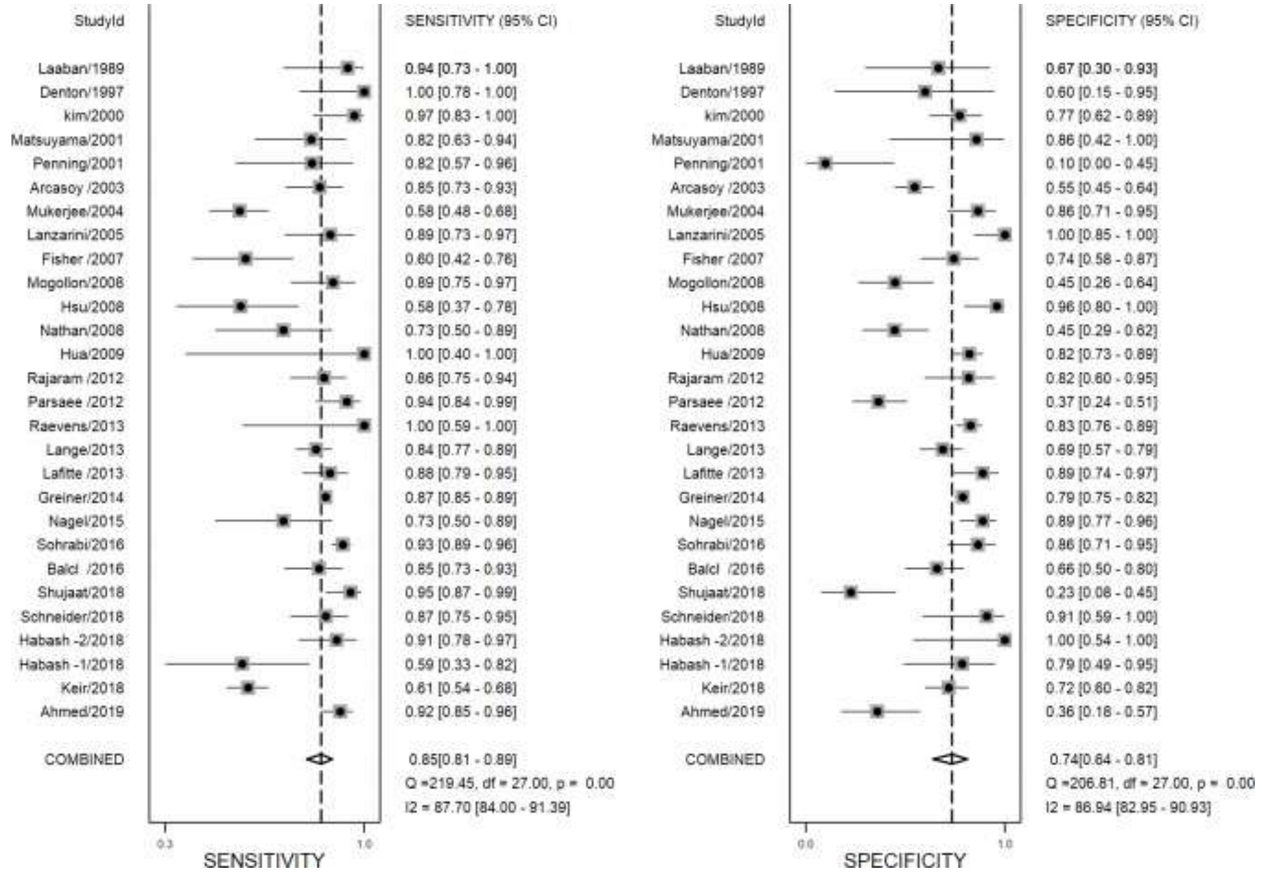
Pulmonary hypertension and HIV



Ten-fold higher prevalence in people with HIV

Sensitivity of echocardiography for diagnosing pulmonary hypertension ~80%.

Lancet Healthy Longev. 2021 Jul;2(7):e389-e390.
BMJ Open. 2019 Dec 22;9(12):e033084.

Traditional vs. extended criteria for the lung donor without HIV.

