

HEART-LUNG TRANSPLANTATION

Adult Recipients

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JHLT. 2013 Oct; 32(10): 965-978

Donor, Recipient and Center Characteristics

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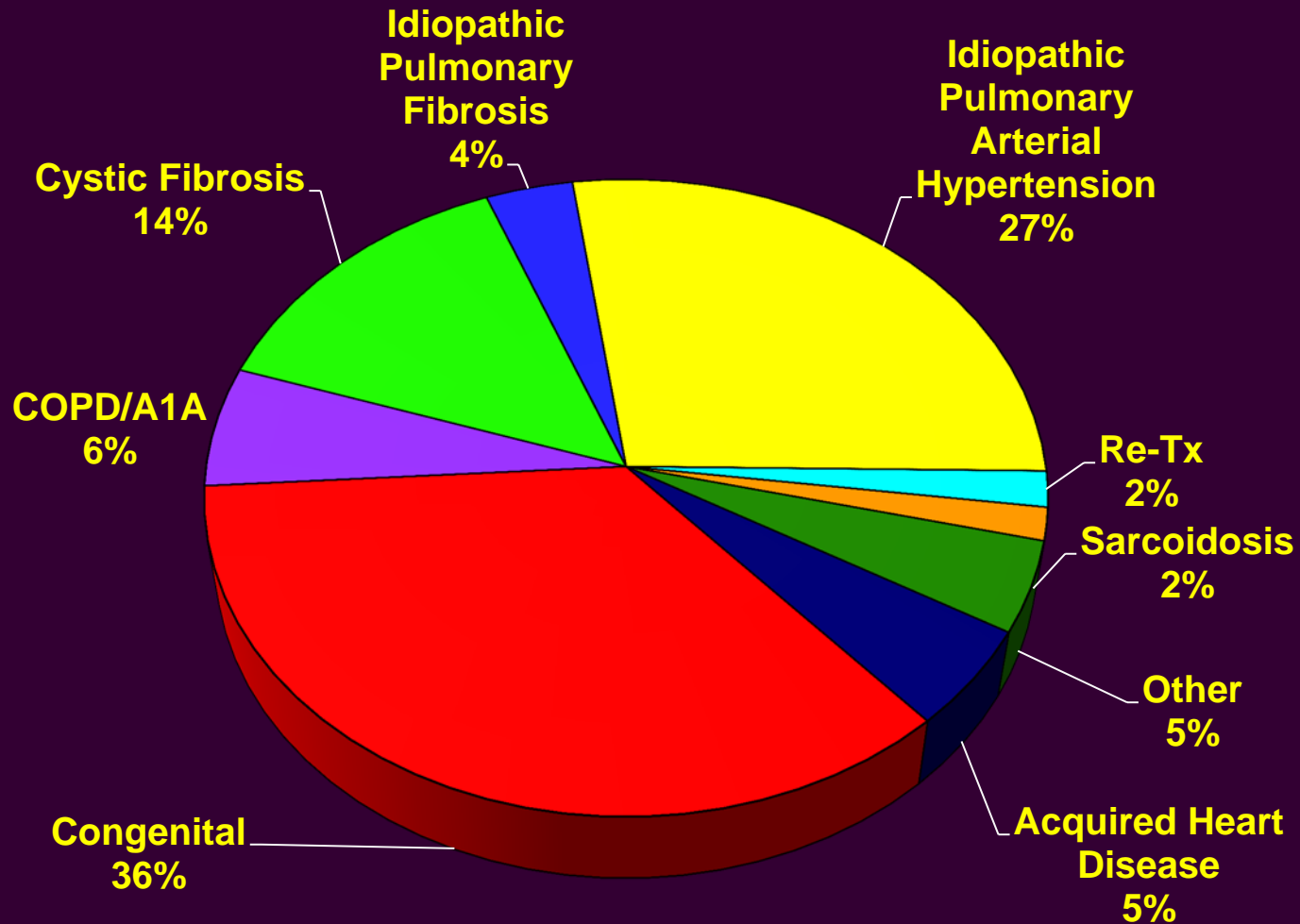
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Adult Heart-Lung Transplants

Diagnosis (Transplants: January 1982 – June 2012)



NOTE: "Other" includes cancer, LAM, OB, bronchiectasis

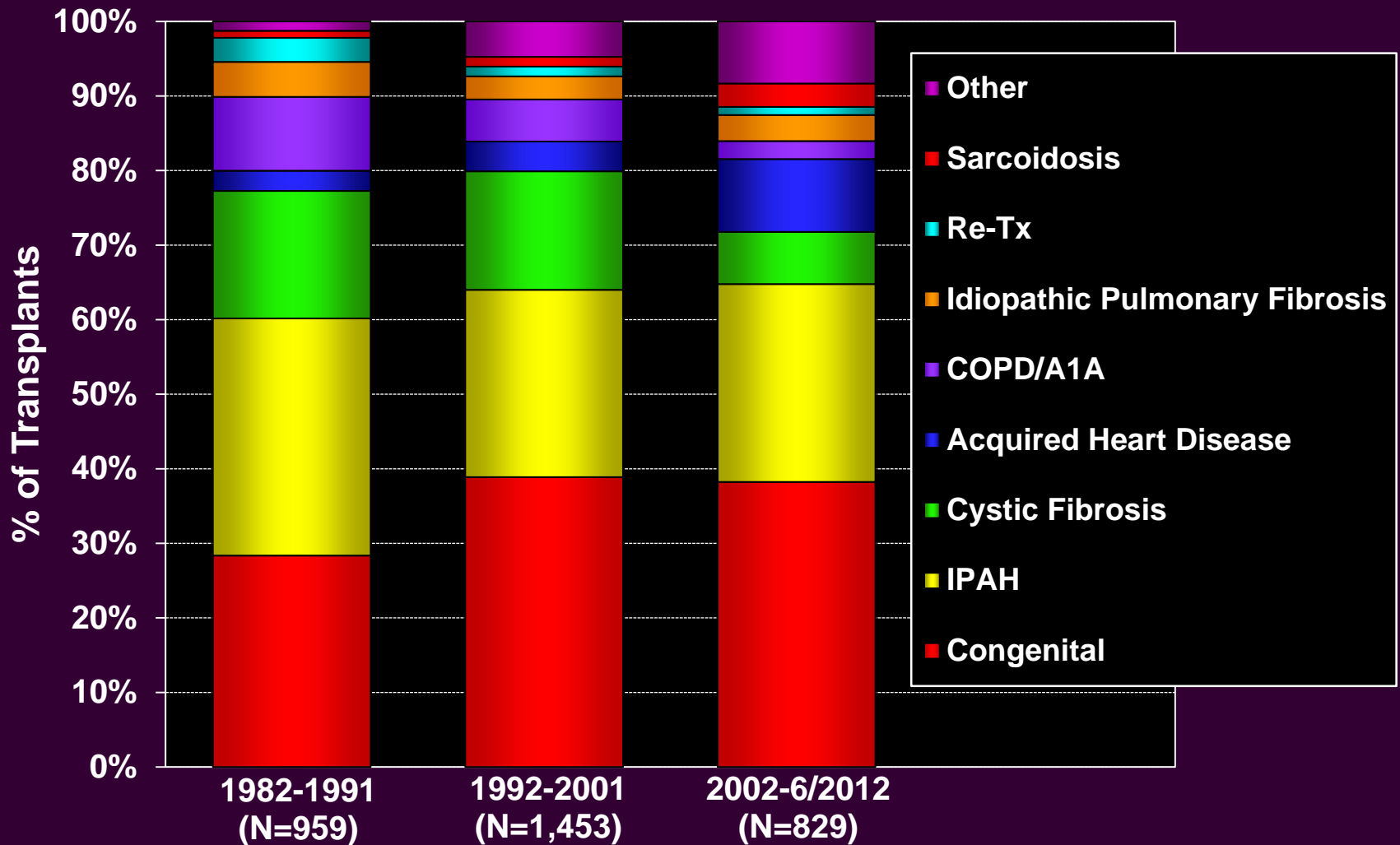
Adult Heart-Lung Transplants

Diagnosis (Transplants: January 1982 – June 2012)

Diagnosis	N (%)
Congenital Heart Disease	1,154 (35.6%)
Idiopathic Pulmonary Arterial Hypertension	890 (27.5%)
Cystic Fibrosis	453 (14.0%)
Acquired Heart Disease	165 (5.1%)
COPD/Emphysema	136 (4.2%)
Idiopathic Pulmonary Fibrosis	119 (3.7%)
Alpha-1	61 (1.9%)
Sarcoidosis	54 (1.7%)
Re-Transplant: Not Obliterative Bronchiolitis	37 (1.1%)
Re-Transplant: Obliterative Bronchiolitis	22 (0.7%)
Bronchiectasis	30 (0.9%)
Obliterative Bronchiolitis (not Re-Transplant)	24 (0.7%)
Other	96 (3.0%)

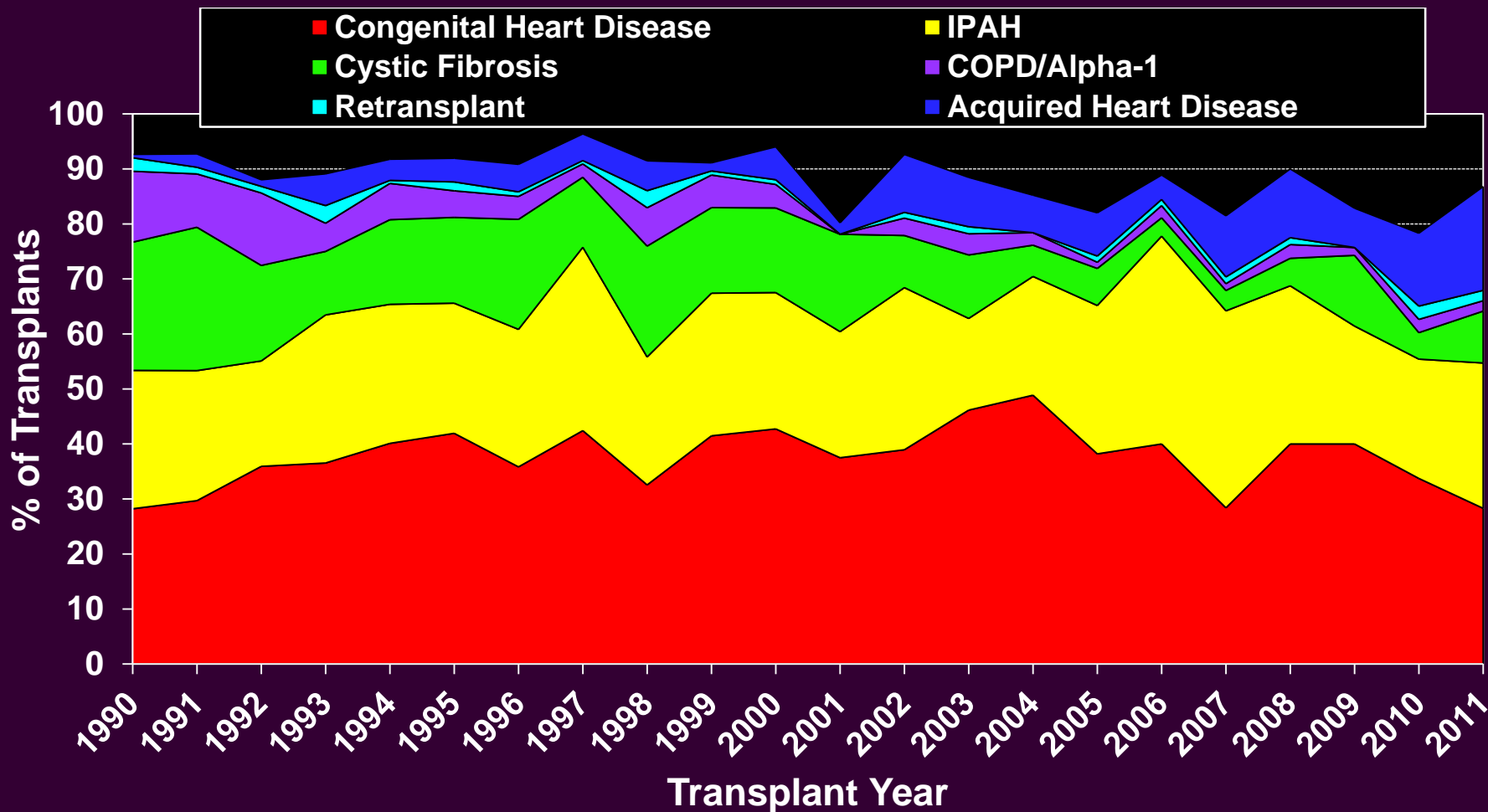
Adult Heart-Lung Transplants

Diagnosis by Era (Transplants: January 1982 – June 2012)

