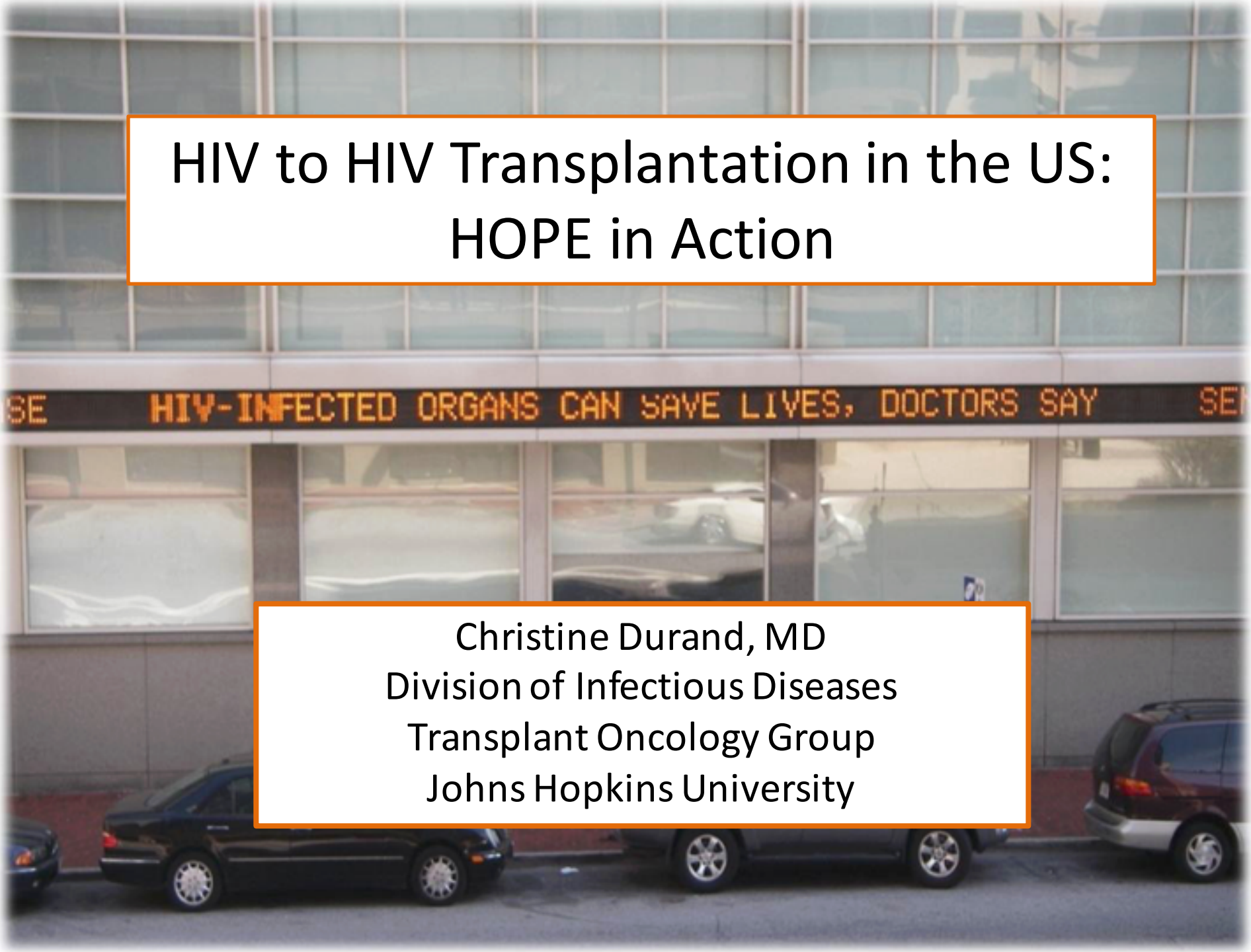
HIV to HIV Transplantation in the US: HOPE in Action



Christine Durand, MD
Division of Infectious Diseases
Transplant Oncology Group
Johns Hopkins University

Disclosures

- Advisory boards and research grants to JHU from Merck Pharmaceuticals, Gilead Sciences, Bristol Meyers Squibb

Funding:

- Living Legacy Foundation, Maryland
- JHU, Discovery Fund
- JHU Center for AIDS Research 1P30AI094189
- NIH R01-AI120938 (Tobian)
- NIH R34-AI123023 (Durand)
- NIH K23-CA177321 (Durand)

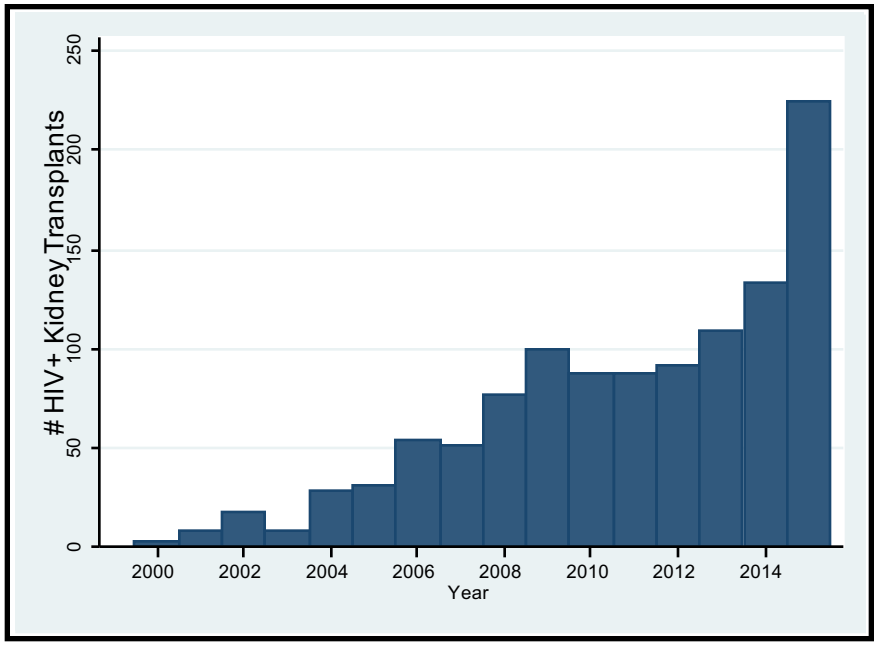
Outline

- Motivation for HIV+ donor organs (D+) for HIV+ recipients (R+) in need of transplant
- Knowledge gaps, risks
- Clinical trials
  - Parent/pilot trial – early outcomes
  - NIH funded multicenter kidney trial

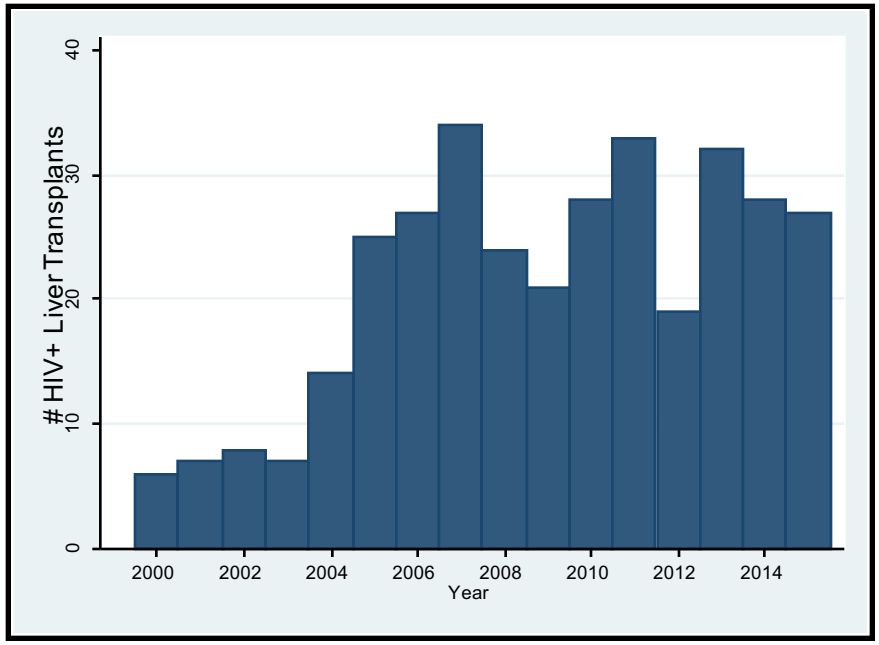
Motivation/Significance

- Prevalence of end stage kidney and liver disease in HIV+ increasing (Lucas CID 2014; Smith Lancet 2014)
- HIV+ candidates have higher waitlist mortality compared to HIV- (Trullas AIDS 2011, Ragni Liver Transpl 2005)
- Excellent outcomes with HIV- organs for HIV recipients (HIV D-/R+) (Roland AIDS 2016, Locke JASN 2015; Locke Transplantation 2016)

US HIV D-/R+ transplant volumes



HIV+ Kidney Transplants



HIV+ Liver Transplants

S Africa: HIV D+/R+ Kidney Transplant

The NEW ENGLAND JOURNAL of MEDICINE

Renal Transplantation between HIV-Positive Donors and Recipients

Table 1. Clinical Characteristics of HIV-Positive Recipients of a Transplant from an HIV-Positive Donor.*

Characteristic	Patient 1	Patient 2	Patient 3	Patient 4
Age (yr)	47	56	37	29
Sex	Male	Male	Male	Female
Before transplantation				
Diagnosis on renal biopsy	HIV-associated nephropathy	HIV-associated nephropathy and hypertensive nephropathy	Malignant hypertension	HIV-associated nephropathy
Creatinine (μmol/liter)	678	582	1712	725
CD4 count (cells/mm³)	288	258	132	147
HIV viral load (copies/ml)	<50	<50	<50	<50
Antiretroviral regimen	Tenofovir, lamivudine, and lopinavir–ritonavir	Stavudine, lamivudine, and efavirenz	Stavudine, lamivudine, and nevirapine	Zidovudine, lamivudine, and nevirapine

Muller et al, NEJM 2010: 362: 2336-7

National Organ Transplant Act, 1984/88

42 U.S.C. 274(b) Sect 372(b):

"requires the OPTN to adopt and use standards for preventing the acquisition of organs from individuals known to be infected with HIV."

American Journal of Transplantation 2011; 11: 1209–1217
Wiley Periodicals Inc.

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doi: 10.1111/j.1600-6143.2011.03506.x

Estimating the Potential Pool of HIV-Infected Deceased Organ Donors in the United States

B. J. Boyarsky[a], E. C. Hall[a,b], A. L. Singer[a], R. A. Montgomery[a], K. A. Gebo[c,d,e] and D. L. Segev[a,d,*]

[a] *Department of Surgery, Johns Hopkins School of Medicine, Baltimore, MD*
[b] *Department of Surgery, Georgetown University School of Medicine, Washington, DC*
[c] *Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD*
[d] *Department of Epidemiology, Johns Hopkins School of Public Health, Baltimore, MD*
[e] *HIV Research Network, Baltimore, MD*
* *Corresponding author: Dorry L. Segev, dorry@jhmi.edu*

- 2000-2008
- 2 national registries (NIS, HIVRN)
- Excluded those with missing data and medical contraindication
- 500-600 donors per year

HOPE (HIV Organ Policy Equity) Act
November 21, 2013

HOPE Act Mandates

- Directs the Secretary to revise current regulations (specifically, 42 CFR 121.6)
- June 2015
- Directs Secretary to publish research criteria relating to HIV+ to HIV+ transplant
- November 2015
- Requires the OPTN to revise standards for the acquisition and transportation of donated HIV+ organs
- November 2015

HIV D+/R+: research only for now

The Hope Act states "not later than 4 years after the date of enactment and annually thereafter, the Secretary shall review the results of scientific research in conjunction with the OPTN to determine whether the results warrant revision of the standards of quality."