Table 1
Criteria used to assess donor lung suitability, defining a "standard lung donor"

Traditional Criteria (Standard Donor)	Extended Criteria (Marginal Donors)
Age ≤55 y	Age >70 y
Clear chest X-ray	Minor diffuse and moderate focal chest radiograph changes acceptable
Pao_2 ≥300 on Fio_2 = 1.0 and positive end-expiratory pressure (PEEP) 5 cm H_2O	Pao_2/Fio_2 <300 mm Hg on PEEP 5 cm H_2O
Tobacco history ≤20 pack yr	Tobacco history <40 pack yr
Absence of chest trauma	Chest trauma not relevant if good pulmonary function
No history of primary pulmonary disease or active pulmonary infection	
No evidence of aspiration/sepsis	Aspiration/sepsis acceptable if good, stable/improving pulmonary function
Absence of pulmonary secretions at bronchoscopy	Purulent secretions not relevant if good, stable/improving pulmonary function
No evidence for human immunodeficiency virus, hepatitis B, hepatitis C, or any other relevant viral disease	
No history or evidence of malignant disease	
ABO compatibility	
Sputum Gram stains: absence of organisms	

- What is an acceptable treatment history for the HIV D+ lung donor?
- When should opportunistic infections exclude lung donation?
- What smoking history is acceptable?
- Single vs double?

Anesthesiology Clin 2019; 37:639–660.

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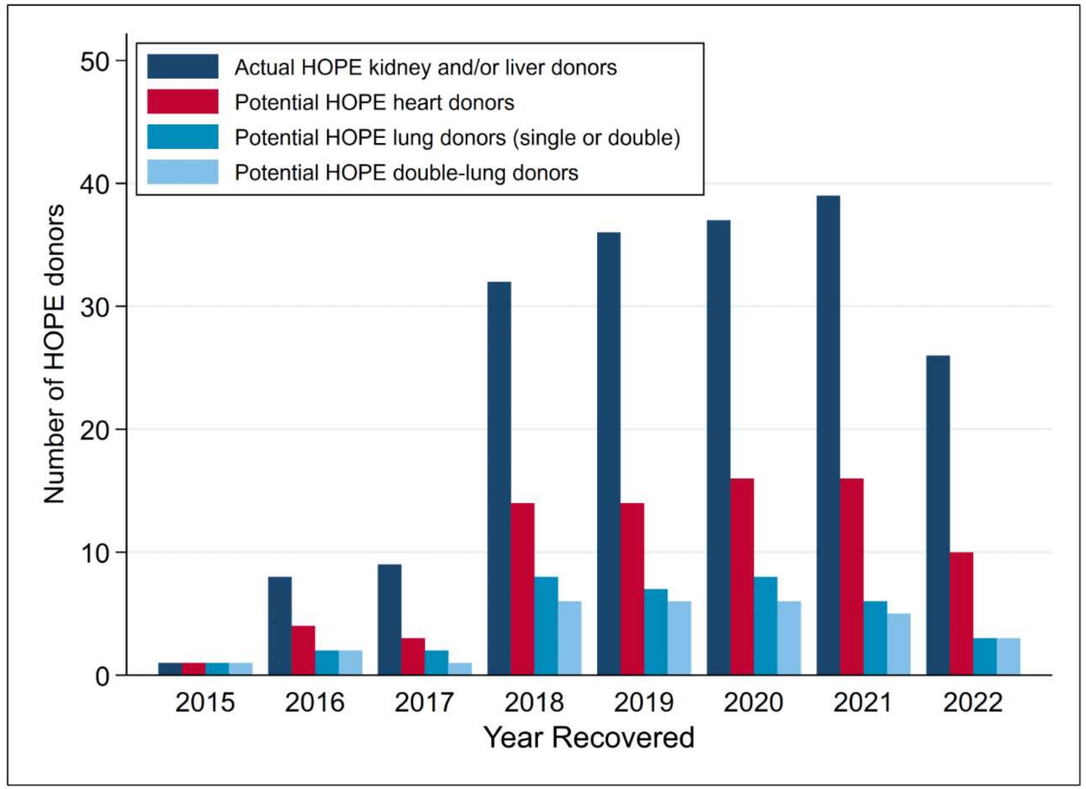
The anticipated number of available thoracic HOPE donors may be less than demand