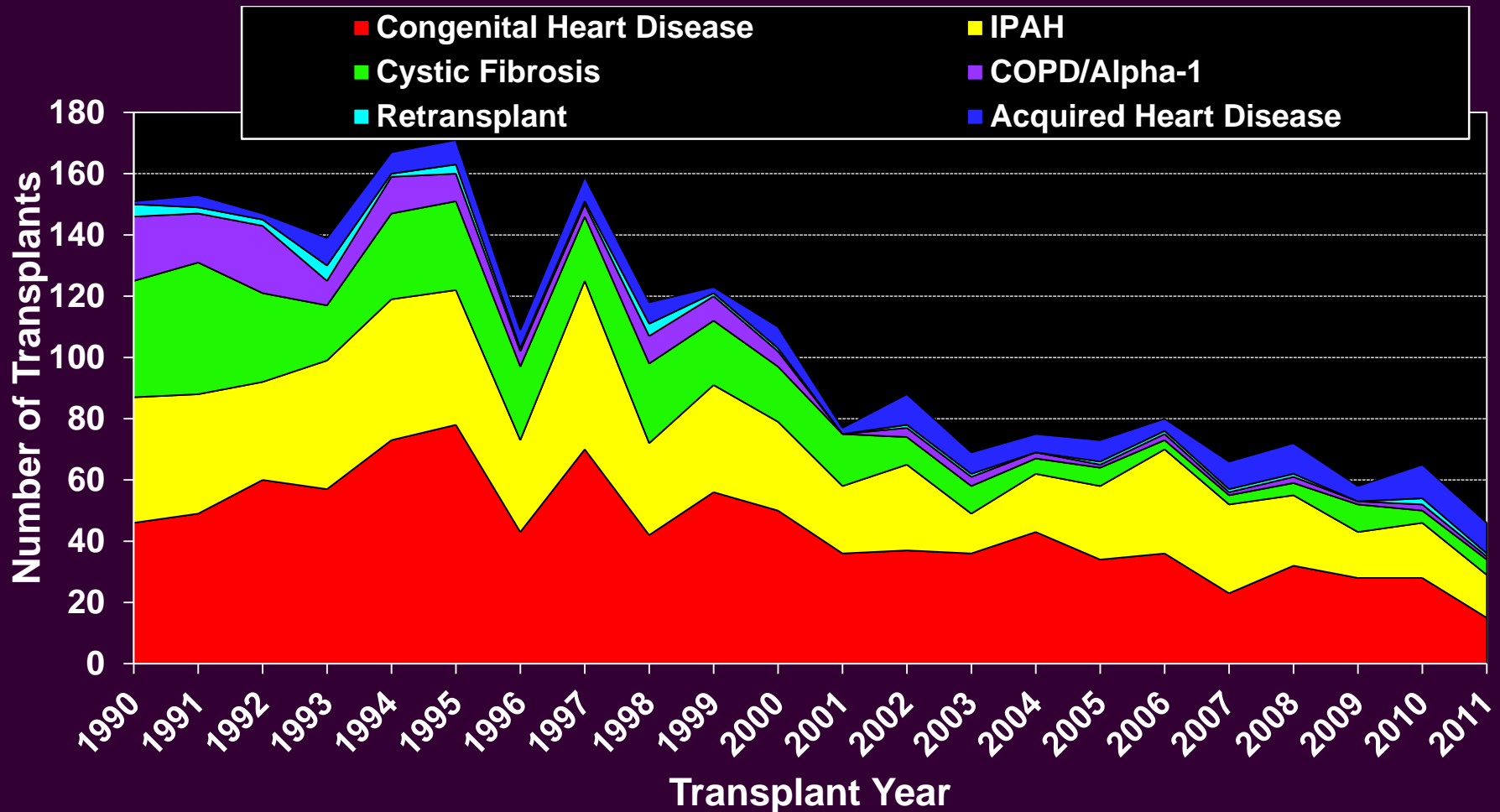


NOTE: "Other" includes OB (non-Re-Tx) and Bronchiectasis.

Adult Heart-Lung Transplants Major Indications by Year (%)

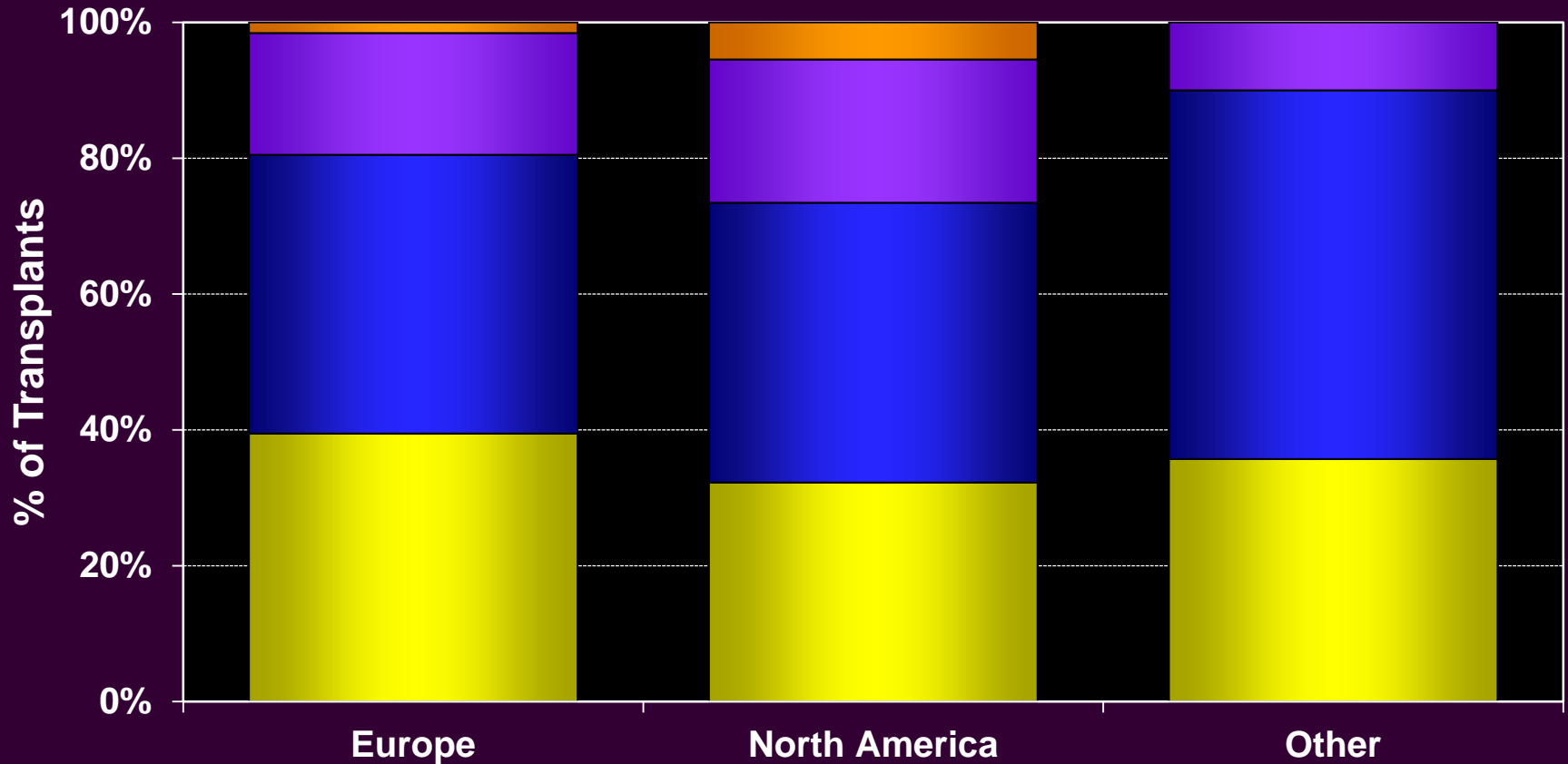


Adult Heart-Lung Transplants Major Indications By Year (Number)



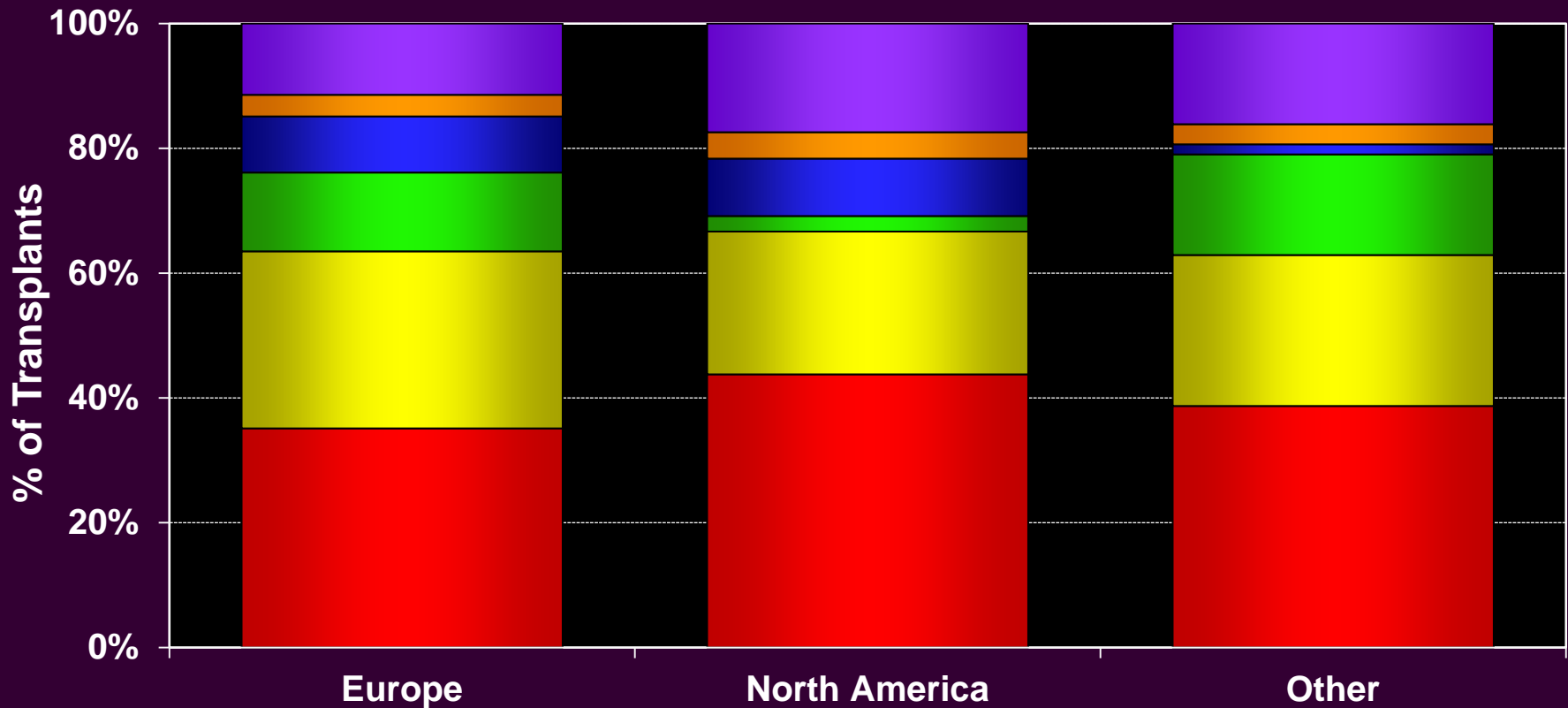
Adult Heart-Lung Transplants Age Distribution By Location (Transplants: January 2000 – June 2012)

■ 18 - 34 years ■ 35 - 49 years ■ 50 - 59 years ■ 60+ years



Adult Heart-Lung Transplants Diagnosis Distribution By Location (Transplants: January 2000 – June 2012)

■ Congenital heart disease ■ IPAH ■ Cystic Fibrosis ■ Acquired heart disease ■ IPF ■ Other

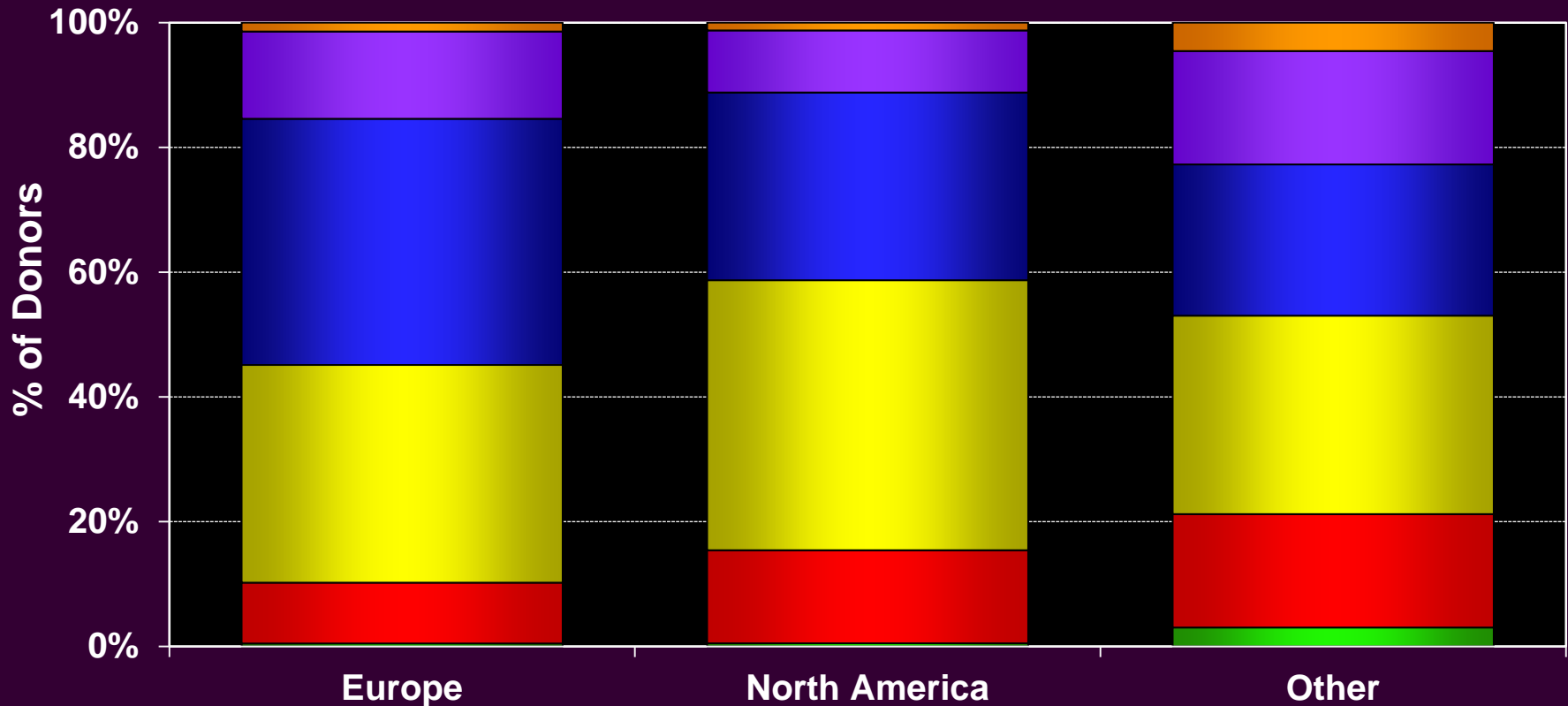


Adult Heart-Lung Transplants

Donor Age Distribution By Location

(Transplants: January 2000 – June 2012)