- IRB approved protocol
- Open Variance from OPTN

OPTN | UNOS

Learn if the use of HIV+ deceased donors is ***safe and effective*** in the US

American Journal of Transplantation 2015; 15: 2023–2030
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doi: 10.1111/ajt.13344

Minireview

Challenges and Clinical Decision-Making in HIV-to-HIV Transplantation: Insights From the HIV Literature

B. J. Boyarsky[1], C. M. Durand[2], F. J. Palella Jr.[3] and D. L. Segev[1,4,*]

[1]*Department of Surgery, Johns Hopkins School of Medicine, Baltimore, MD*
[2]*Department of Medicine, Johns Hopkins School of Medicine, Baltimore, MD*
[3]*Department of Medicine, Feinberg School of Medicine, Northwestern University Chicago, Chicago, IL*
[4]*Department of Epidemiology, Johns Hopkins School of Public Health, Baltimore, MD*
[*]*Corresponding author: Dorry Segev, dorry@jhmi.edu*

Biologic risks

- HIV superinfection
- HIV nephropathy
- Donor derived infections
- Rejection

Key differences: US and S Africa

	South Africa	US
Population	53 million	316 million
Persons living with HIV	5.6 million	1.1 million
HIV+ prevalence	17.8%	0.6%
Predominant subtype	C	B
Annual HIV+ deaths	310,000	17,000
Transmitted drug resistance	< 5%	10-18%
Transplant wait list	4300	123,992
Transplant per year	229	16,896

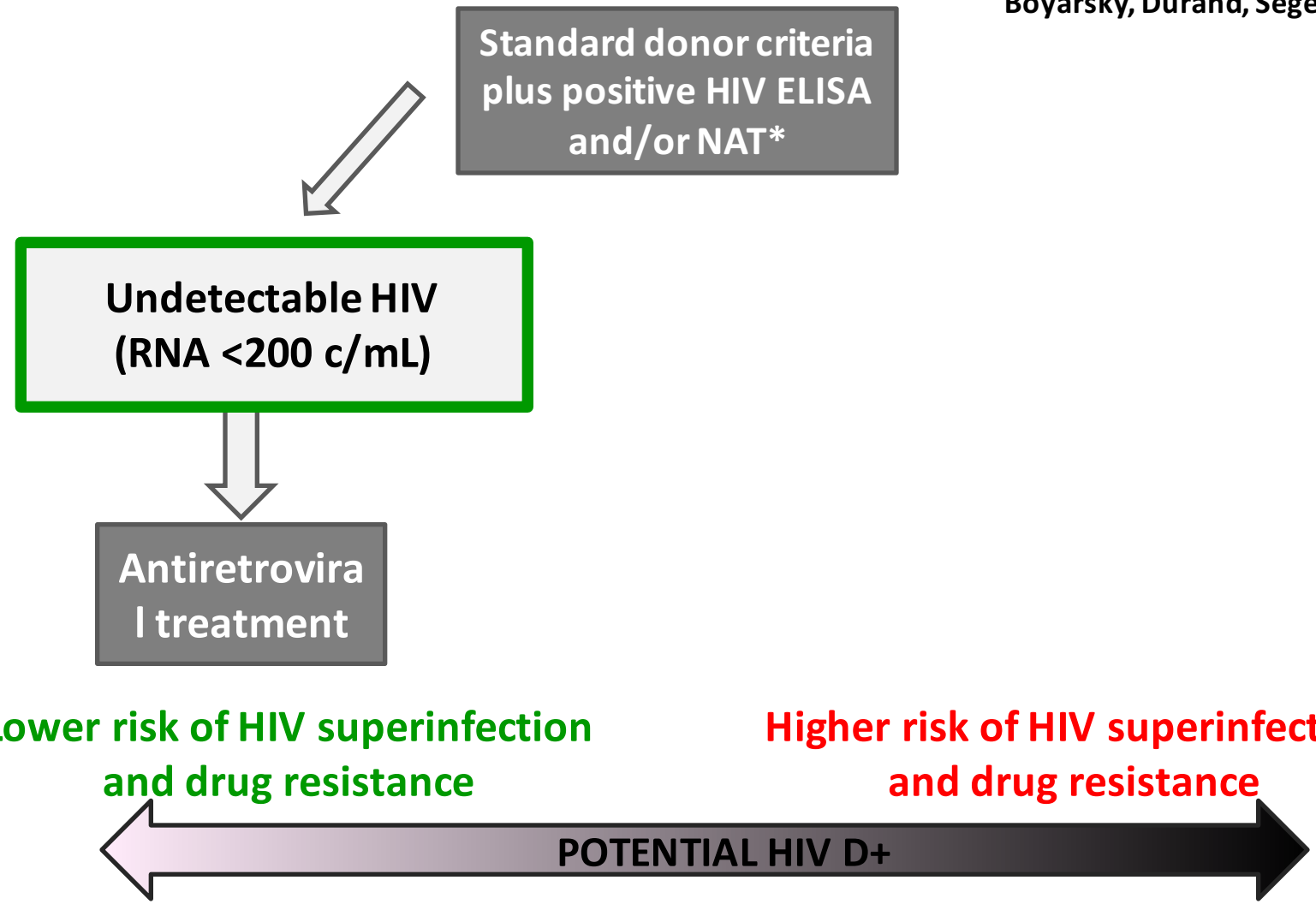
Durand/Segev, AJT 2015; 15:2023-30

Boyarsky, Durand, Segev AJT in press

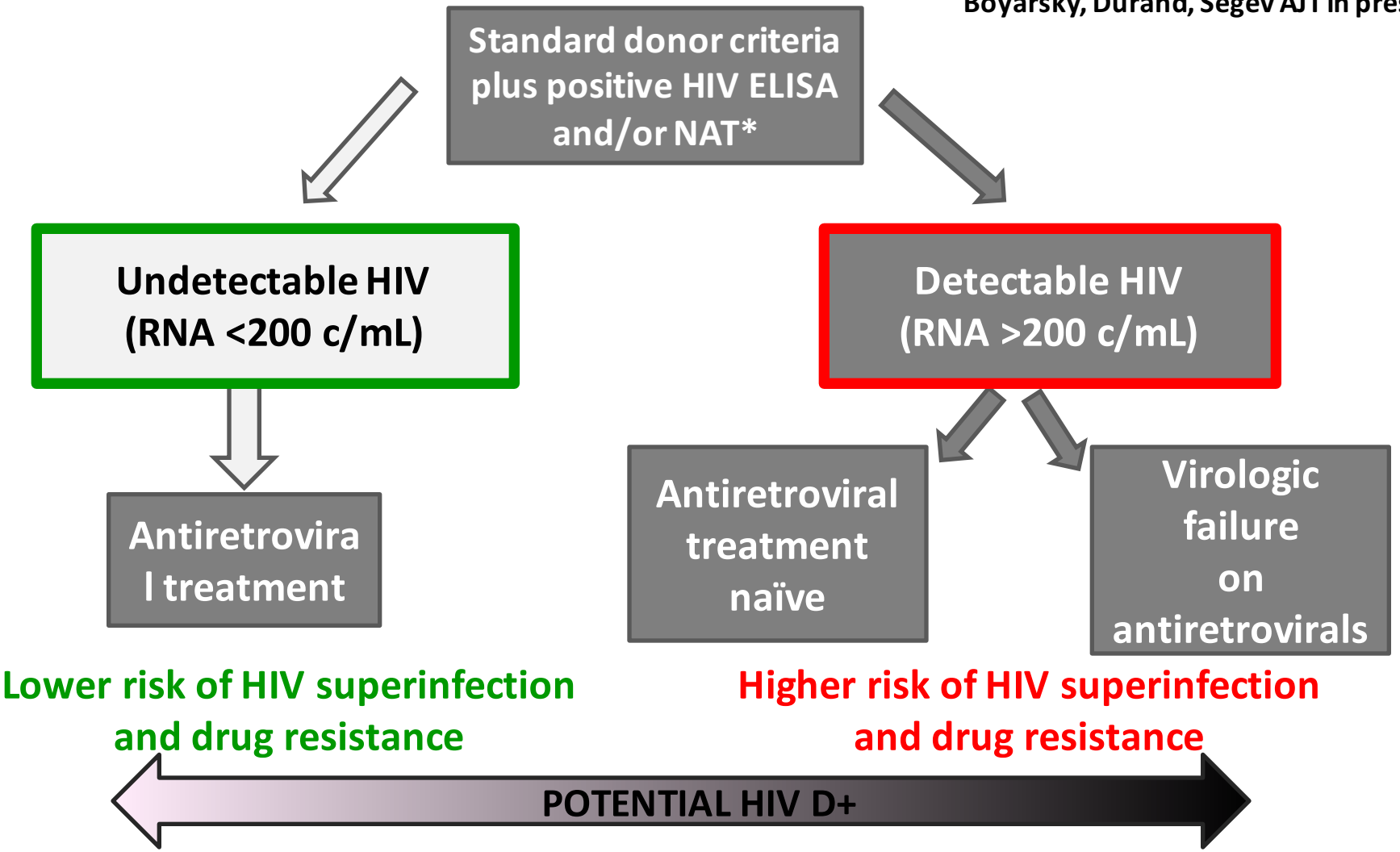
- First line ART regimen
- R5 tropic virus
- Potential for PI Ritonavir -sparing regimen
- Higher CD4+ T cell count

- Second-line ART
- X4 tropic virus
- History of drug resistance
- Requires PI/Ritonavir-based regimen
- Lower CD4+ T cell count

Boyarsky, Durand, Segev AJT in press



Boyarsky, Durand, Segev AJT in press



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HOPE IN ACTION

Learn if the use of HIV+ deceased donors in the is ***safe and effective*** in the US

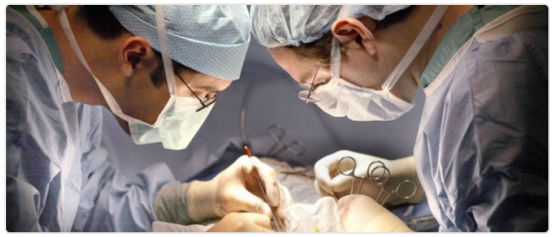
- Parent/pilot transplant trial

ClinicalTrials.gov: NCT02602262

CDC follows

Dr. Hazel Dean @DrDeanCDC · 2h
Great news! @HopkinsMedicine doctors performed 1st-ever liver **transplant** btwn **#HIV**+ patients 1.usa.gov/25KH8ab

ABC News @ABC · Mar 31
1st liver **transplant** between **HIV**-positive donor and recipient is milestone for **HIV** patients. abcn.ws/25yxvv3



Gizmodo @Gizmodo · Mar 31
Doctors successfully **transplant HIV**-infected organs in the US for the first time gizmo.do/dtetzER

AIDS.gov @AIDSgov · 41m
#DYK the HOPE Act is saving & improving lives, such as the 1st ever **#HIV**-positive to **HIV**-positive organ **transplant**?1.usa.gov/1q9wU2f

Christopher Anderson via **Los Angeles Times**
19 hrs

It's great to see that the HIV Organ Policy Equity Act (HOPE Act), which I introduced in the House and was signed into law, is working to save lives!