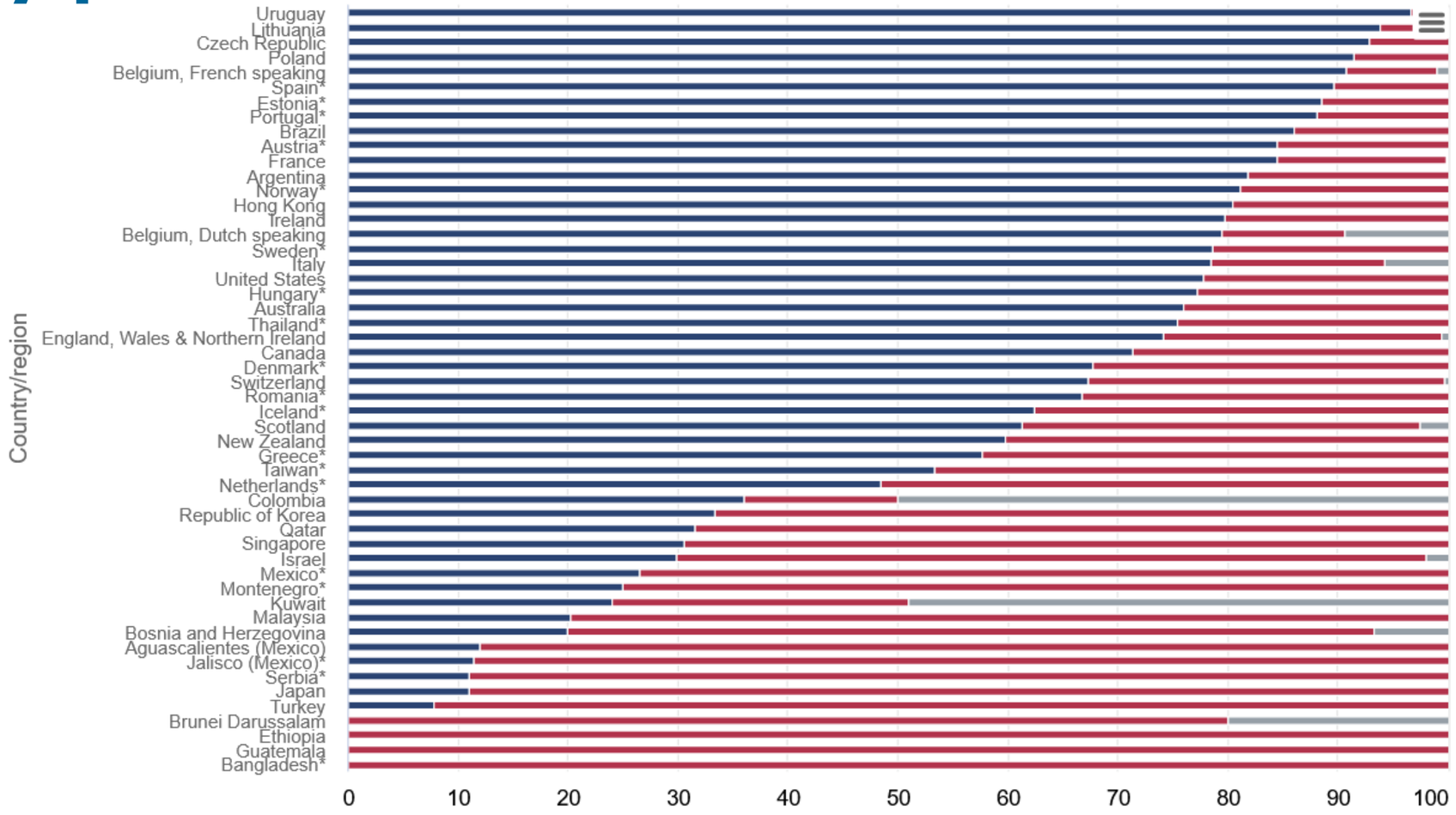
- I think extrapolations from abdominal numbers are an upper bound on the actual number of available thoracic donors via the HOPE program in the United States and internationally
- False positive donors will be the low-hanging fruit



ATC 2023, abstract 193

Living donors are the majority of kidney transplant donors for many parts of the world