6-11 12-17 18-34 35-49 50-59 60+



Post-Transplant: Survival and Other Outcomes

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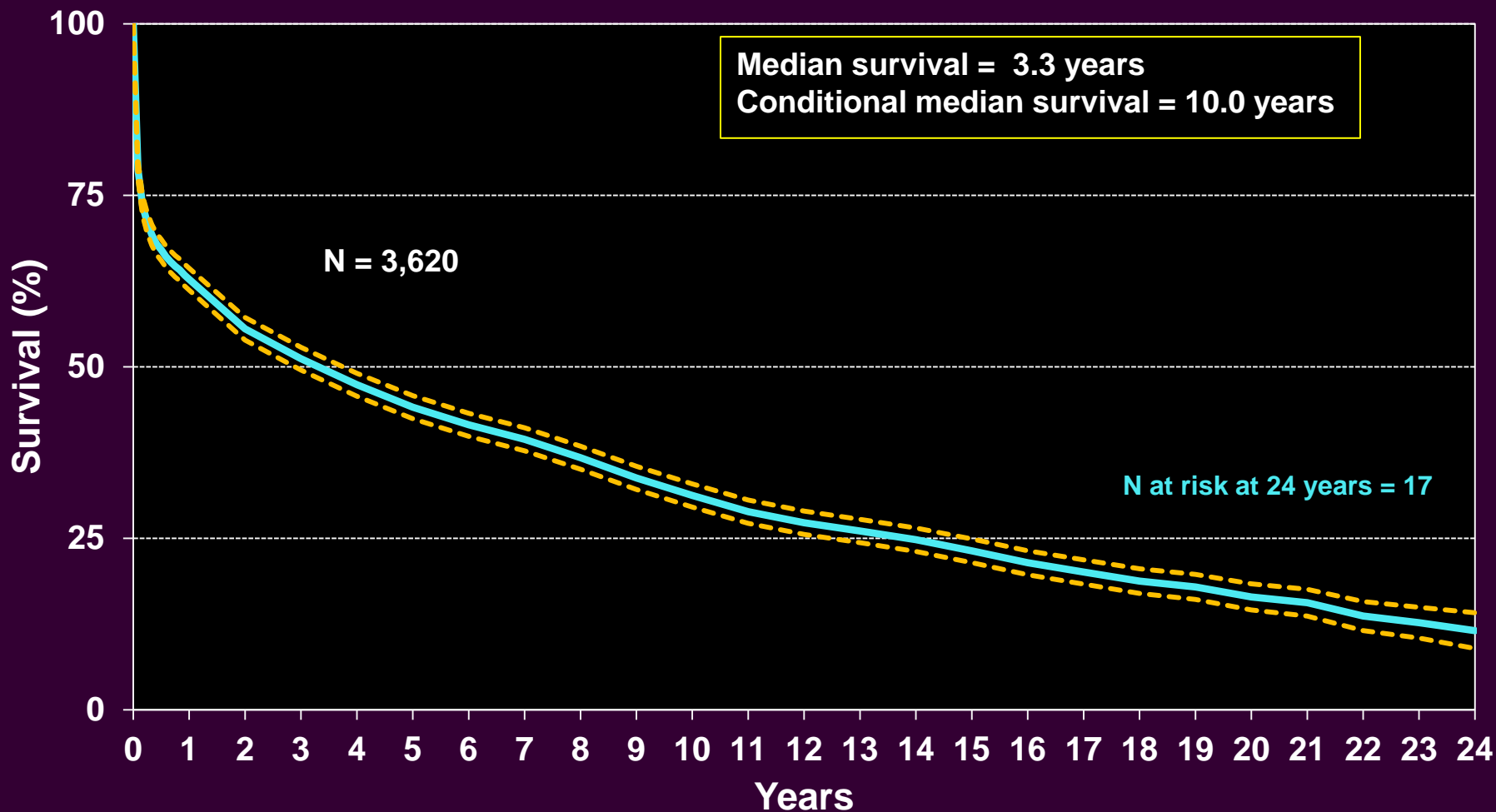
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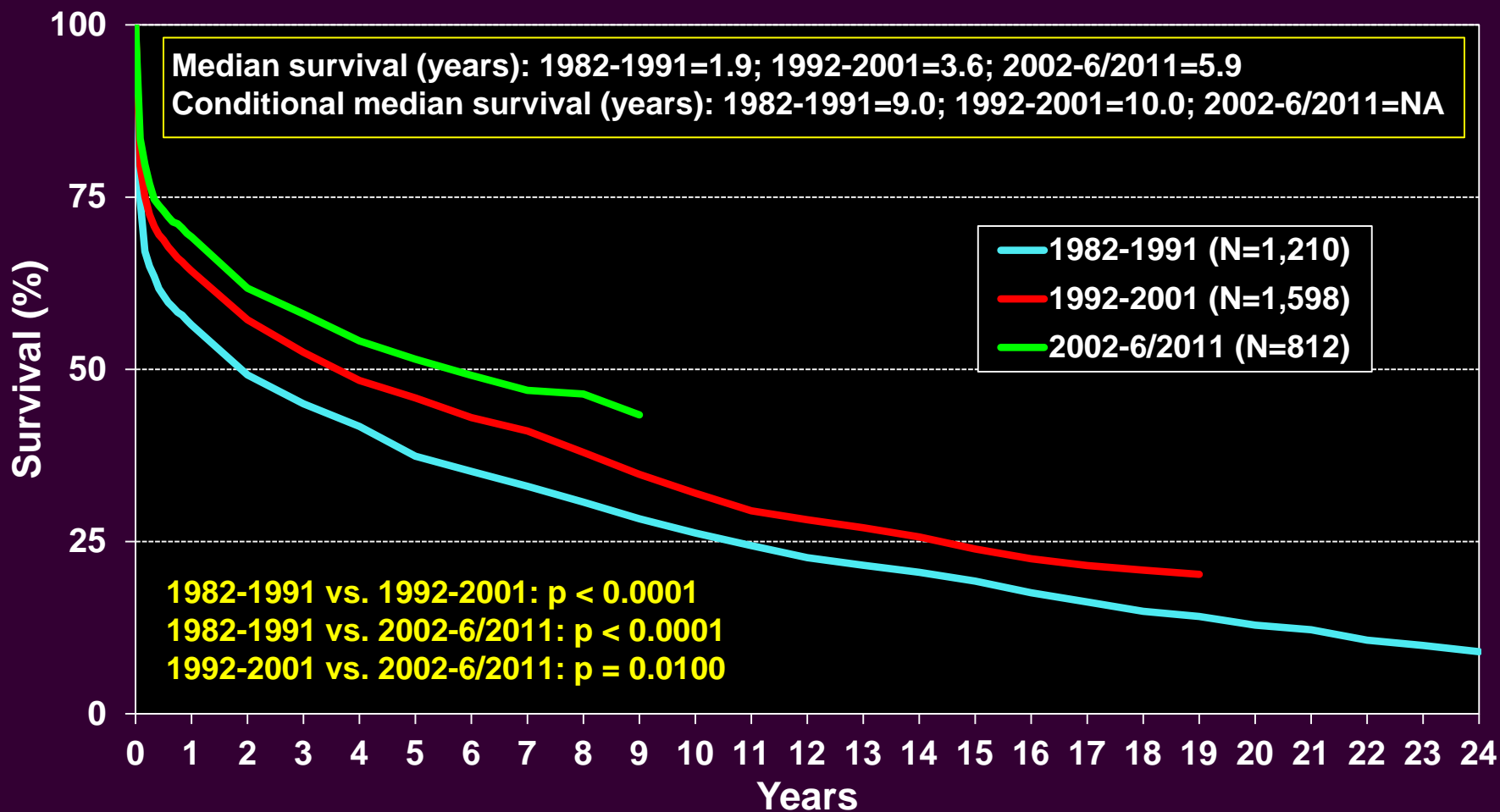
Adult Heart-Lung Transplants

Kaplan-Meier Survival

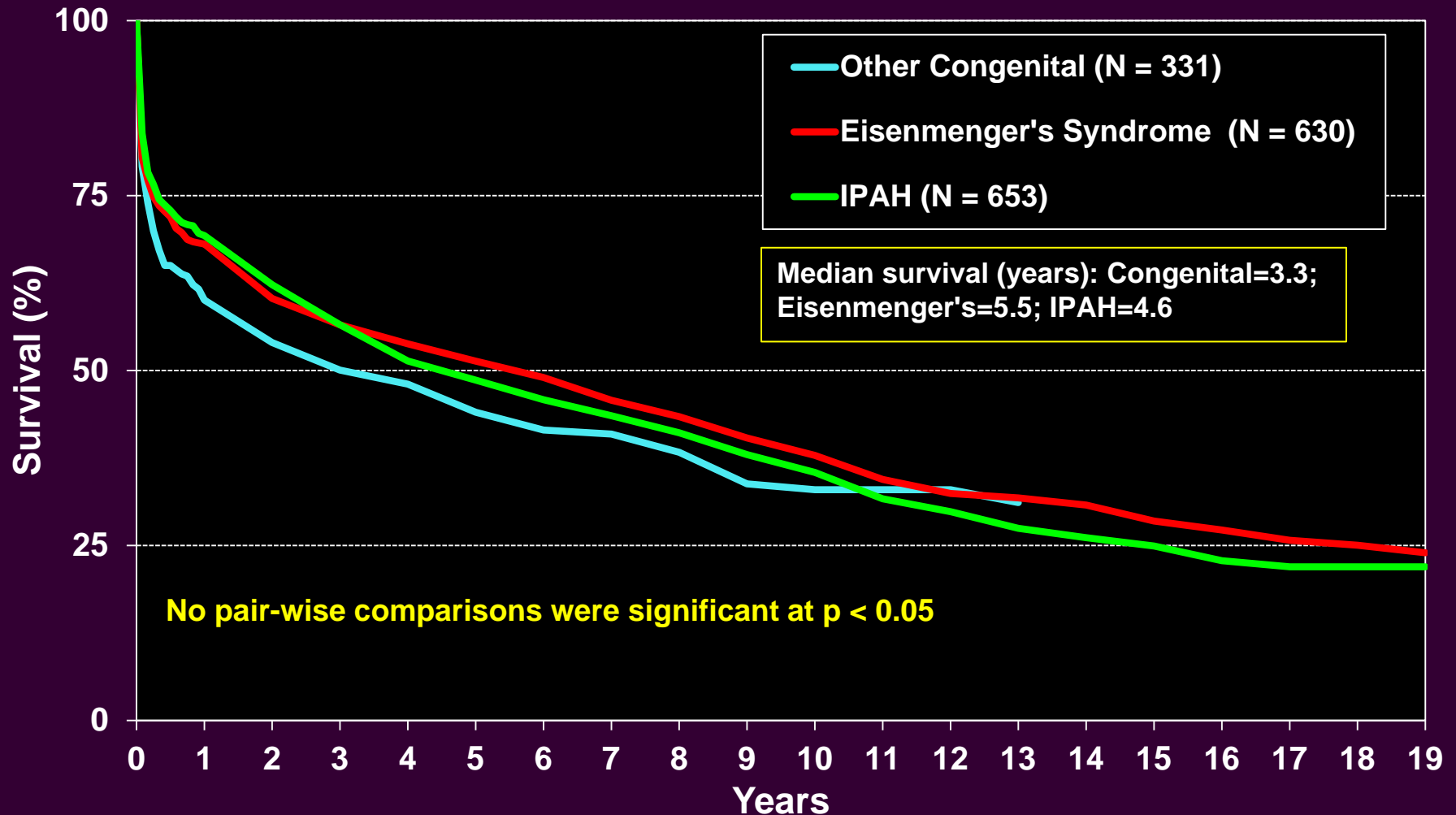
(Transplants: January 1982 – June 2011)



Adult Heart-Lung Transplants Kaplan-Meier Survival by Era (Transplants: January 1982 – June 2011)