THE BALTIMORE SUN

BREAKING SPORTS MARYLAND POLITICS OPINION OBITS ENEWSPAPER ADVERTISING

Johns Hopkins performs first transplants between donors, recipients infected with HIV

January 2016, Pilot protocol (NCT02602262)
March 2016, First in US HIV D+/R+ kidney and liver transplants

HEALTH

Hopkins Begins

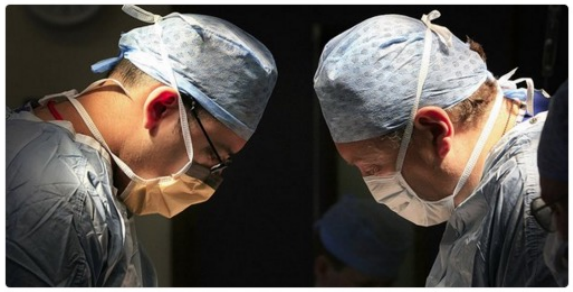
By THE ASSOCIATED PRESS MARCH 30,

WASHINGTON —
transplanted organ
recipients, a long-
whose kidneys or l

Johns Hopkins Un
recovering well after one received a kidney and the other a liver from a deceased donor — organs that ordinarily would have been thrown away because of the HIV infection.

Doctors in South Africa have reported successfully transplanting HIV-positive kidneys but Hopkins said the HIV-positive liver transplant is the first worldwide. Hopkins didn't identify its patients, but said the kidney recipient is recuperating at home and the liver recipient is expected to be

People Magazine @people · Mar 31
Johns Hopkins performs first successful **HIV**-positive organ **transplant** peoplem.ag/YvMn3vR



This is the culmination of 6 years of research, writing and passing a congressional bill, setting up policy and safety protocols, and actually doing the thing. Press conference today at noon. Lesson: you can change the world, but it ain't easy. Or, in the words of Stephen Sondheim: wishes come true, not free.

STAT

For patients living with both HIV and end-stage organ disease… this could mean a new chance at life.

Dr. Dorry Segev, transplant surgeon

Read more at statnews.com

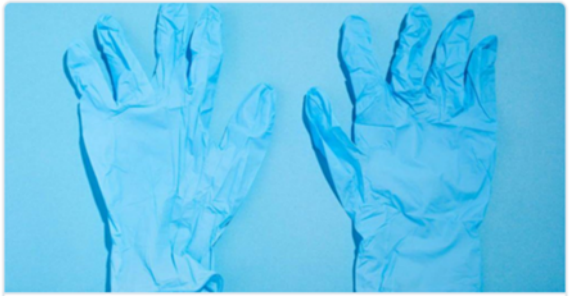
The White House OSTP @whitehouseostp
Great to see the HOPE Act beginning to save lives.

News from JHM @HopkinsMedNews
Today docs at Johns Hopkins share news of landmark surgeries that took place after the passage of HOPE Act. @WhiteHouse. #HopkinsGivesHOPE

New Source Of **Transplant** Organs For Patients With **HIV**: Others With **HIV** n.pr/1RLlzxl

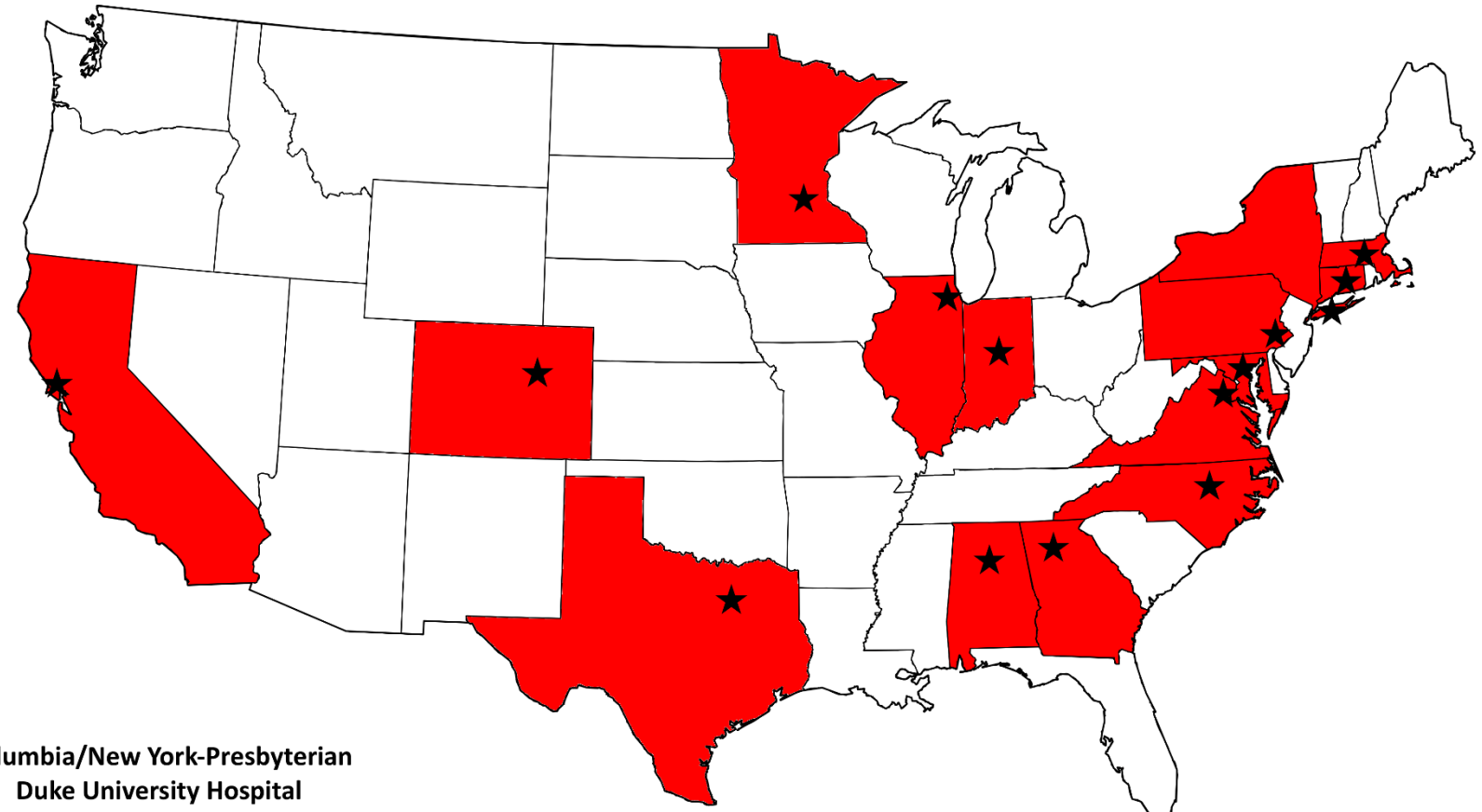
27 18 View summary

TIME.com @TIME · Mar 31
First ever **HIV**-to-**HIV** liver **transplant** performed in U.S. ti.me/1pMuWVe



First Transplant from HIV-Positive Donor Performed …

UNOS variance – 19 active centers

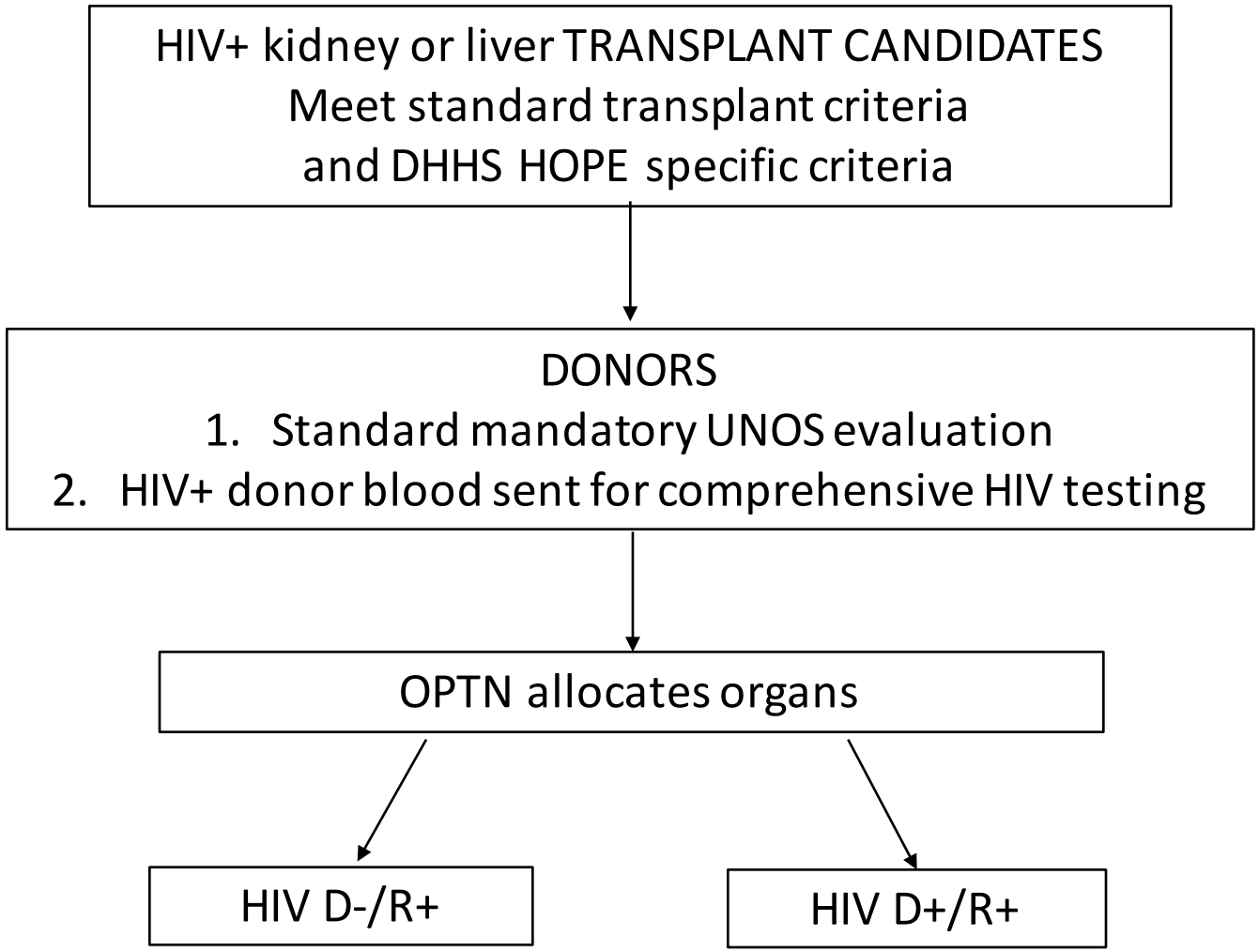


Columbia/New York-Presbyterian
Duke University Hospital
Emory University Hospital
Georgetown University Medical Center
Hahnemann University Hospital
Indiana University Health
The Johns Hopkins Hospital
Massachusetts General Hospital

Methodist Dallas Medical Center
Montefiore Medical Center
Mount Sinai Medical Center
Rush University Medical Center
University of Alabama at Birmingham
University of California, San Francisco

University of Colorado, Denver
University of Maryland Medical System
University of Minnesota
Virginia Commonwealth University Medical Center
Yale New Haven Hospital