- Many centers (including my own) hesitant to accept PLWH as living donors due to concerns about long term donor health



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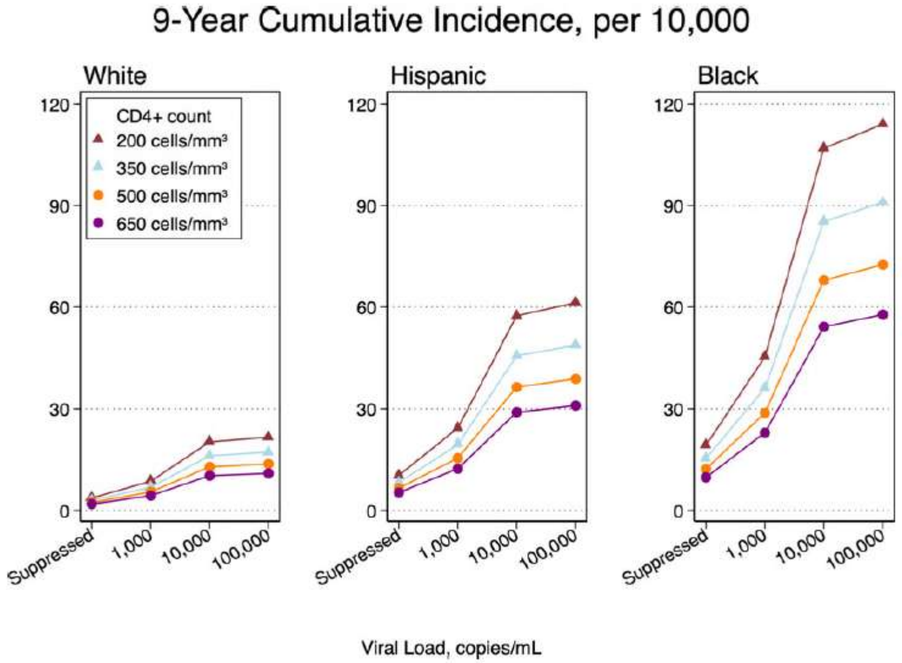
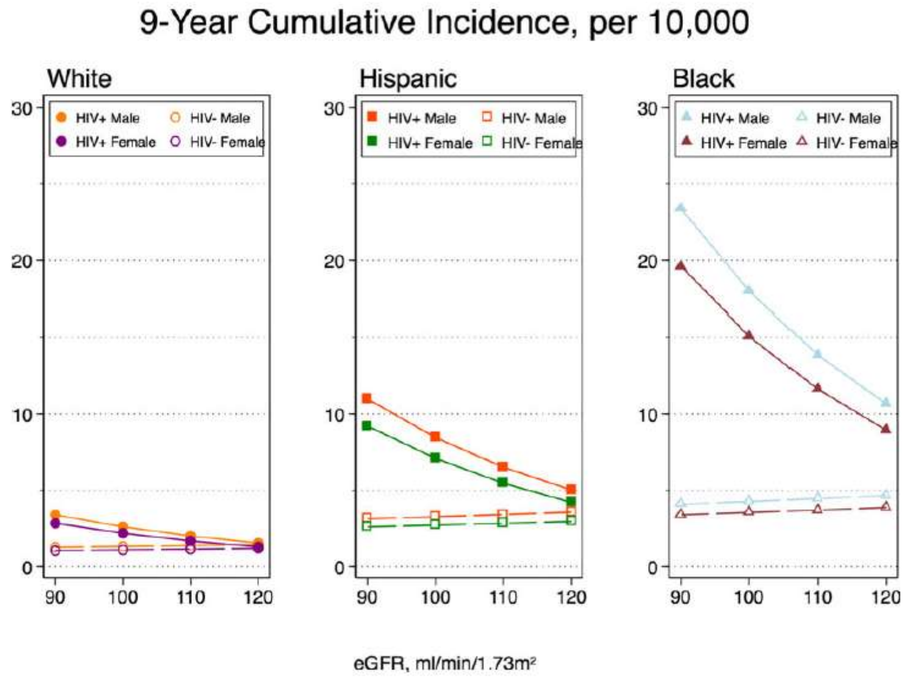
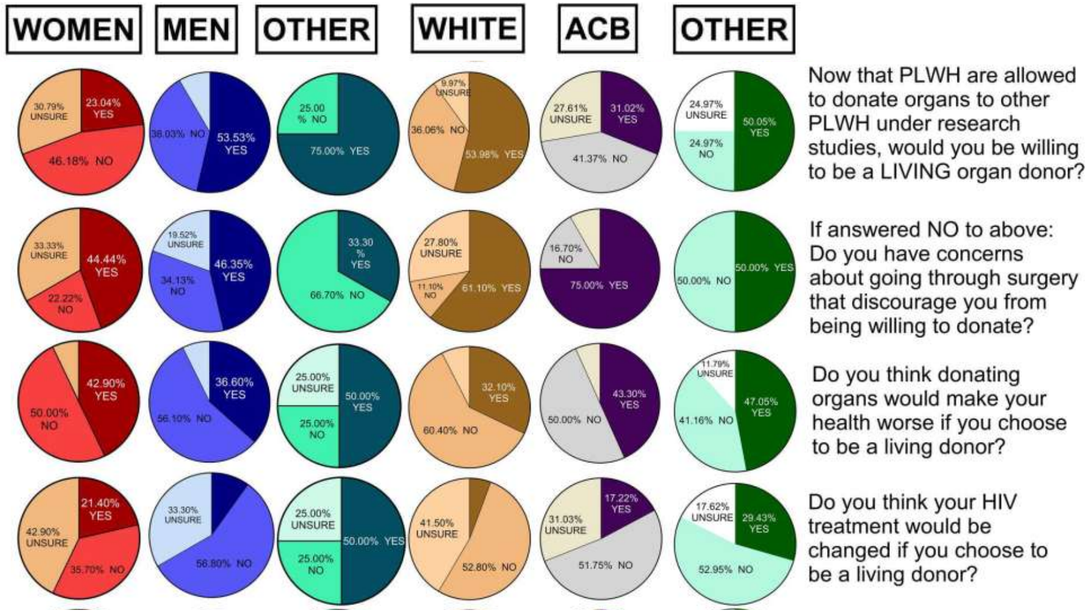
Potential live donors have elevated but acceptable risks of ESRD