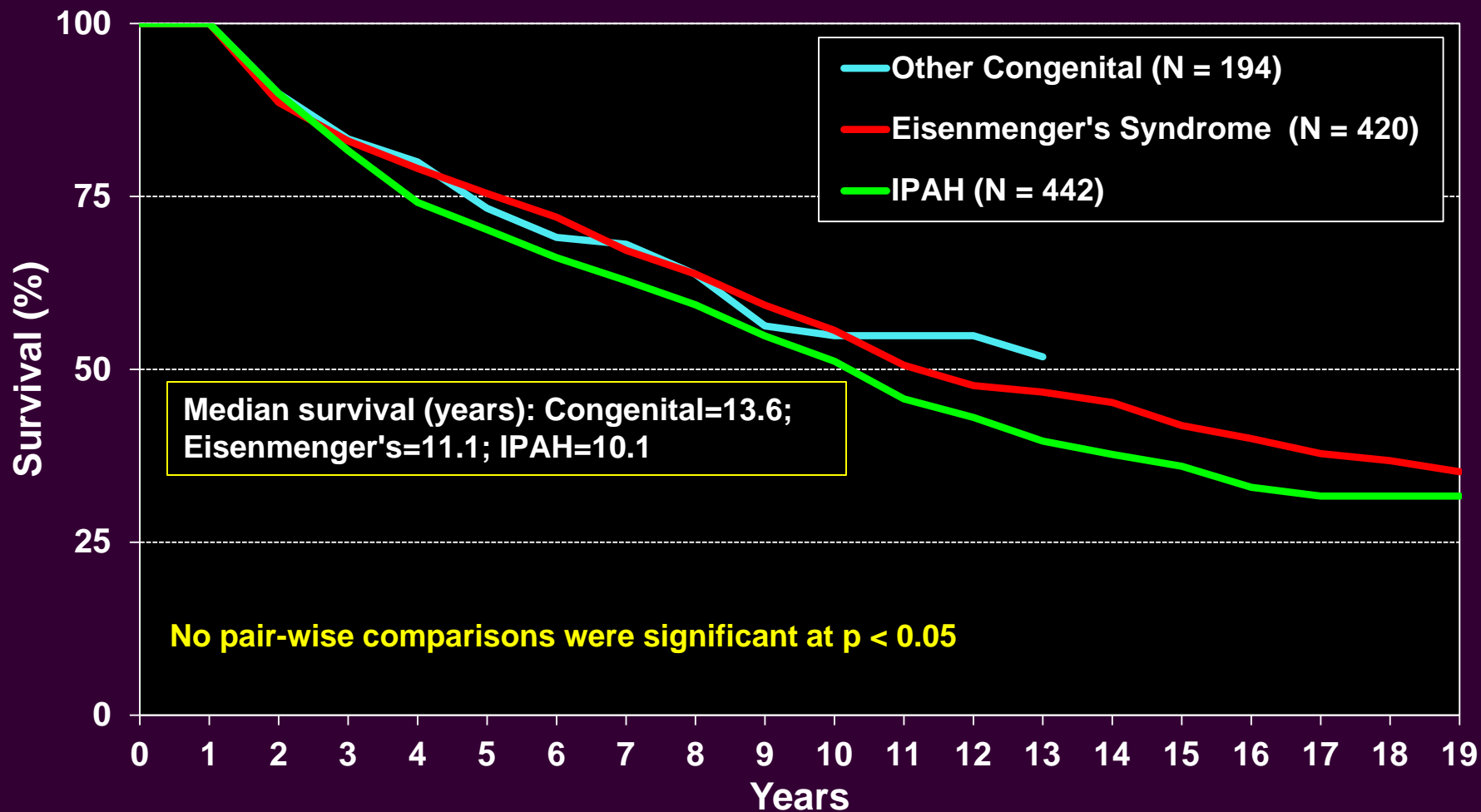


Adult Heart-Lung Transplants Kaplan-Meier Survival By Diagnosis (Transplants: January 1990 – June 2011)



Adult Heart-Lung Transplants

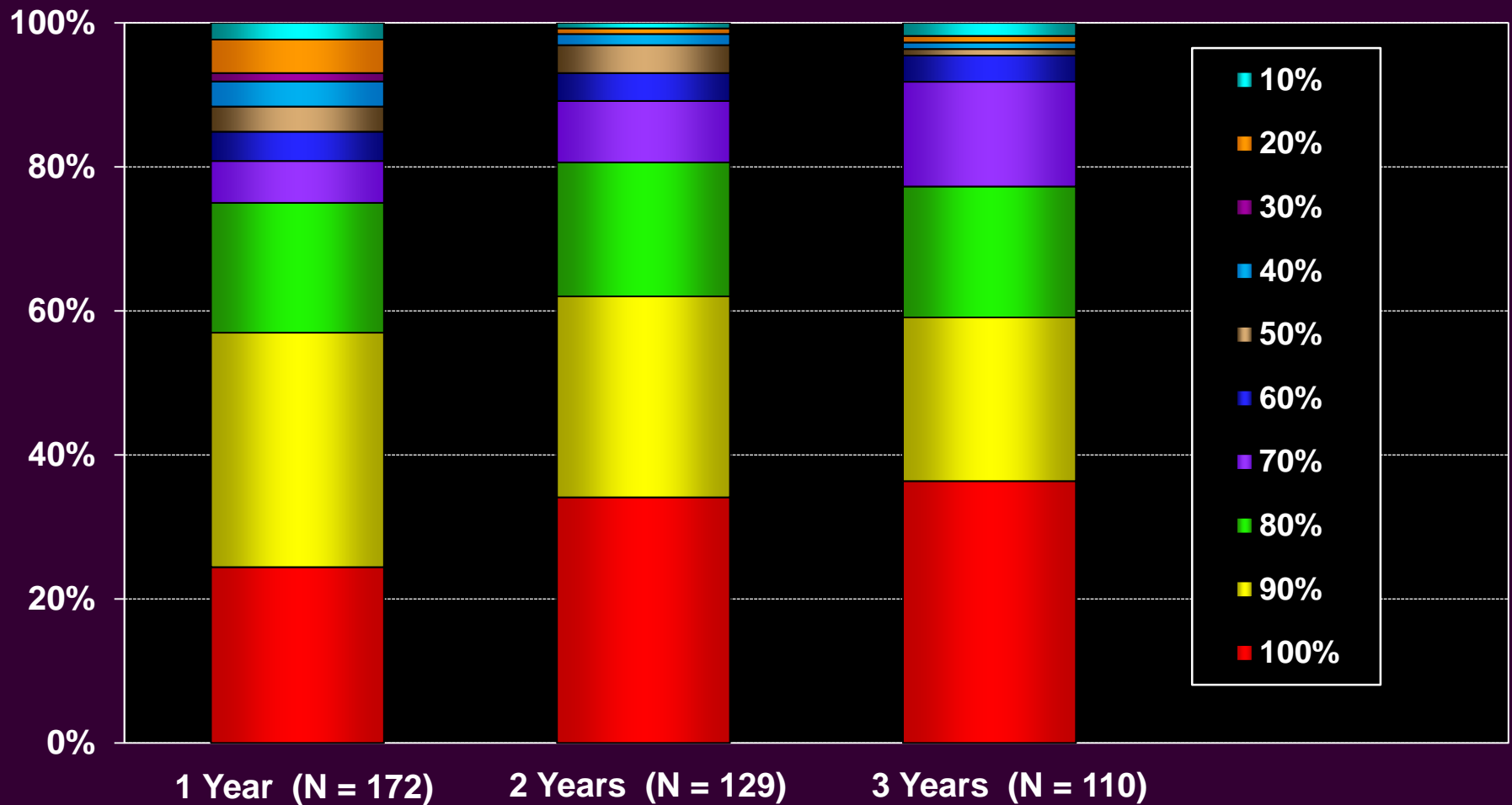
Kaplan-Meier Survival By Diagnosis Conditional on Survival to 1 Year (Transplants: January 1990 – June 2011)



Adult Heart-Lung Transplants

Functional Status of Surviving Recipients

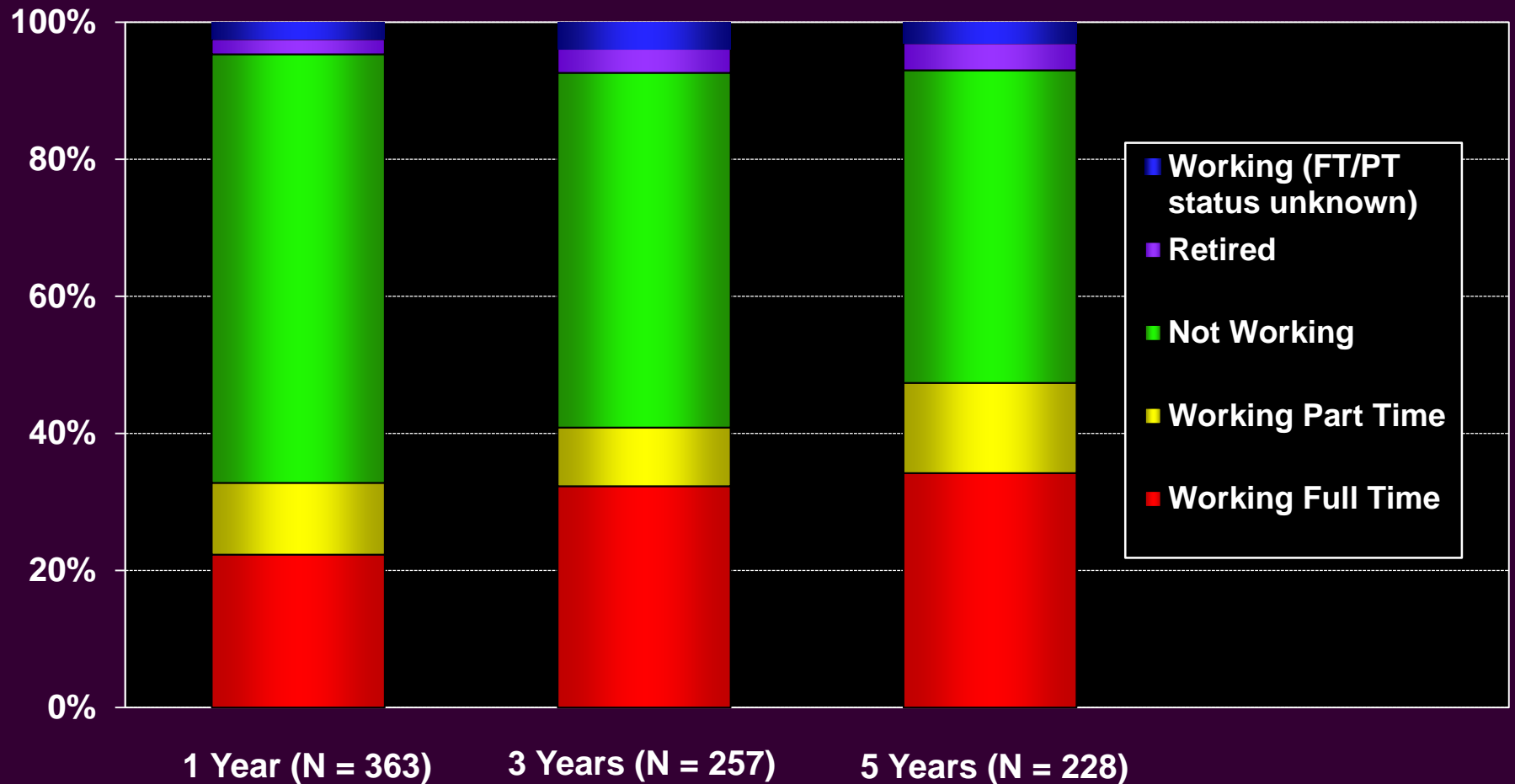
(Follow-ups: March 2005 – June 2012)