Methods: Trial Design



ClinicalTrials.gov: NCT02602262

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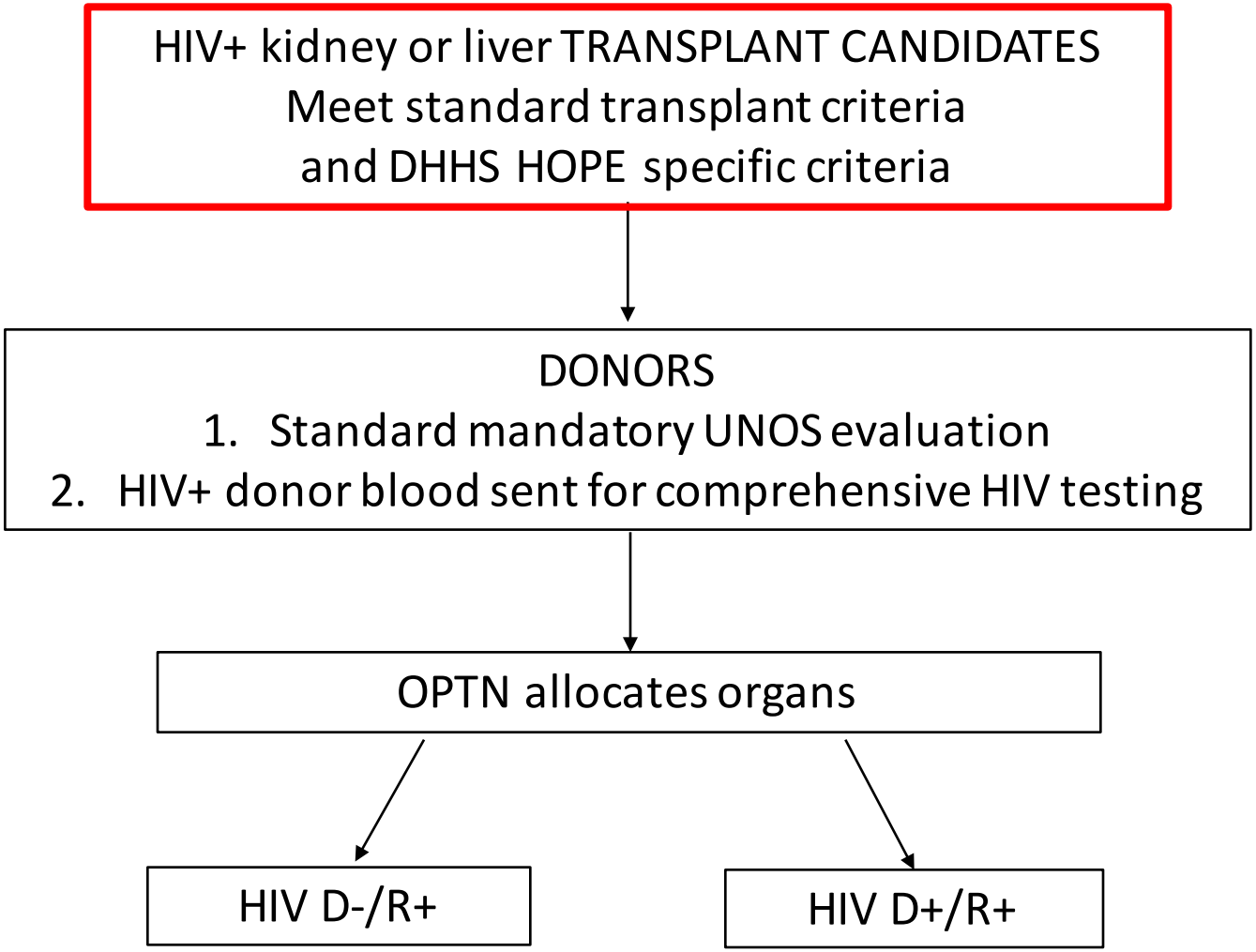


ClinicalTrials.gov: NCT02602262

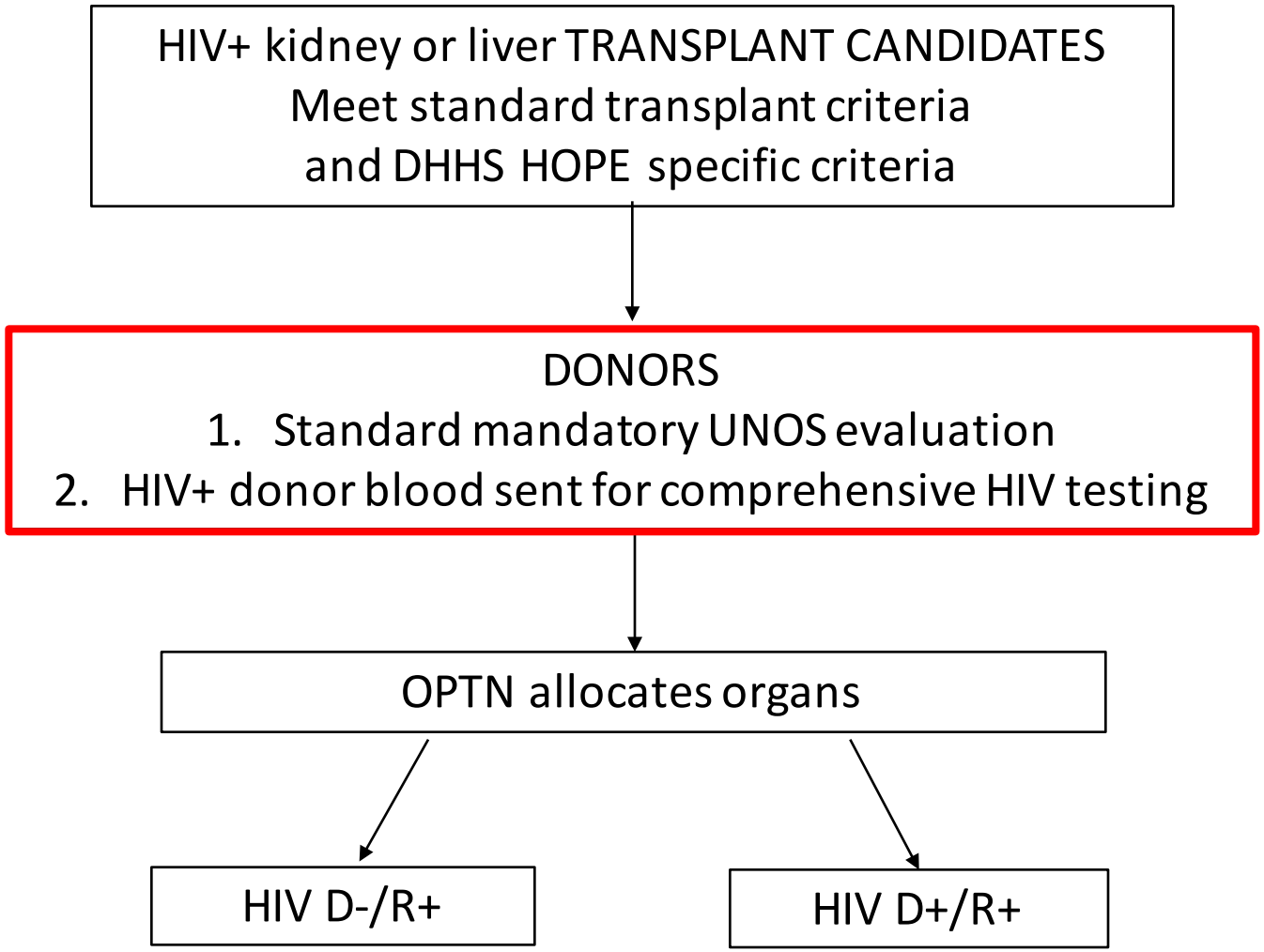
HIV+ Candidate Inclusion Criteria

- No active opportunistic infections or cancer
- Kidney CD4 > 200 cells
  - HIV RNA suppressed on effective ART
- Liver CD4 > 100 cells
  - If unable to tolerate ART, an effective regimen is anticipated post-transplant

Federal Register / Vol. 80, No. 227 / Wednesday, November 25, 2015 / Notices

Methods: Trial Design

HOPE IN ACTION



ClinicalTrials.gov: NCT02602262

HIV D+ Inclusion Criteria

- No active opportunistic infections or cancer
- Any HIV VL or CD4 count is allowed but study team must describe effective post-transplant antiretroviral regimen for the recipient

Federal Register / Vol. 80, No. 227 / Wednesday, November 25, 2015 / Notices

HIV D- eligibility

- Per transplant center study team
- Including donors with no history of HIV who test positive during donor screening – <u>suspected false positives</u>
- Historically organs from these donors were not recovered now allowed under HOPE Act

Suspected HIV False Positive Donor: Definition

HOPE IN ACTION

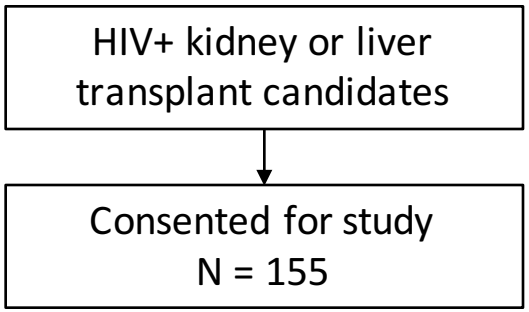
1. Clinical suspicion of false positive: no history of HIV per chart review and Donor Risk Assessment Interview

2. Discordant HIV Ab and NAT on standard OPTN screening*

*Must fulfill both criteria, discordant Ab and NAT alone does not indicate a false positive

- HIV+ donors on ART can be HIV Ab+/NAT- (treatment suppresses HIV nucleic acid)
- HIV+ donors acutely infected can be HIV Ab- and NAT+ (before seroconversion)