American Journal of Transplantation 2017; 17: 1823–1832

Many PLWH are willing to be living organ donors



- 64% of PLWH in a primary care clinic willing to be living organ donors
- Concerns:
  - Will need to change ARV regimen
  - Surgery
  - Long term health implications
- Reasons for interest
  - Helping a fellow HIV survivor
  - Decreasing stigma

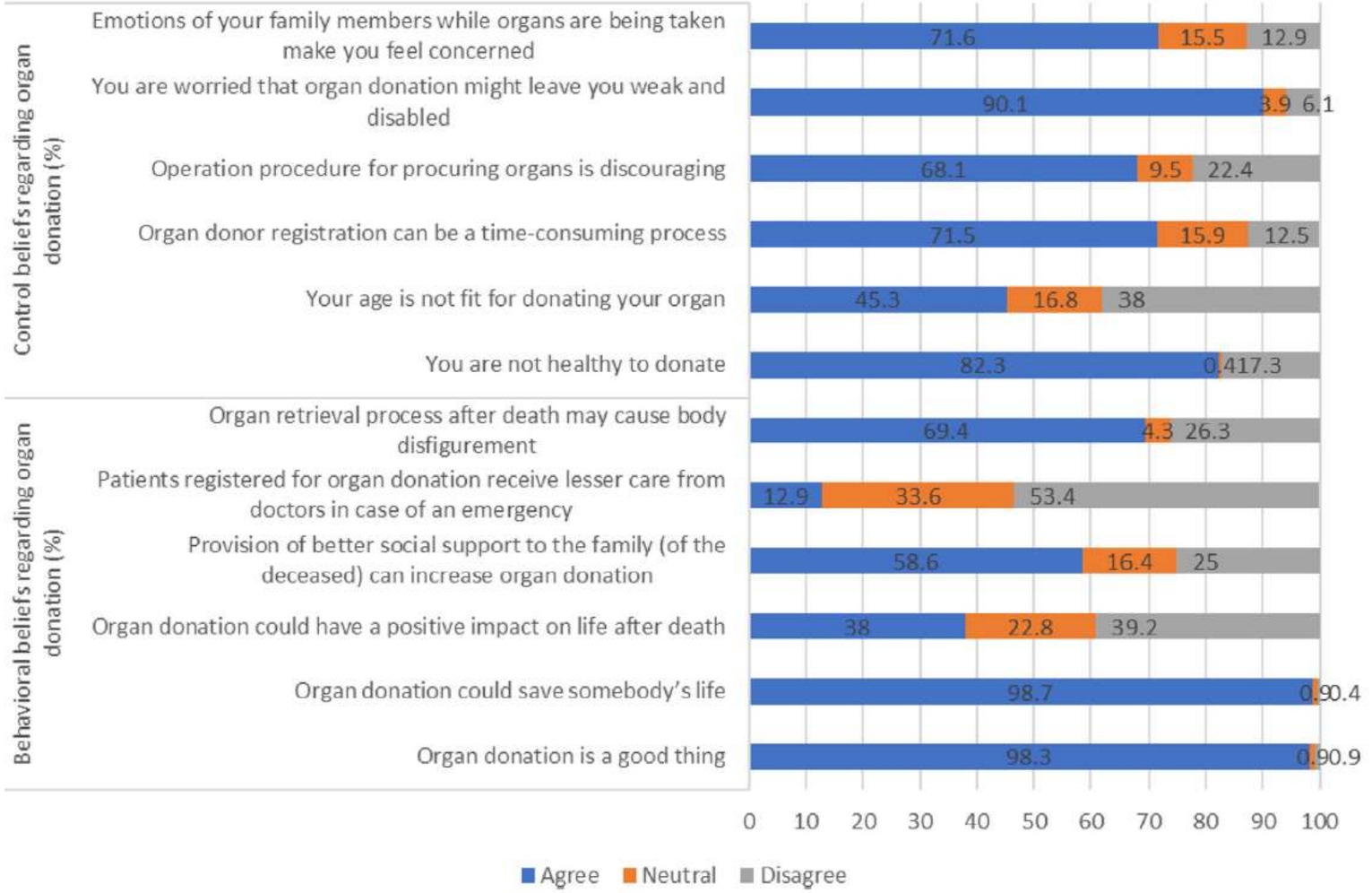
Canada

AIDS Care. 2025 May;37(5):832-842.

United States

J Acquir Immune Defic Syndr. 2018 Sep 1;79(1):e30-e36.
AIDS Care. 2018 Dec;30(12):1595-1599

Patient concerns regarding living donor transplant likely very dependent on the specific country



- Concerns about bodily disfigurement or family concerns more prominent in this Ugandan study
- More research in multiple settings will help to clarify barriers to living donor transplant

Transpl Infect Dis. 2024 Jun;26(3):e14300.

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Living donors to date in the United States

- First living HIV D+ kidney transplant was inadvertent
  - No development of ESRD 11 years post-donation
- Three HIV D+/R+ living donor kidney transplants in US
  - All APOL1 negative
  - Pre-transplant biopsies reassuring
  - No ESRD to date in donors or recipients

Transpl Infect Dis. 2021 Aug;23(4):e13691.

Lancet Reg Health Am. 2023 Jul 24:24:100553.

Cases reported in a number of countries worldwide

- Case reports of living donor kidney transplant internationally with good short-intermediate outcomes
  - India
  - Israel
  - Germany
- Single case of HIV D+/R- mother-to-child living donor liver transplant in South Africa

Indian J Nephrol 2022;32:375-7.
Transpl Infect Dis. 2019 Dec;21(6):e13171.
Transplant Proc. 2020 Nov;52(9):2739-2741.
AIDS. 2018 Oct 10;32(16):F13–F19.

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  - Neeraja Swaminathan
- Heart transplant
  - Ulrich Jorde
  - Snehal Patel
  - Omar Saeed
  - Shivank Madan
- Lung transplant
  - Mohammed Abbasi
  - Ali Mansour
- Montefiore Transplant ID
  - Yoram Puius
  - Grace Minamoto
  - Victoria Muggia
  - Rachel Bartash
  - Daniel Burack
  - Helen Tsai
  - Margaret McCort

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