Adult Heart-Lung Transplants

Employment Status of Surviving Recipients

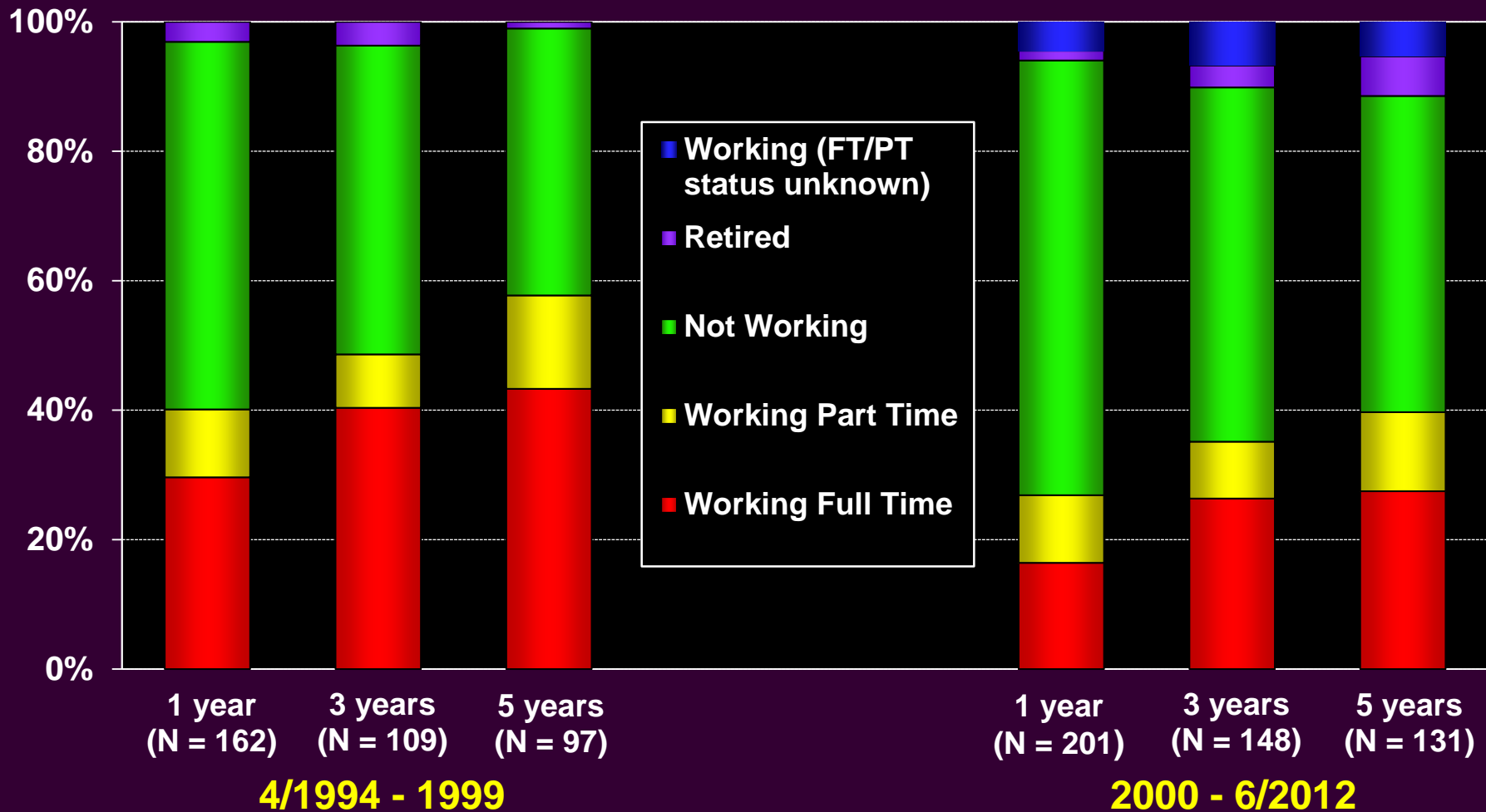
(Follow-ups: April 1994 – June 2012)



Adult Heart-Lung Transplants

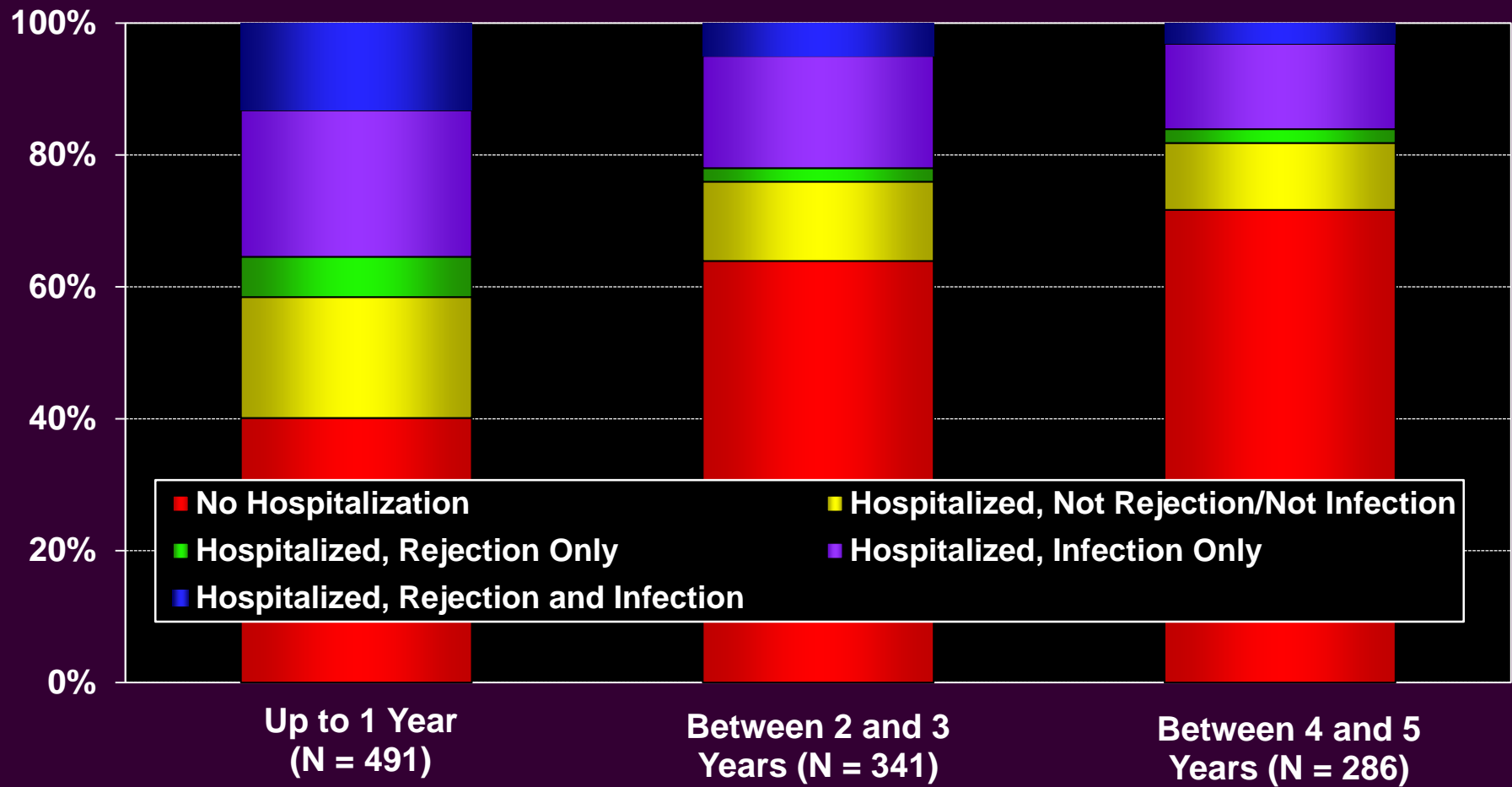
Employment Status of Surviving Recipients by Era

(Follow-ups: April 1994 – June 2012)



Adult Heart-Lung Transplants

Rehospitalization Post-transplant of Surviving Recipients (Follow-ups: April 1994 – June 2012)



Induction and Maintenance Immunosuppression

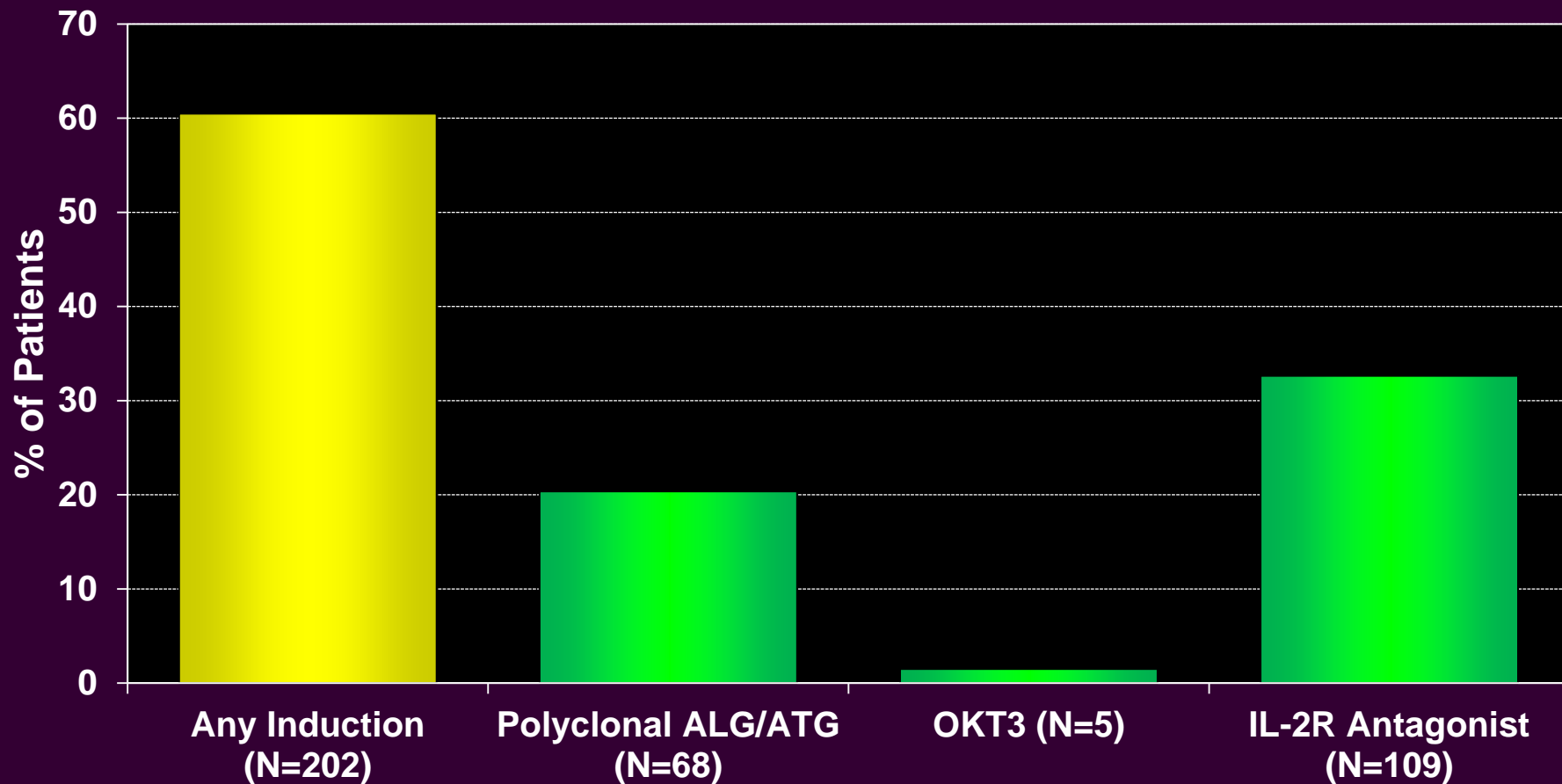
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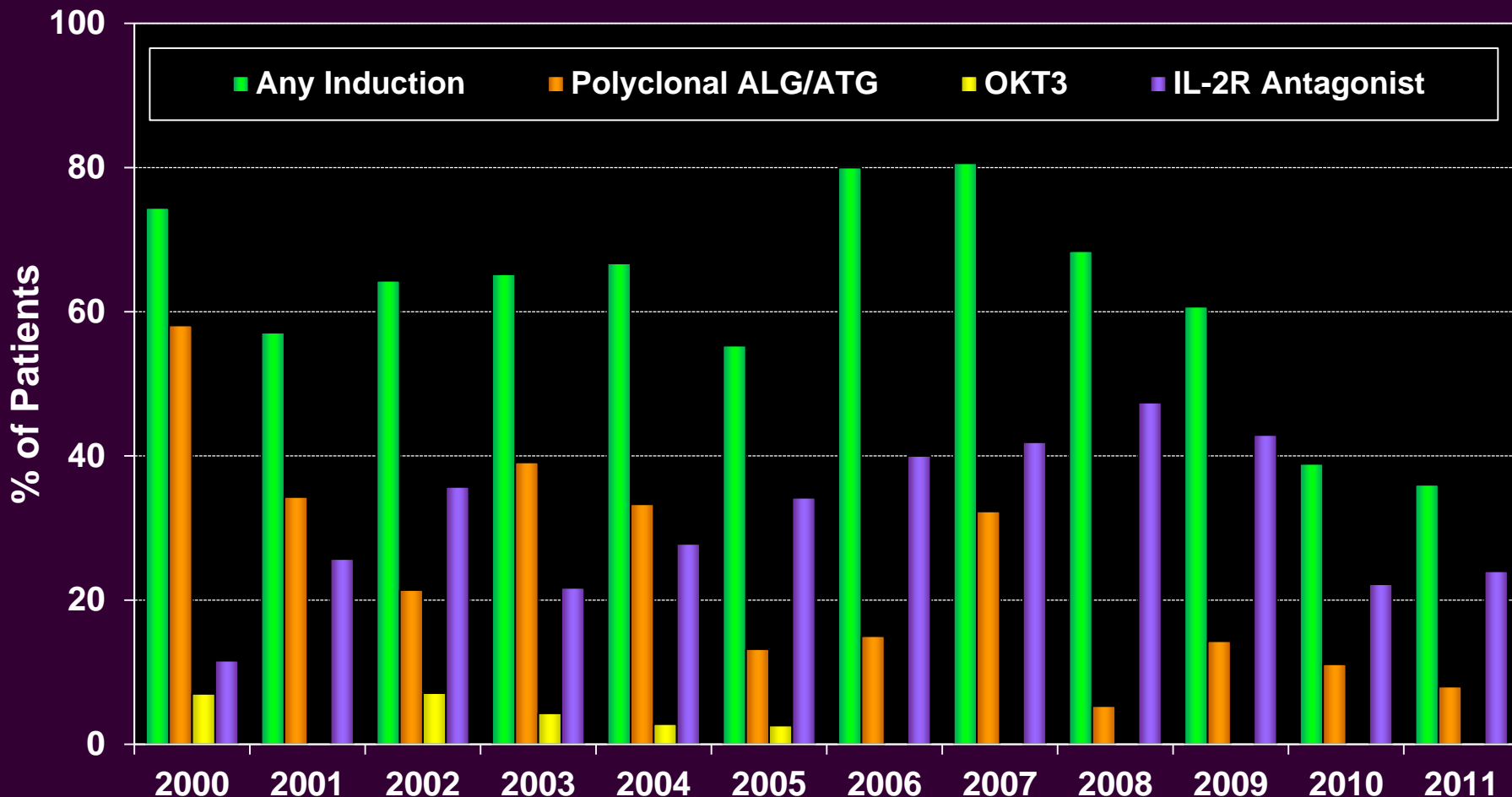
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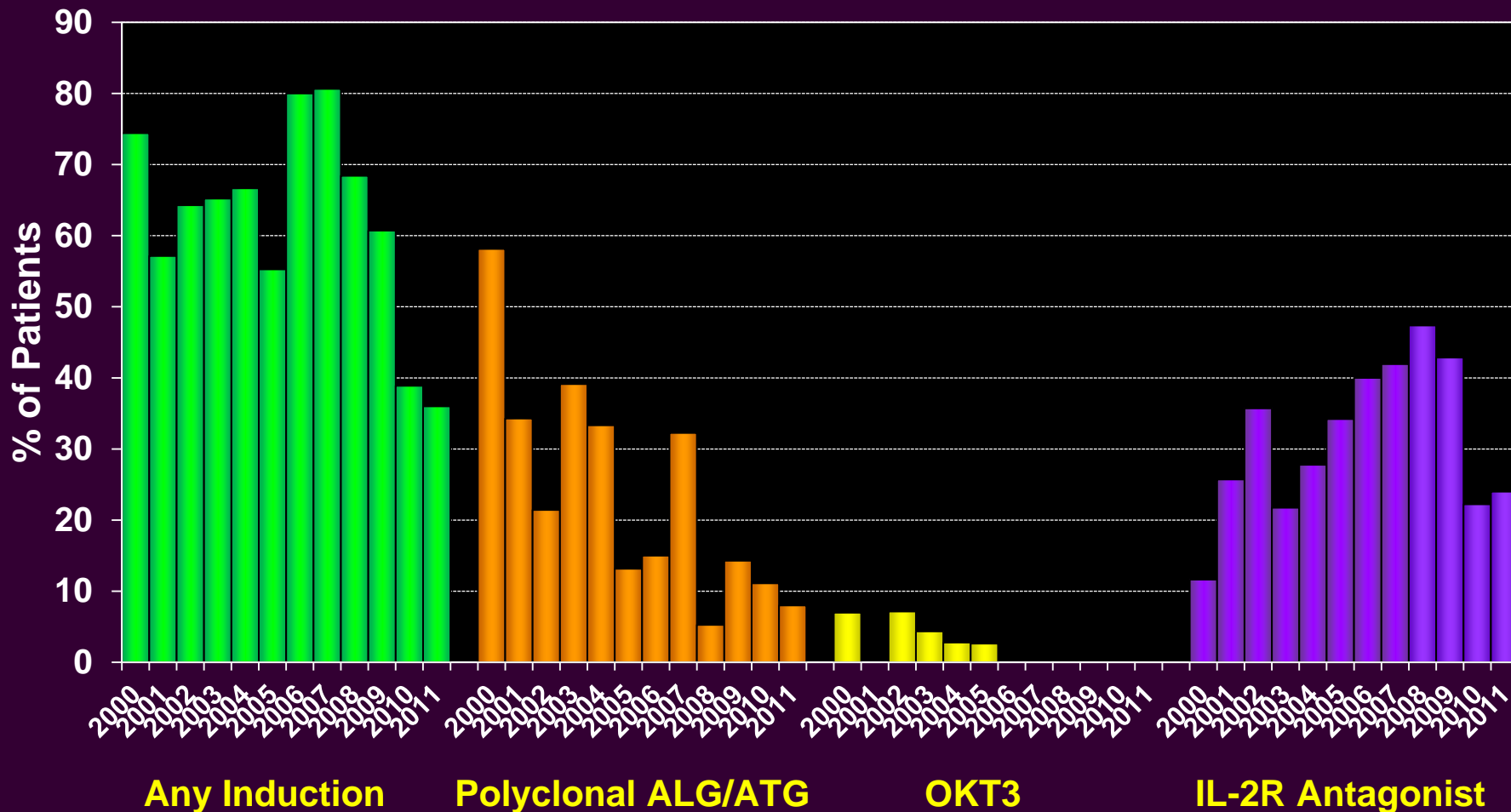
Adult Heart-Lung Transplants Induction Immunosuppression (Transplants: January 2001 – June 2012)