Trial Enrollment



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Consented patients, by site

Characteristic	Johns Hopkins	Mount Sinai	Yale University	Indiana University	Emory University	University of Alabama
	N = 42	N = 94	N = 4	N = 2	N = 9	N = 1
Age, yr, Med (IQR)	52 (42-57)	53 (47-58)	58 (51-61)	52 (45-59)	50 (37-51)	33 (33-33)
Female; N (%)	11 (33%)	26 (31%)	1 (25%)	0 (0%)	1 (11%)	0 (0%)
Race; N (%)						
White	6 (15%)	29 (31%)	1 (25%)	0 (0%)	0 (0%)	0 (0%)
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Non-Hispanic	28 (85%)	74 (88%)	4 (100%)	2 (100%)	9 (100%)	1 (100%)
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Organ; N (%)						
Kidney only	32 (76%)	84 (87%)	4 (100%)	2 (100%)	9 (100%)	1 (100%)
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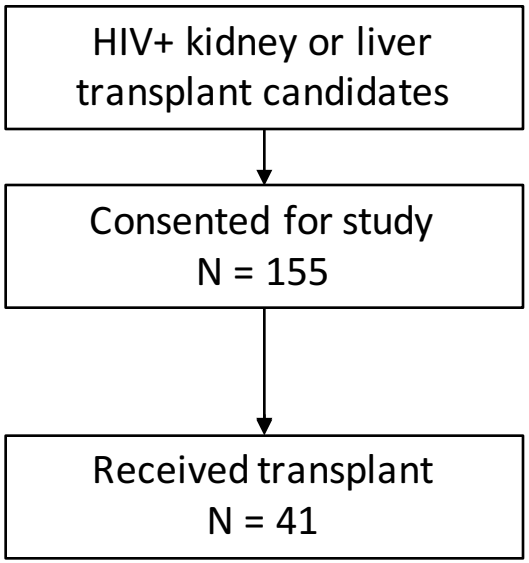
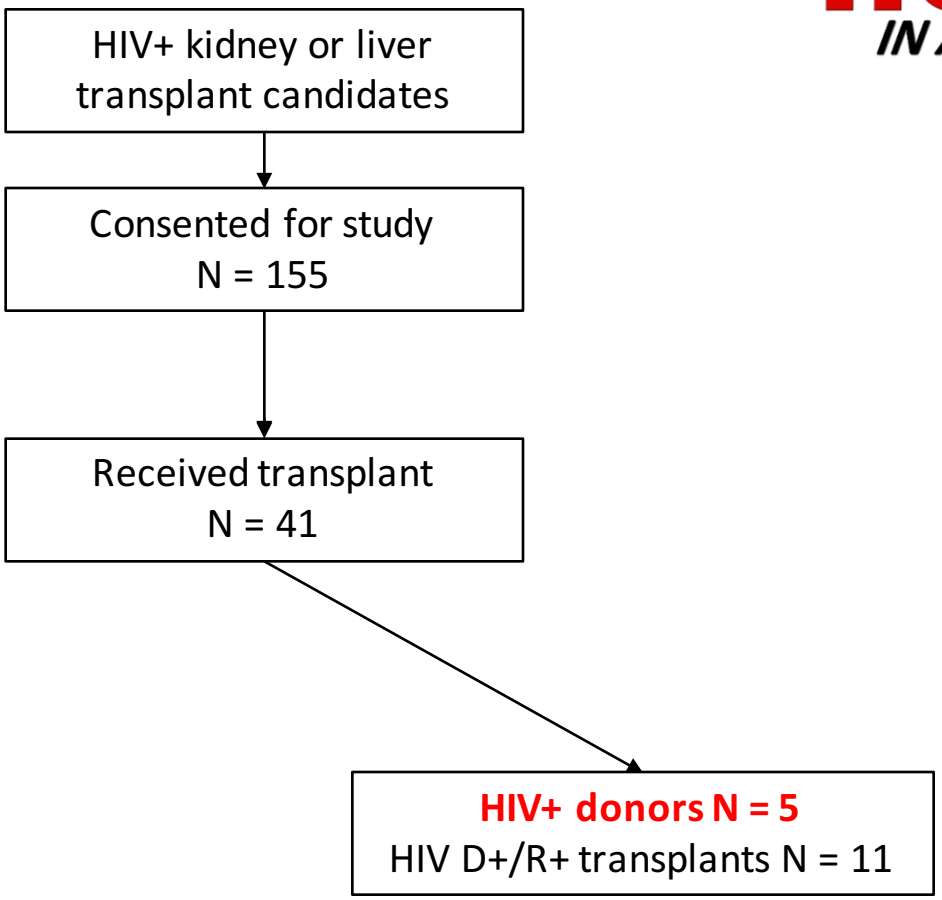
Trial Enrollment



ClinicalTrials.gov: NCT02602262

Trial Enrollment



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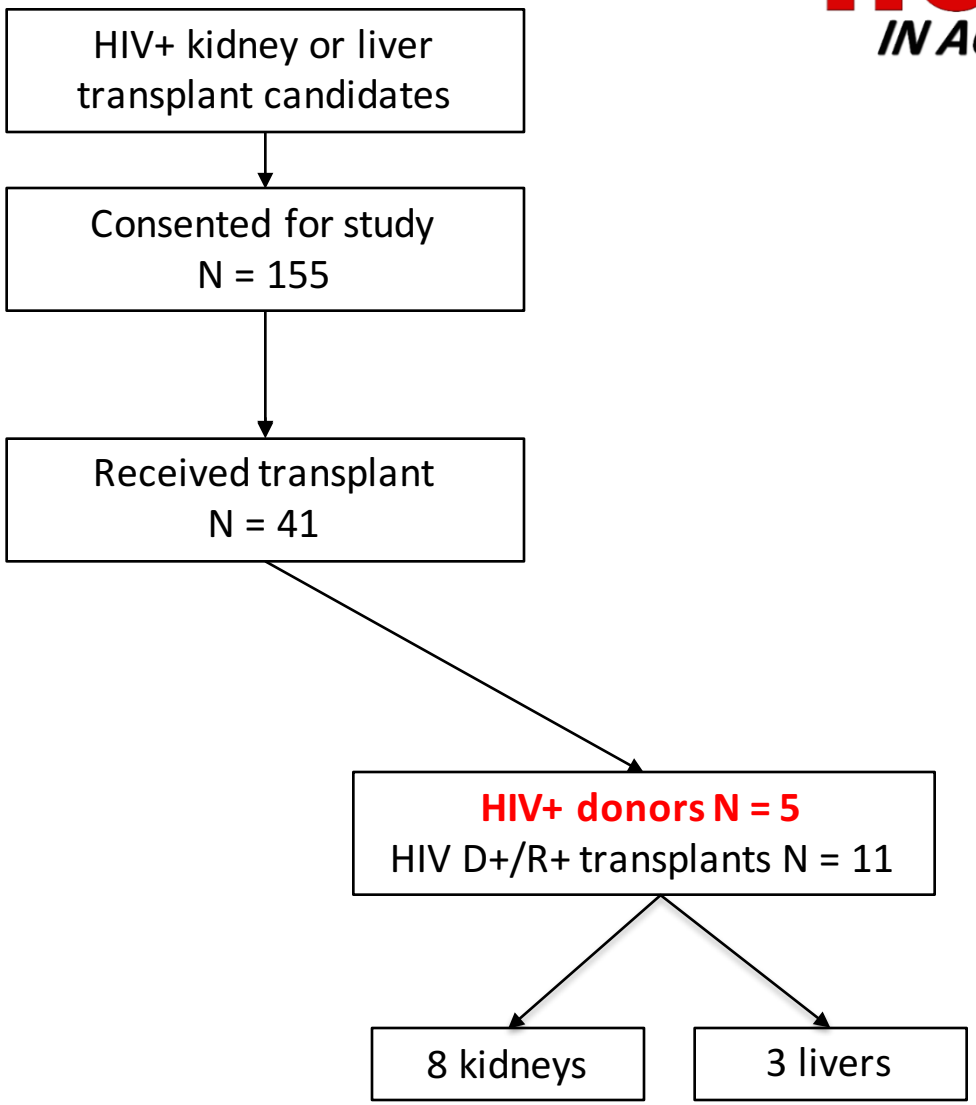

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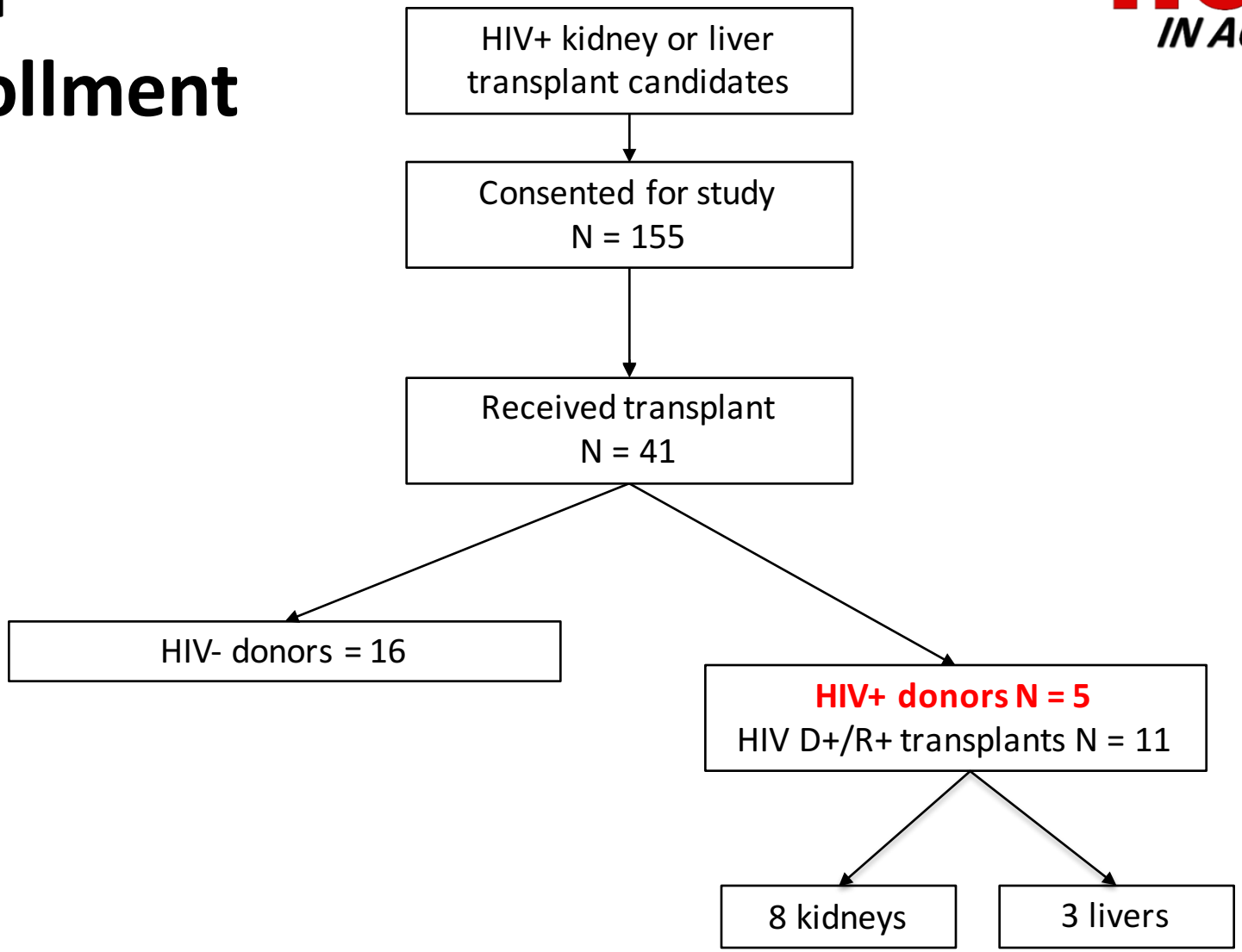