Adult Heart-Lung Transplants Induction Immunosuppression (Transplants: January 2000 – December 2011)



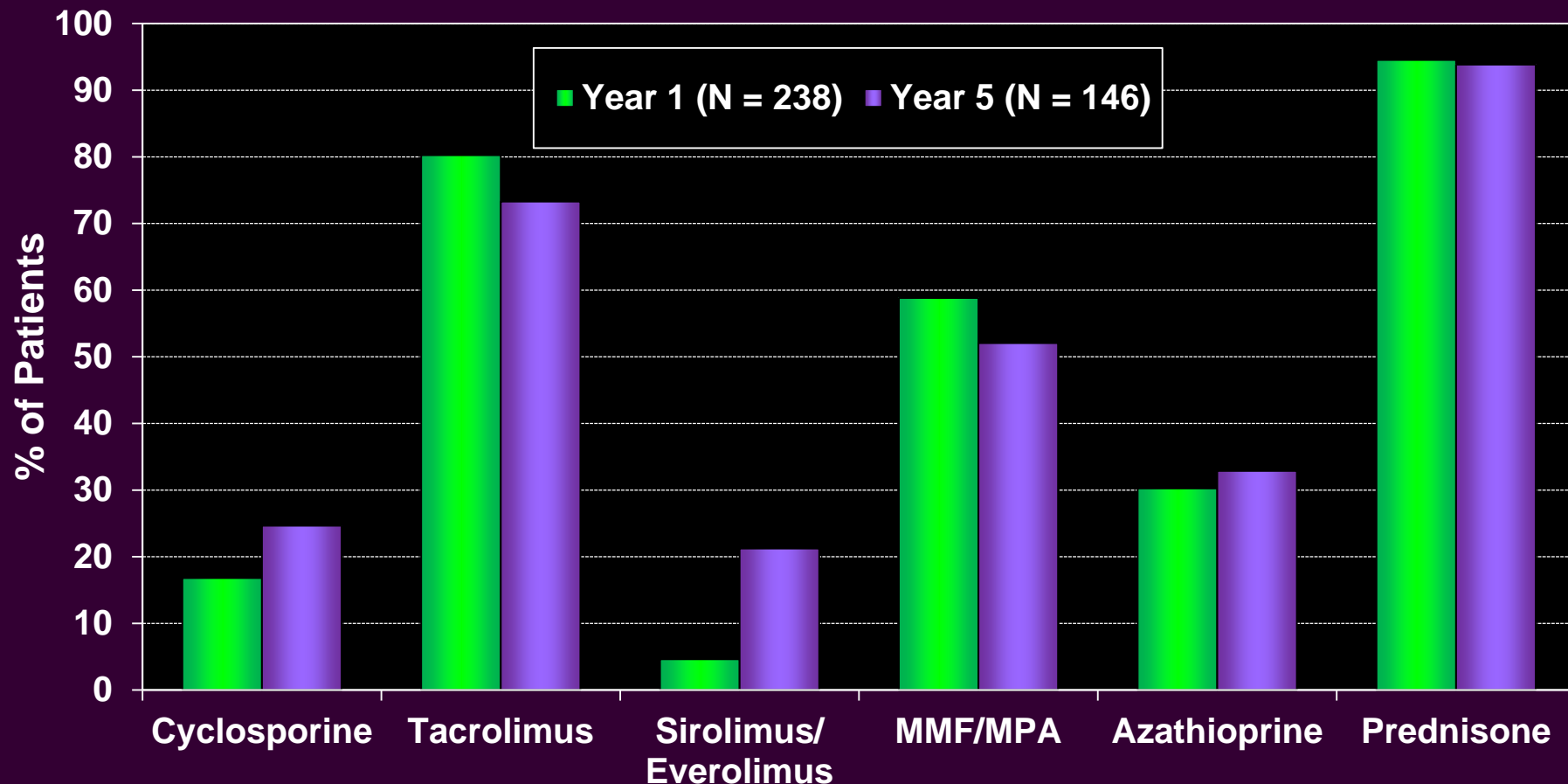
Adult Heart-Lung Transplants Induction Immunosuppression (Transplants: January 2000 – December 2011)





Adult Heart-Lung Transplants

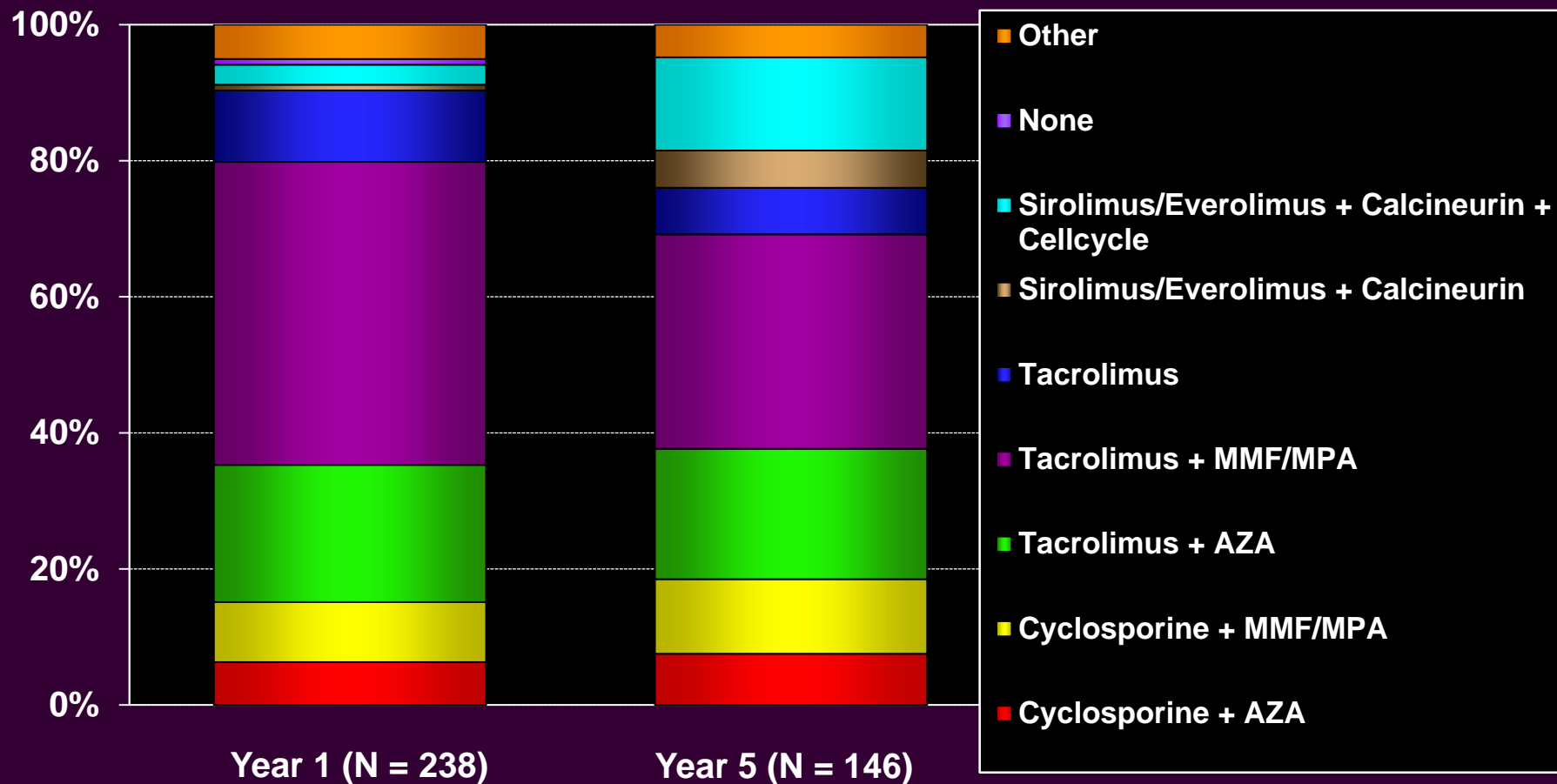
Maintenance Immunosuppression at Time of Follow-up (Follow-ups: January 2001 – June 2012)



NOTE: Different patients are analyzed in Year 1 and Year 5

Adult Heart-Lung Transplants

Maintenance Immunosuppression Drug Combinations at Time of Follow-up (Follow-ups: January 2001 – June 2012)



NOTE: Different patients are analyzed in Year 1 and Year 5

Analysis is limited to patients who were alive at the time of the follow-up

Post-transplant Morbidities

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Adult Heart-Lung Transplants

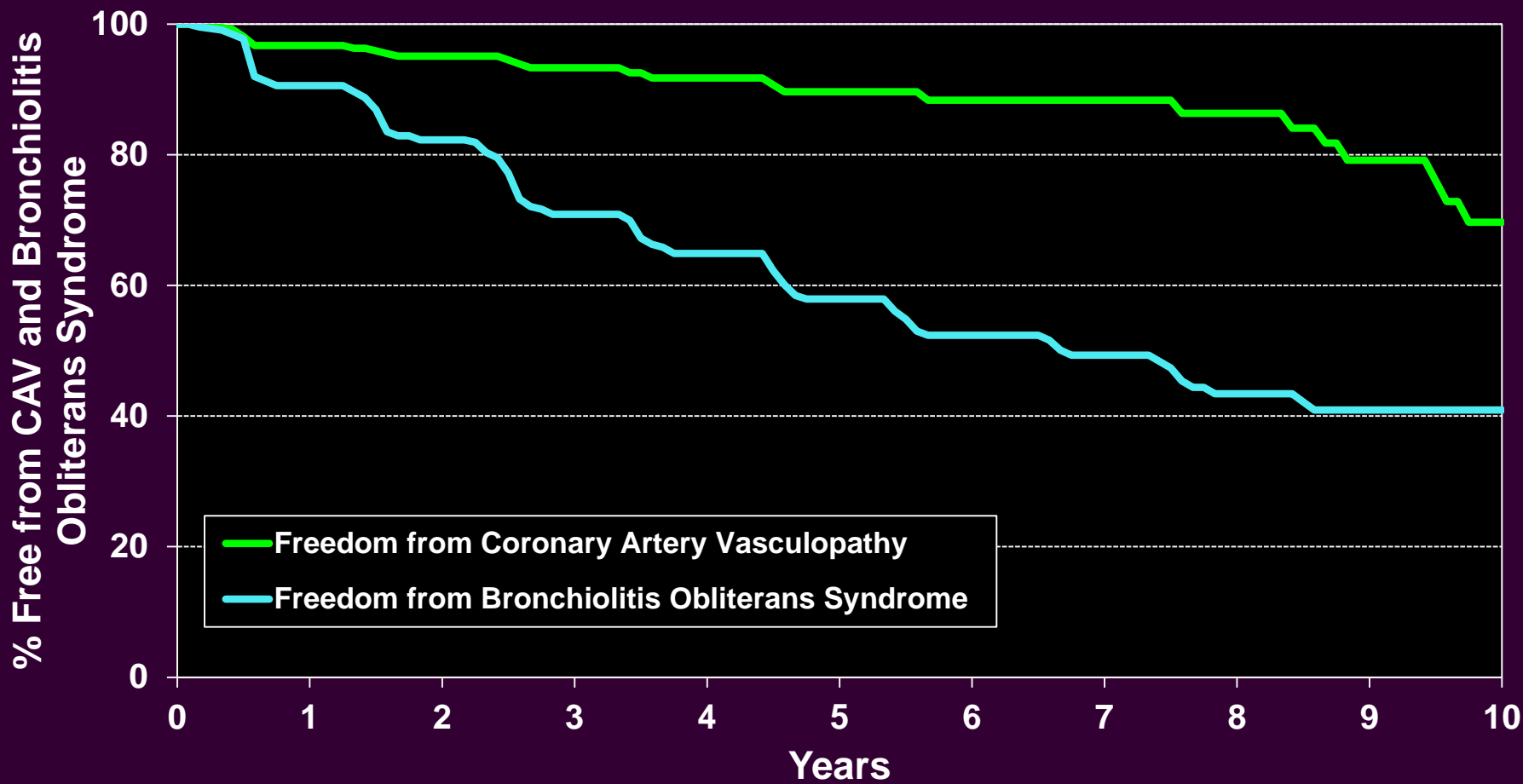
Cumulative Morbidity Rates in Survivors within 1 and 5 Years Post-Transplant (Follow-ups: April 1994 – June 2012)

Outcome	Within 1 Year	Total number with <u>known response</u>	Within 5 Years	Total number with <u>known response</u>
Hypertension	59.1%	(N = 421)	87.8%	(N = 148)
Renal Dysfunction	18.2%	(N = 466)	45.3%	(N = 181)
<i>Abnormal Creatinine ≤ 2.5 mg/dl</i>	11.2%		31.5%	
<i>Creatinine > 2.5 mg/dl</i>	2.8%		10.5%	
<i>Chronic Dialysis</i>	4.1%		2.2%	
<i>Renal Transplant</i>	0.2%		1.1%	
Hyperlipidemia	26.6%	(N = 443)	69.2%	(N = 156)
Diabetes	18.8%	(N = 469)	27.9%	(N = 179)
Coronary Artery Vasculopathy	3.0%	(N = 371)	7.6%	(N = 92)
Bronchiolitis Obliterans Syndrome	8.6%	(N = 441)	28.3%	(N = 152)

Adult Heart-Lung Transplants

Freedom from Coronary Artery Vasculopathy and Bronchiolitis Obliterans Syndrome

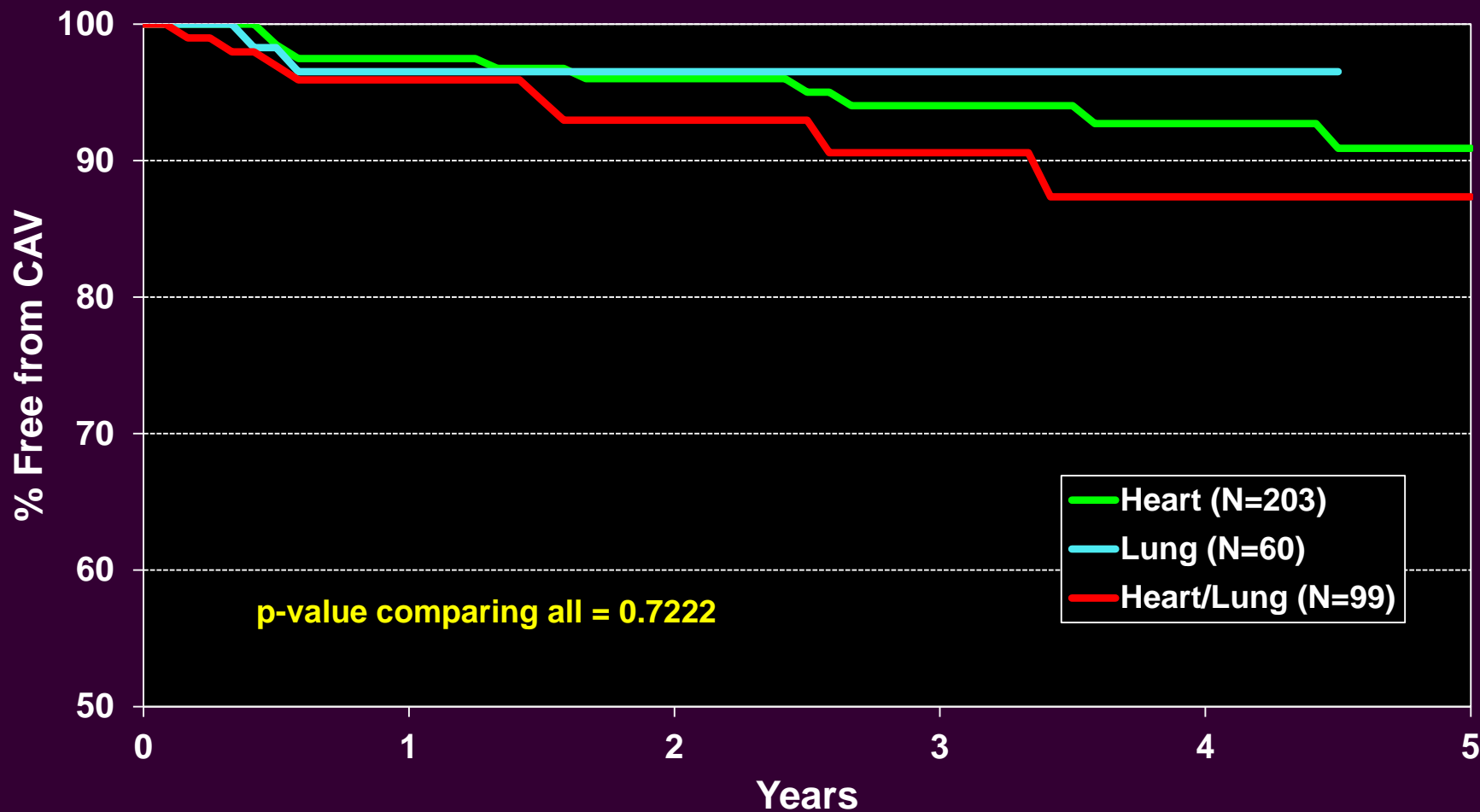
(Follow-ups: April 1994 – June 2012)



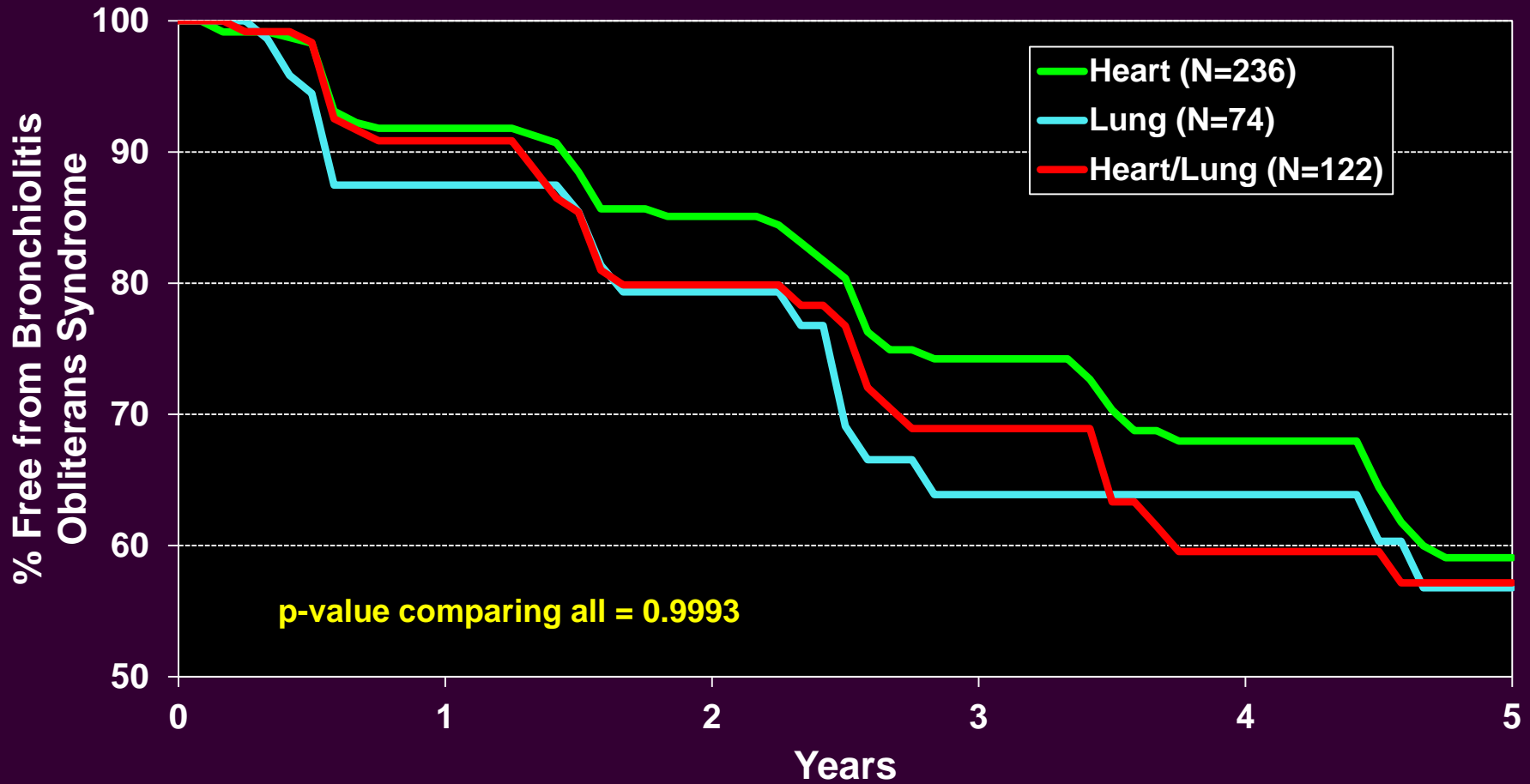
Adult Heart-Lung Transplants

Freedom from Coronary Artery Vasculopathy

By Diagnosis Type (Follow-ups: April 1994 – June 2012)