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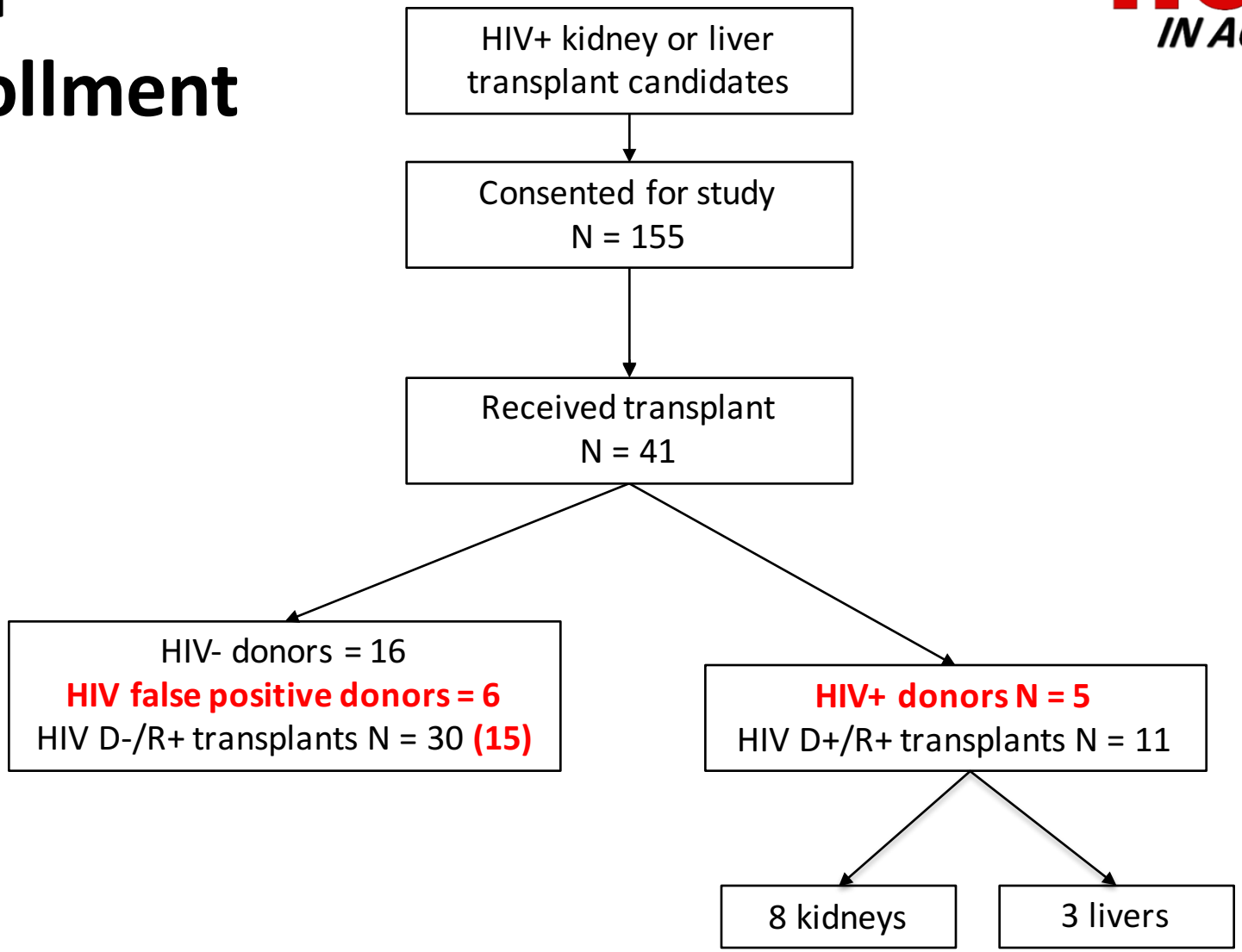

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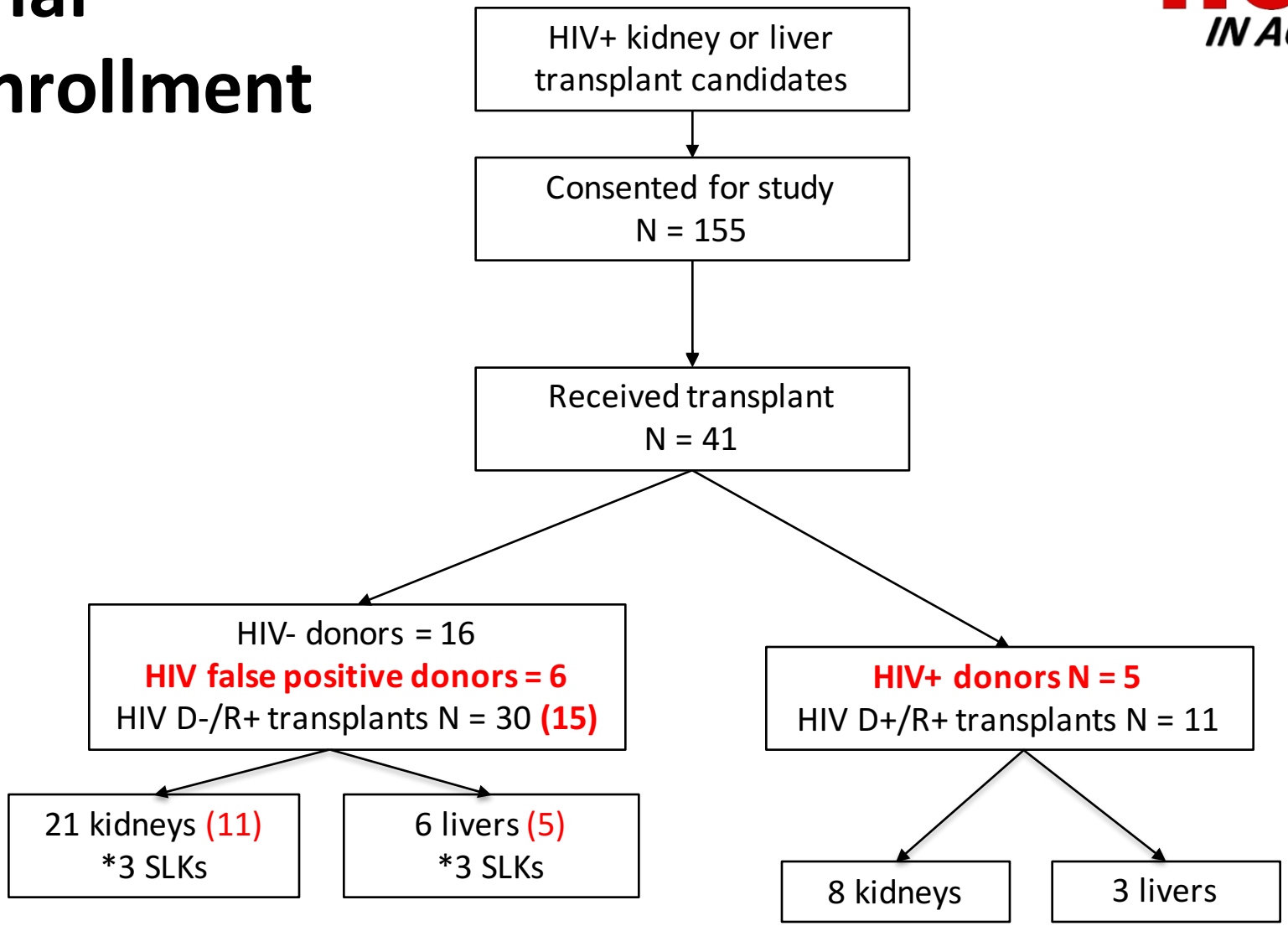

ClinicalTrials.gov: NCT02602262

Donor characteristics

Characteristic	HIV- donor (N=22)	HIV+ donor (N=5)
Age, yr, Med (IQR)	31 (25-39)	31 (28-35)
Female; N (%)	7 (32%)	3 (60%)
Race/Ethnicity; N (%)		
White	8 (36%)	1 (20%)
Black/African American	10 (45%)	3 (60%)
Asian	1 (5%)	0 (0%)
Hispanic	3 (14%)	1 (20%)
KDPI; Med (IQR)*	44 (23-54)	30 (28-54)
BMI, kg/m^2; Med (IQR)	25 (21-27)	23 (23-26)

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HIV+ donor characteristics (N=5)

Characteristic	HIV+ donor (N=5)
CD4+ T-cell count, cells/mm^3	980 (476-1533)
HIV plasma RNA, copies/mL; N (%)	
Detectable plasma RNA (140 & 2200 c/mL)	2 (40%)
Undetectable (<20 copies/mL)	3 (60%)
Hepatitis C Antibody Positive; N (%)	0 (0%)
Hepatitis C NAT Positive; N (%)	0 (0%)
Hepatitis B Surface Ag Positive; N (%)	0 (0%)
Hepatitis B Core Antibody Positive; N (%)	0 (0%)
ART Resistance by Clinical Review; N (%)	1 (20%)

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ART Resistance by Clinical Review; N (%)	1 (20%)

HIV D+/R+ ART

Donor	Donor ART	Recipient	Recipient Post-transplant ART*	Organ
1	3TC DTG RTV DRV	1	FTC TAF DTG MVC	Liver
		2	FTC TAF DTG MVC	Kidney
2	ATV RTV TDF FTC	3	RAL ABC 3TC	Kidney
		4	ABC 3TC DTG	Kidney
3	FTC+TAF ATV/c	5	MVC DTG DRV	Kidney
4	EVG/c/TAF/FTC	6	3TC AZT RAL	Kidney
		7	FTC TDF EFV	Kidney
		8	DTG FTC TAF	Liver
5	ATV DTG RTV TDF+FTC	9	FTC RPV DTG TDF	Kidney
		10	DTG FTC/RPV/TAF	Kidney
		11	DRV DTG FTC/TAF	Liver

*FTC = emtricitabine; TAF = tenofovir alafenamide fumarate; DTG = dolutegravir; MVC = maraviroc; RAL = raltegravir; ABC = abacavir; 3TC = lamivudine; DRV = darunavir; AZT = zidovudine; TDF = tenofovir disoproxil fumarate; EFV = efavirenz; ATV/c = atazanavir; EVG = elvitegravir; c = cobicistat

Recipient ART Changes

Donor	Recipient	ART changed	Reason for Change
1	1	Yes	-Stopped ABC due to donor HLA B5701 status associated with hypersensitivity reaction -Changed RAL to DTG for less pill burden -Stopped ETV due to interaction with DTG
	2	No	N/A
2	3	No	N/A
	4	No	N/A
3	5	No	N/A
4	6	No	N/A
	7	No	N/A
	8	No	N/A
5	9	Yes	Clinical history with reported resistance to multiple classes of medications (M41L, V188L, M184V, T215F, K103N)
	10	Yes	
	11	Yes	

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4	6	No	N/A
	7	No	N/A
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HIV D+/R+ ART

Donor	**Donor ART**	Recipient	Recipient Post-transplant ART*	Organ
1	**3TC DTG RTV DRV**	1	FTC TAF DTG MVC	Liver
		2	FTC TAF DTG MVC	Kidney
2	**ATV RTV TDF FTC**	3	RAL ABC 3TC	Kidney
		4	ABC 3TC DTG	Kidney
3	**FTC+TAF ATV/c**	5	MVC DTG DRV	Kidney
4	**EVG/c/TAF/FTC**	6	3TC AZT RAL	Kidney
		7	FTC TDF EFV	Kidney
		8	DTG FTC TAF	Liver
5	**ATV DTG RTV TDF+FTC**	9	DTG RPV TAF FTC	Kidney
		10	DTG RPV TAF FTC	Kidney
		11	DRV/r DTG TAF FTC	Liver

*FTC = emtricitabine; TAF = tenofovir alafenamide fumarate; DTG = dolutegravir; MVC = maraviroc; RAL = raltegravir; ABC = abacavir; 3TC = lamivudine; DRV = darunavir; AZT = zidovudine; TDF = tenofovir disoproxil fumarate; EFV = efavirenz; ATV/c = atazanavir; EVG = elvitegravir; c = cobicistat

HIV- donor characteristics

Characteristic	HIV- donor (N=22)
Suspected False Positive Cases	6 (27%)
HIV Ab+/NAT negative	4 (18%)
HIV Ab-/NAT positive	2 (9%)
Hepatitis C Antibody Positive; N (%)	5 (23%)
Hepatitis C NAT Positive; N (%)	6 (27%)
Hepatitis B Surface Ag Positive; N (%)	1 (5%)
Hepatitis B Core Antibody Positive; N (%)	2 (9%)

HIV- donor characteristics

Characteristic	HIV- donor (N=22)
Suspected False Positive Cases	6 (27%)
HIV Ab+/NAT negative	4 (18%)
HIV Ab-/NAT positive	2 (9%)
Hepatitis C Antibody Positive; N (%)	5 (23%)
Hepatitis C NAT Positive; N (%)	6 (27%)
Hepatitis B Surface Ag Positive; N (%)	1 (5%)
Hepatitis B Core Antibody Positive; N (%)	2 (9%)