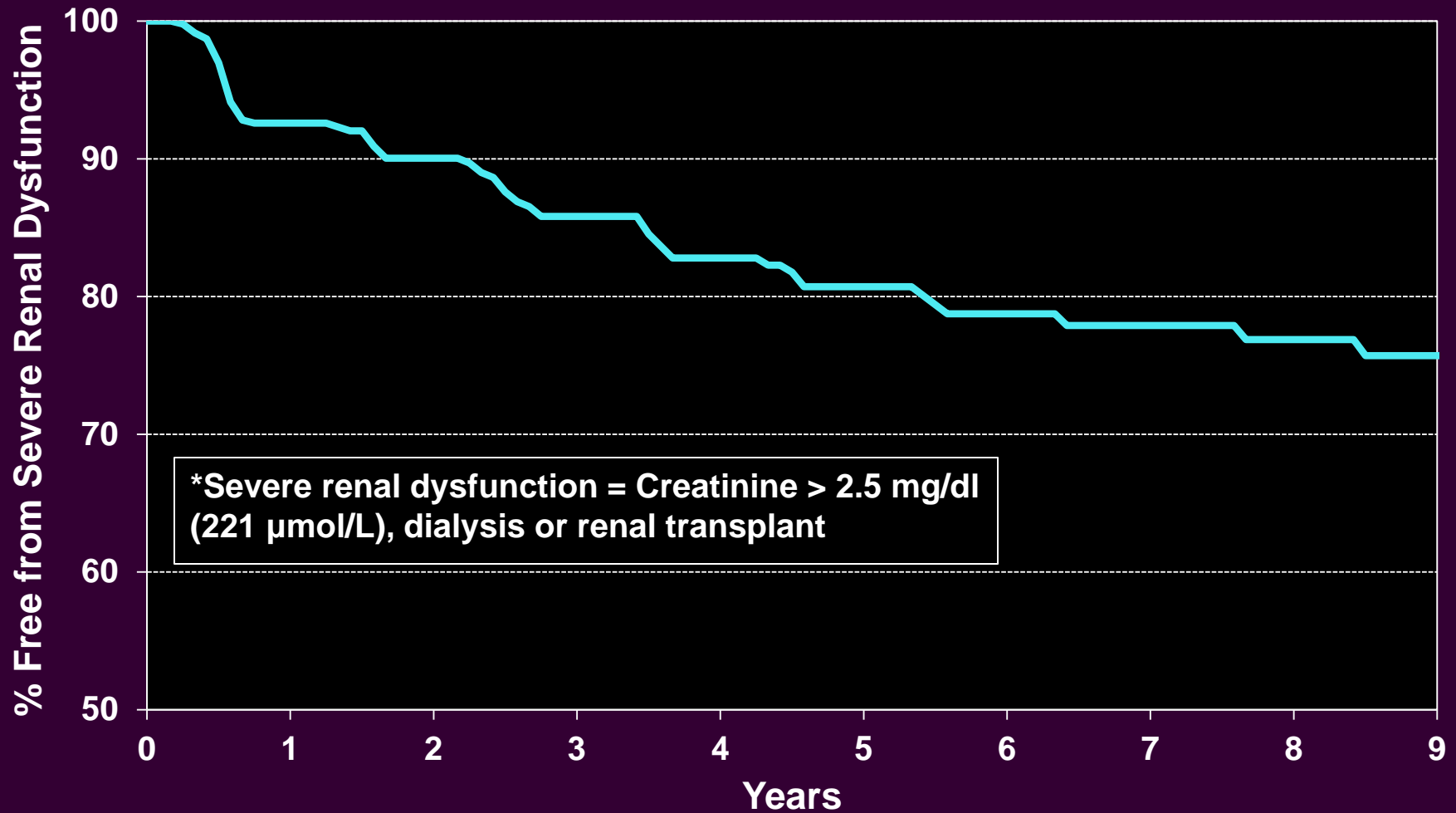
Adult Heart-Lung Transplants Freedom from Bronchiolitis Obliterans Syndrome By Diagnosis Type (Follow-ups: April 1994 – June 2012)



Adult Heart-Lung Transplants

Freedom from Severe Renal Dysfunction*

(Follow-ups: April 1994 – June 2012)



Adult Heart-Lung Transplants

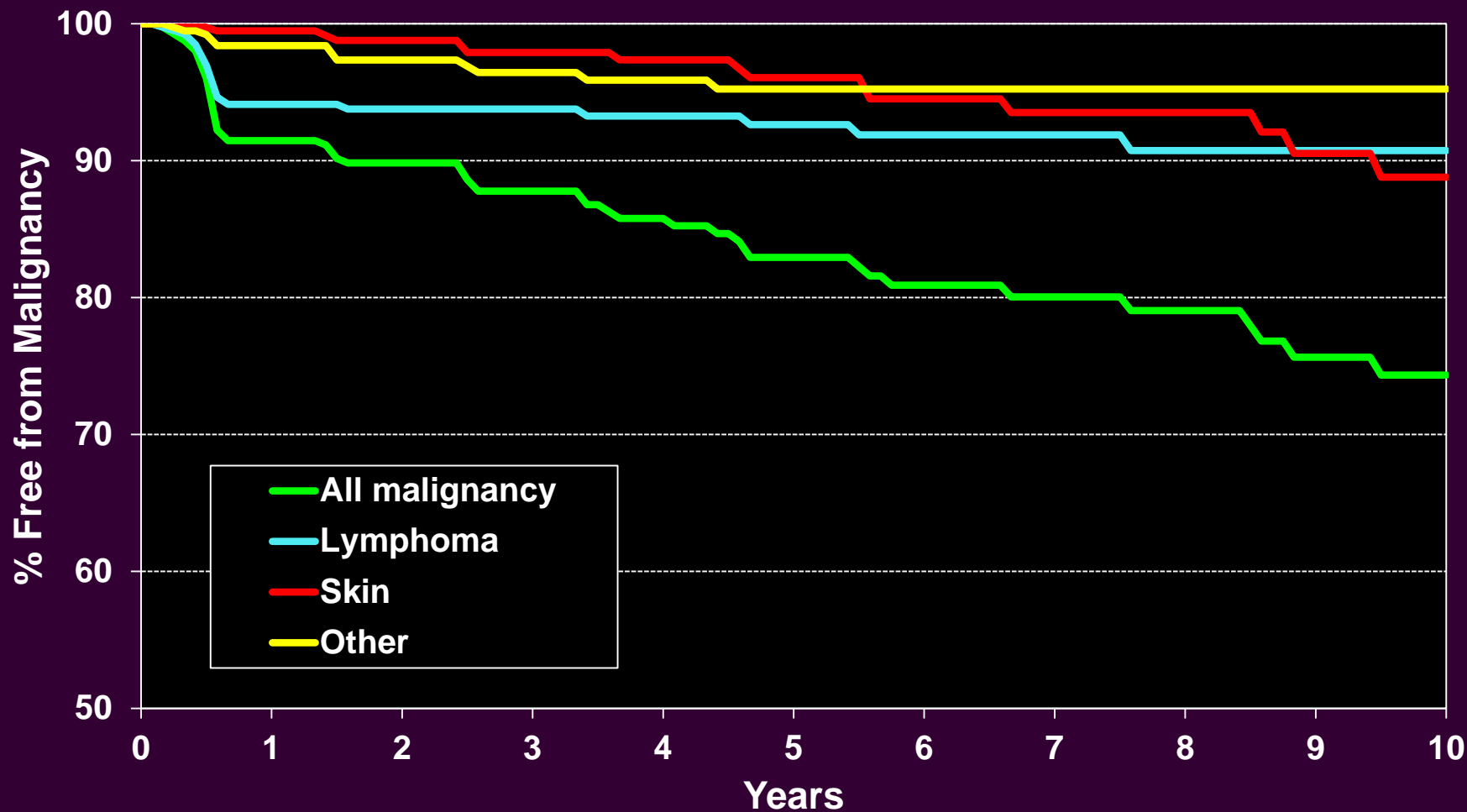
Post Transplant Malignancy (Follow-ups: April 1994 – June 2012)

Cumulative Morbidity Rates in Survivors

Malignancy/Type		1-Year Survivors	5-Year Survivors	10-Year Survivors
No Malignancy		449 (94.5%)	166 (88.8%)	58 (84.1%)
Malignancy (all types combined)		26 (5.5%)	21 (11.2%)	11 (15.9%)
Malignancy Type*	<i>Skin</i>	2	8	9
	<i>Lymphoma</i>	18	6	1
	<i>Other</i>	4	5	2
	<i>Type Not Reported</i>	2	2	0

* Recipients may have experienced more than one type of malignancy so sum of individual malignancy types may be greater than total number with malignancy.

Adult Heart-Lung Transplants Freedom from Malignancy (Follow-ups: April 1994 – June 2012)



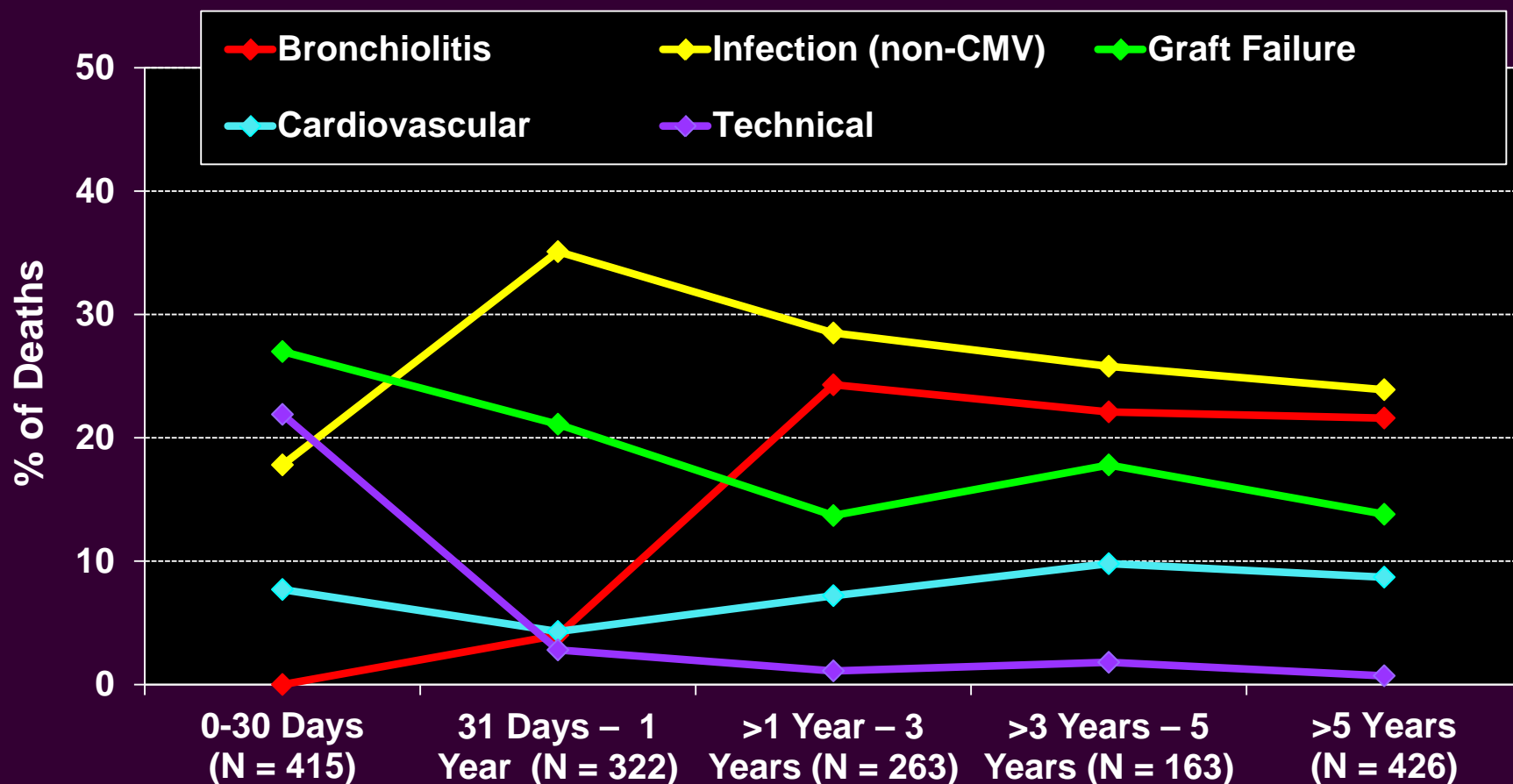
Adult-Heart Lung Transplants

Cause of Death (Deaths: January 1992 – June 2012)

CAUSE OF DEATH	0-30 Days (N = 415)	31 Days - 1 Year (N = 322)	>1 Year - 3 Years (N = 263)	>3 Years - 5 Years (N = 163)	>5 Years (N = 426)
BRONCHIOLITIS	0	13 (4.0%)	64 (24.3%)	36 (22.1%)	92 (21.6%)
ACUTE REJECTION	7 (1.7%)	9 (2.8%)	5 (1.9%)	2 (1.2%)	3 (0.7%)
LYMPHOMA	0	8 (2.5%)	13 (4.9%)	8 (4.9%)	9 (2.1%)
MALIGNANCY, OTHER	1 (0.2%)	7 (2.2%)	12 (4.6%)	5 (3.1%)	27 (6.3%)
CMV	0	2 (0.6%)	1 (0.4%)	1 (0.6%)	1 (0.2%)
INFECTION, NON-CMV	74 (17.8%)	113 (35.1%)	75 (28.5%)	42 (25.8%)	102 (23.9%)
GRAFT FAILURE	112 (27.0%)	68 (21.1%)	36 (13.7%)	29 (17.8%)	59 (13.8%)
CARDIOVASCULAR	32 (7.7%)	14 (4.3%)	19 (7.2%)	16 (9.8%)	37 (8.7%)
TECHNICAL	91 (21.9%)	9 (2.8%)	3 (1.1%)	3 (1.8%)	3 (0.7%)
OTHER	98 (23.6%)	79 (24.5%)	35 (13.3%)	21 (12.9%)	93 (21.8%)

Adult Heart-Lung Transplants

Relative Incidence of Leading Causes of Death (Deaths: January 1992 – June 2012)





Multivariable Analysis

Adult Heart-Lung Transplants (January 1995 – June 2011)

Risk Factors For 1 Year Mortality

VARIABLE	N	Hazard Ratio	P-value	95% Confidence Interval
Diagnosis: IPAH vs. Other*	446	0.78	0.0171	0.63 - 0.96
Continuous factors (see figures)				
Donor age				
Transplant center volume (borderline)				

N = 1,681

* Other = All diagnoses other than IPAH and Congenital



Adult Heart-Lung Transplants (January 1995 – June 2011)

Risk Factors For 1 Year Mortality with 95% Confidence Limits

Donor Age





Adult Heart-Lung Transplants (January 1995 – June 2011)

Risk Factors For 1 Year Mortality with 95% Confidence Limits

Transplant Center Volume