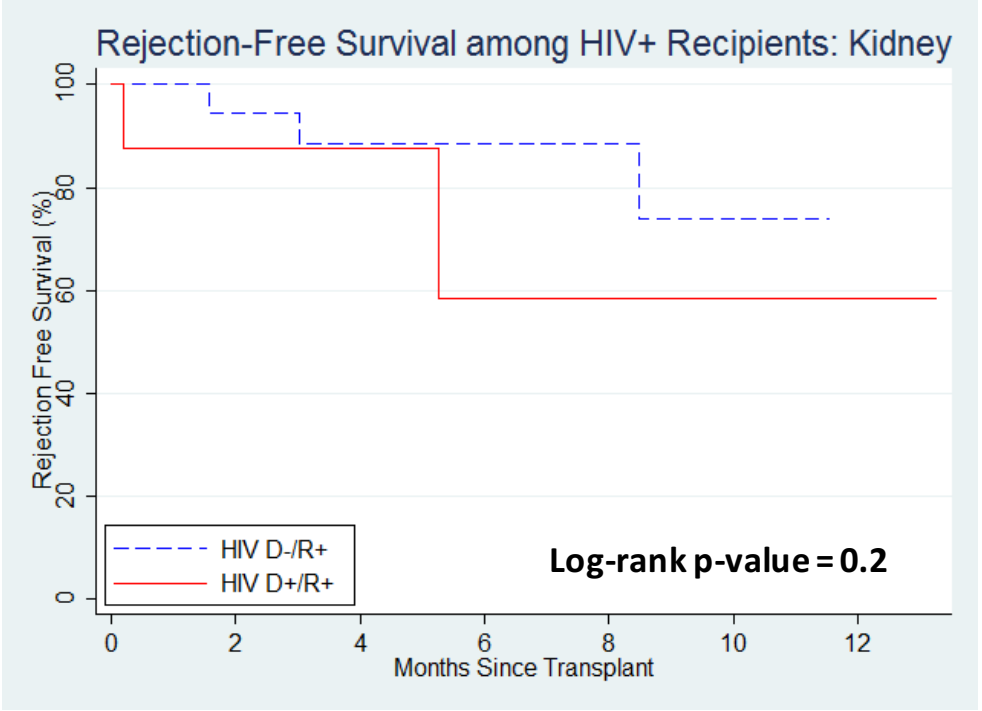
Post-transplant follow-up

	Overall (N=41)	HIV D-/R+ (N=30)	HIV D+/R+* (N=11)
Med (IQR) months	5.4 (2.9-8.8)	5.6 (4.4-9.2)	2.9 (1.1-5.3)
Range of follow-up	0.2 – 13.3	0.3-11.6	0.2-12.3

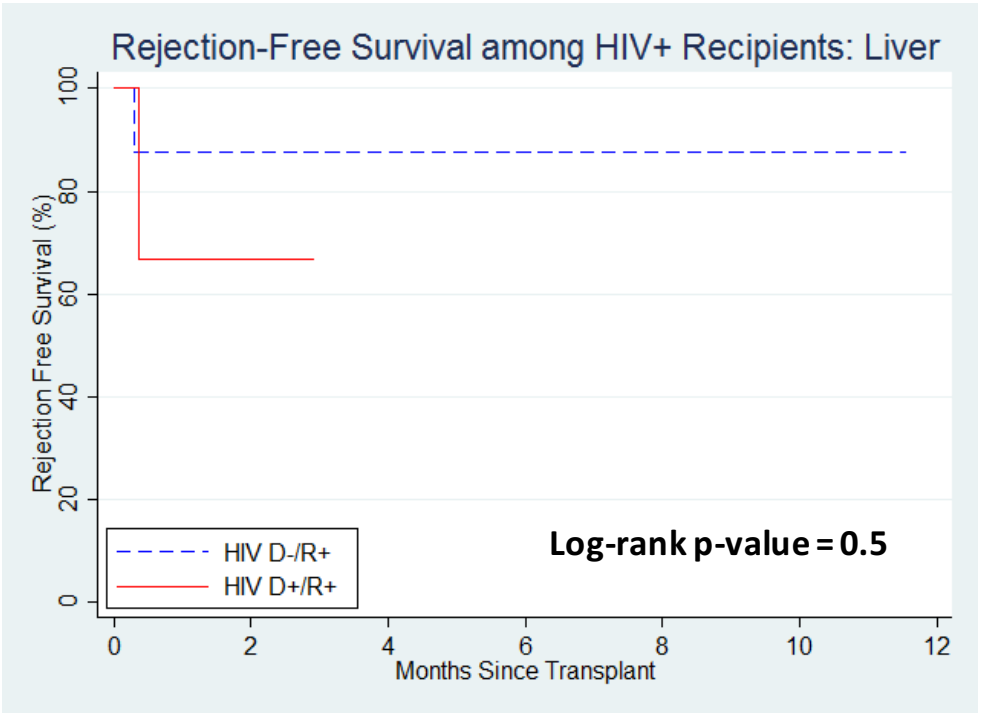
Post-transplant outcomes

	HIV D-/R+	HIV D+/R+
	N=30	N=11
Rejection episodes; N (%)	4 (13.3%)	3 (27.3%)
Opportunistic Infections; N (%)	0 (0%)	0 (0%)
Breakthrough viremia; N (%)	0 (0%)	0 (0%)
Malignancy; N (%)	0 (0%)	0 (0%)
Graft failure; N (%)	0 (0%)	1 (9.1%)
Death; N (%)	0 (0%)	0 (0%)

Among those who received kidneys:



Among those who received livers:



Serious Adverse Event Rates

	Patients (N)	Number of SAEs	Person-years	SAEs per person-year	p-value
HIV D-/R+	30	16	16.67	0.96	0.7
HIV D+/R+	11	6	5.13	1.17	

	HIV D+	HIV D-
Acute cellular rejection	0	2
Acute kidney injury	0	1
Altered mental status	1	0
CMV viremia	0	1
Hydronephrosis of transplanted kidney	0	1
Hyperglycemia	1	2
Hypotension	0	1
Lymphocele	1	0
Neutropenia	0	1
Oral ulcers	0	1
PD catheter malfunction	0	1
Pneumonia	0	1
Possible bleed after biopsy	1	0
Renal vein thrombosis	1	0
Tacrolimus toxicity	1	0
Upper respiratory infection	0	1
Urine leak	0	1
UTI	0	1
Wound dehiscence	0	1

HOPE IN ACTION → TO DATE

HIV-to-HIV Transplants Save Lives

26 Lives Saved by Transplant

11 Organ Donor Heroes

19 Transplant Center Partners

15 Organ Procurement Organizations

*Visit **transplantepi.org** for more about HOPE*
*Register to be an organ donor at **registerme.org***

HOPE IN ACTION

Learn if the use of HIV+ deceased donors in the is ***safe and effective*** in the US

- Parent/Pilot transplant trial
- NIH multicenter trial

NIH U01: HIV D+/R+ Kidney Transplant

- 15 US Transplant Centers
- Deceased donor kidney transplant
- Compare HIV D-/R+ and HIV D+/R+, **N = 80 per arm**
- Anticipated start in fall

Program Officer:
Jonah Odim, MD PhD

National Institute of Allergy and Infectious Diseases

Project Manager:
Natasha Watson, MSN

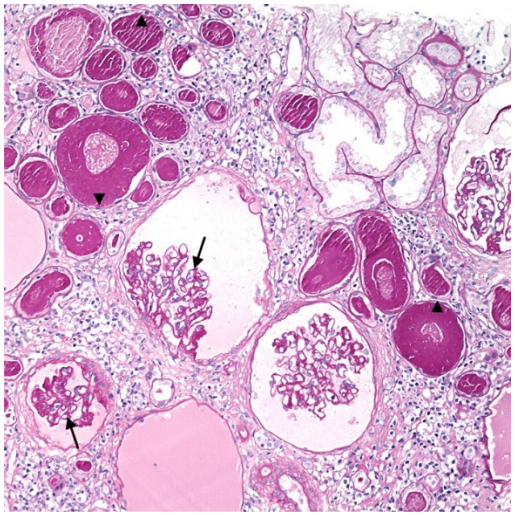
HIV-to-HIV Solid Organ Transplantation in the US: R34AI23023

Renal Disease

Allograft rejection

HIV associated renal diseases

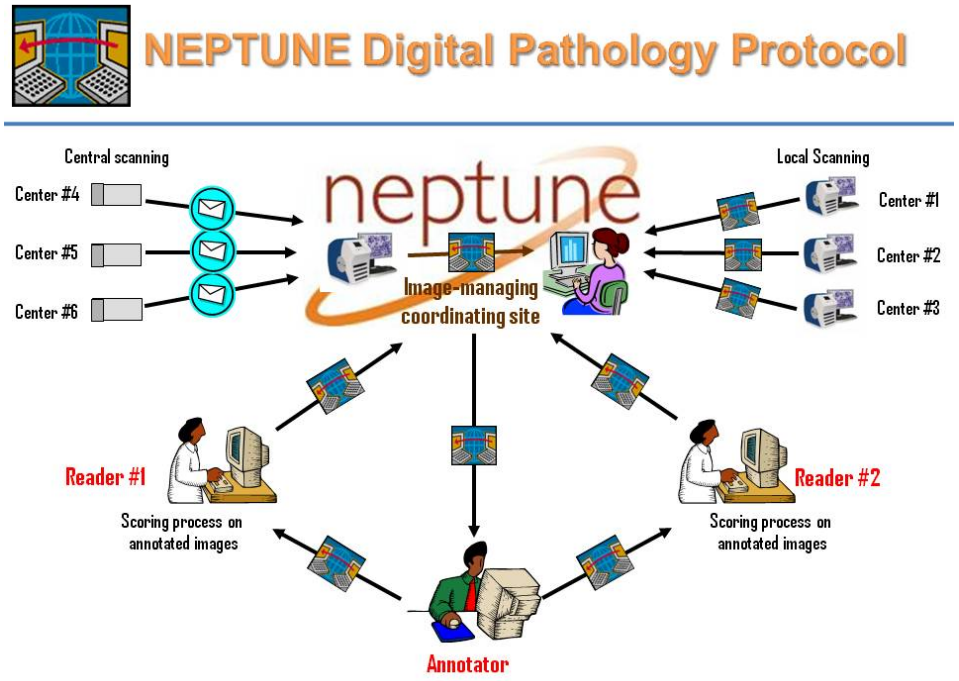
- HIV associated nephropathy
- HIV associated immune complex disease
- Non-collapsing FSGS
- Thrombotic microangiopathy



Digital Repository of Biopsies

Stephen Hewitt, MD, PhD

Head of Experimental Pathology



NIH NATIONAL CANCER INSTITUTE

HOPE IN ACTION

Genetic Risk: Donors and Recipients

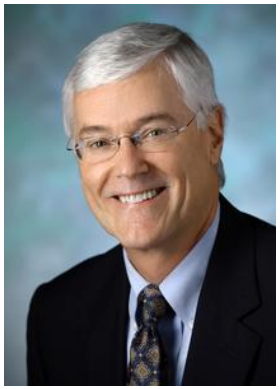
- ApoL1 protein variants in donors and recipients

Jeffrey Kopp, MD
NIDDK
Chief, Kidney Diseases Branch

Cheryl Winkler, PhD
NCI
Head, Molecular Genetic Epidemiology

Virology Studies

- Incidence of HIV-superinfection in blood
- Incidence of HIV-superinfection in tissue by laser capture microdissection
- Changes in HIV latent reservoir



Andrew Redd, PhD NIAID/JHU
Tom Quinn, MD NIAID/JHU
Aaron Tobian, MD PhD JHU

HIV Reservoir and Implications for Cure Efforts

HOPE IN ACTION

The Journal of Clinical Investigation BRIEF REPORT

Rapamycin-mediated mTOR inhibition uncouples HIV-1 latency reversal from cytokine-associated toxicity

Alyssa R. Martin,[1] Ross A. Pollack,[2] Adam Capoferri,[2,3] Richard F. Ambinder,[1] Christine M. Durand,[2] and Robert F. Siliciano[2,3]

Alyssa Martin, PhD

- HIV PCR based assays are problematic but viral outgrowth assays (gold standard), costly, not always feasible

Defective proviruses rapidly accumulate during acute HIV-1 infection

Katherine M Bruner[1], Alexandra J Murray[1], Ross A Pollack[1], Mary G Soliman[1], Sarah B Laskey[1], Adam A Capoferri[1,2], Jun Lai[1], Matthew C Strain[3], Steven M Lada[4], Rebecca Hoh[5], Ya-Chi Ho[1], Douglas D Richman[3,4,6], Steven G Deeks[5], Janet D Siliciano[1] & Robert F Siliciano[1,2]

Katie Bruner, PhD Bob Siliciano, MD PhD

HOPE IN ACTION

Epidemiology Research Group in Organ Transplantation

Principal Investigators

Christine Durand, MD
Infectious Diseases

Dorry Segev, MD PhD
Surgery

Aaron Tobian, MD PhD
Pathology

Epidemiology and Biostatistics

Mary Grace Bowring, MPH
Lauren Kucirka, ScM PhD
Xun Luo, MD MPH
Allan Massie, PhD
Richard Moore, MD PhD
Larry Moulton, PhD
Abi Muzaale, MD MHS

Nephrology/Hepatology

Mohammed Atta, MD
Derek Fine, MD
James Hamilton, MD
Fizza Naqvi, MD
Hamid Rabb, MD

Clinical Study Operations

Saad Anjum, BA
Diane Brown, MSN
Ayla Cash, MPH
Willa Cochran, NP
Samantha Halpern, BA
Komal Kumar, MPH
Oyinkansola Kusemiju, MPH
Darin Ostrander, PhD
Sarah Rasmussen, BA
Shanti Seaman, BA

Ethical, Legal, Social Issues Team

Brianna Doby, BA
Macey Henderson, JD PhD
Jeremy Sugarman, MD
Albert Wu, MD

Pathology

Serena Bagnasco, MD
William Clarke, MD PhD
Lysandra Voltaggio, MD

Surgery

Andrew Cameron, MD PhD
Niraj Desai, MD
Jacqueline Garonzik-Wang, MD PhD
Shane Ottman, MD
Benjamin Philosophe, MD PhD
Nabil Dagher, MD
Bonnie Lonze, MD PhD

Virology and Immunology

Gilad Bismut, BS
Alyssa Martin, PhD
Alexandra Murray, BS
Thomas Quinn, MD
Andrew Redd, PhD
Robert Siliciano, MD PhD

JOHNS HOPKINS MEDICINE

HOPE IN ACTION

Epidemiology Research Group in Organ Transplantation

UCSF

Peter Chin-Hong, MD
Rodney Rogers
Peter Stock, MD PhD

Columbia University

Marcela Laurito, MD PhD
Theresa Lukose, PharmD
Marcus Pereira, MD

Rush University Medical Center

Mark Mall, RN
Yoona Rhee, MD
Carlos A.Q. Santos, MD

Northwestern University

Jane Charette, RN
Sara Lake Lescano, MPH
Valentina Stosor, MD

Indiana University

Oluwafisayo Adebiyi, MD
Jeanne Chen, PharmD

Icahn School of Medicine at Mount Sinai

Sander Florman, MD
Brandy Haydel, CCRC
Shirish Huprikar, MD
Susan Lerner, MD

Emory University

Elizabeth Ferry, RN
Farzan Saeed
Nicole Turgeon, MD
Dasia Webster

Duke University

Kelly Stanly
Cameron Wolfe, MBBS

Yale University

Maricar Malinis, MD
Ricarda Tomlin, CCRP

Georgetown University

Matthew Cooper, MD
Alexander Gilbert, MD
Takada Harris

University of Pennsylvania

Emily Blumberg, MD
Susanna Nazarian, MD PhD
Maryann Najdzinowicz
Deirdre Sawinski, MD

University of Alabama at Birmingham

Yolanda Hogeland
Jayme Locke, MD
Shikha Mehta, MD
Darnell Mompoint-Williams, DNP

Drexel University

Cynthia Gifford-Hollingsworth, DNP
Dong Heun Lee, MD

University of Maryland

Anthony Amoroso, MD
Amanda Bartosic
Jonathan Bromberg, MD PhD

Massachusetts General Hospital

Margaret Thomas, CCRC
David Wojciechowski, DO

Weill Cornell Medical College

Thangamani Muthukumar, MD
Benjamin Samstein, MD
Catherine Small, MD

Methods: HIV testing

HOPE IN ACTION

OPTN: FDA-Approved HIV Screening for Donor Products

Assay Name	Assay Type[a]	Maker	Sensitivity	Specificity	FP Rate
HIV Antibody assays					
Genetic Systems HIV-1/HIV-2 Plus O	EIA	Bio-Rad	100%	99.89%	0.11%
ABBOTT PRISM HIV O Plus	ChLIA	Abbott	100%	99.94%	0.06%
HIVAB HIV-1/HIV-2 (rDNA) EIA	EIA	Abbott	100%	99.90%	0.1%
HIV NAT assays					
COBAS AmpliScreen HIV-1 Test, v1.5	PCR	Roche	99.1%	99.7%	0.3%
Procleix HIV-1/HCV	TMA	Gen-Probe	99.8%	99.87%	0.13%
Procleix Ultrio	TMA	Gen-Probe	99.6%	99.8%	0.2%
COBAS TaqScreen MPX Test	PCR	Roche	100%	99.98%	0.02%
Procleix Ultrio Plus	TMA	Gen-Probe	99.72%	100%	0%

Donor HIV testing

HOPE IN ACTION

Donor	OPTN Ab	Result	OPTN NAT	Result	HOPE qPCR
1	Genetic systems HIV 1/2/O EIA	Pos	Procleix Ultrio Plus	Neg	Neg
2	Genetic systems HIV 1/2/O EIA	Pos	COBAS Taq screen MTX v2	Neg	Neg
3	Abbott Prism HIV O plus	Pos	Procleix Ultrio Plus	Neg	Neg
4	Genetic systems HIV 1/2/O EIA	Neg	Procleix Ultrio Plus	Pos	Neg
5	Genetic systems HIV 1/2/O EIA	Neg	COBAS Taq screen MTX v2	Pos	Neg
6	Genetic systems HIV 1/2/O EIA	Pos	Procleix Ultrio Plus	Neg	Neg

South Africa: HIV-to-HIV

27 recipients

- CD4 > 200, VL < 50
- Median age 41
- 56% male
- 96% African
- 94% HIV-associated nephropathy

15 donors

- Median age 30
- Cause of death: trauma, overdose, SAH
- 14 treatment naïve, 1 on antiretroviral therapy

Muller et al, NEJM; 2015; 372:613-20.

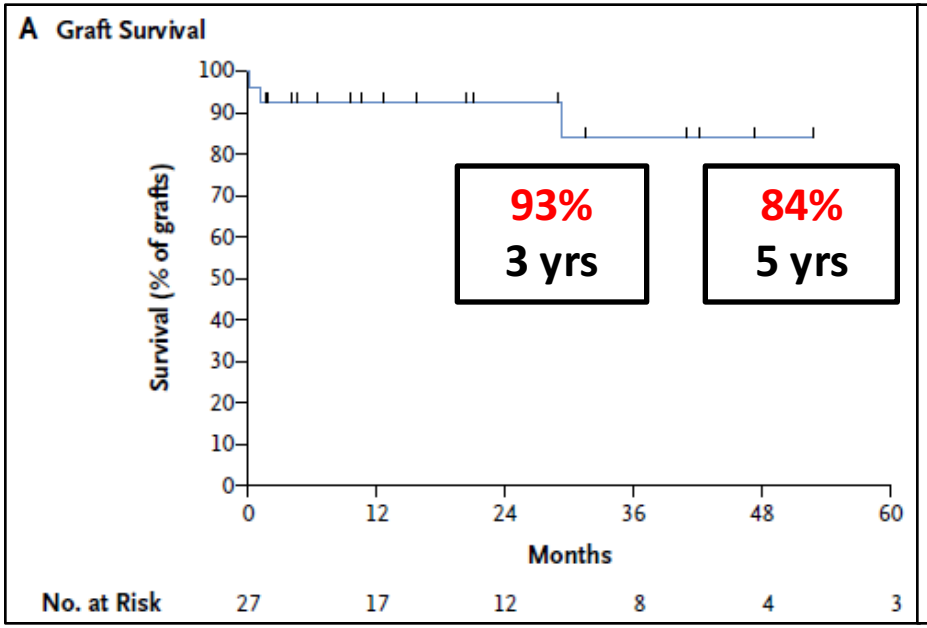
South Africa: HIV-to-HIV

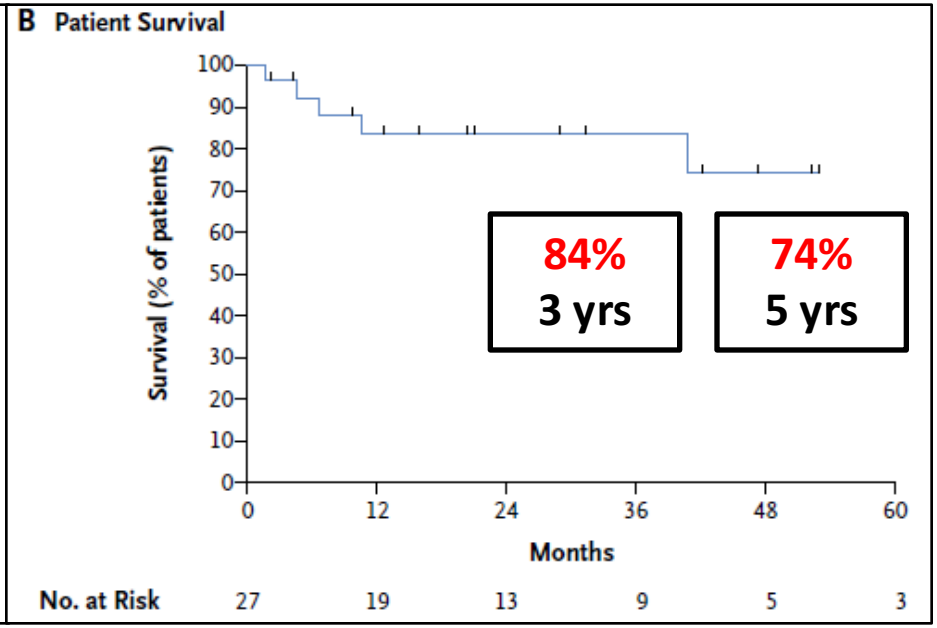
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

HIV-Positive–to–HIV-Positive Kidney Transplantation — Results at 3 to 5 Years

Elmi Muller, M.B., Ch.B., M.Med., Zunaid Barday, M.B., Ch.B., Marc Mendelson, M.D., Ph.D., and Delawir Kahn, M.B., Ch.B., Ch.M.





N =27

Muller et al, NEJM; 2015; 372:613-20.

South Africa: HIV-to-HIV

HIV disease and infections

- 100% HIV suppression maintained
- One case of extrapulmonary TB, one of aspergillus

Rejection (all received ATG/thymoglobuline)

- 8% - 1 year
- 22% - 3 years

Recurrent HIV-AN?

- 3/27 early histologic changes with normal eGFR

Muller et al, NEJM; 2015; 372:613-20.