OPTN Liver and Intestine Transplantation Committee

Allocation and Distribution Subcommittee

Public Forum

Atlanta, April 12-13, 2010

Goran B. G. Klintmalm MD, PhD, FACS
Chief and Chairman
BRTI, Dallas

The Credibility Gap

$$E(L_i(\tau)|D(u),w) = \int_0^\tau \left(S_i^G(u) + w\left(S_i^T(u) - S_i^G(u) - S_i^W(u)\right)\right)\exp(-D(u))\,du$$

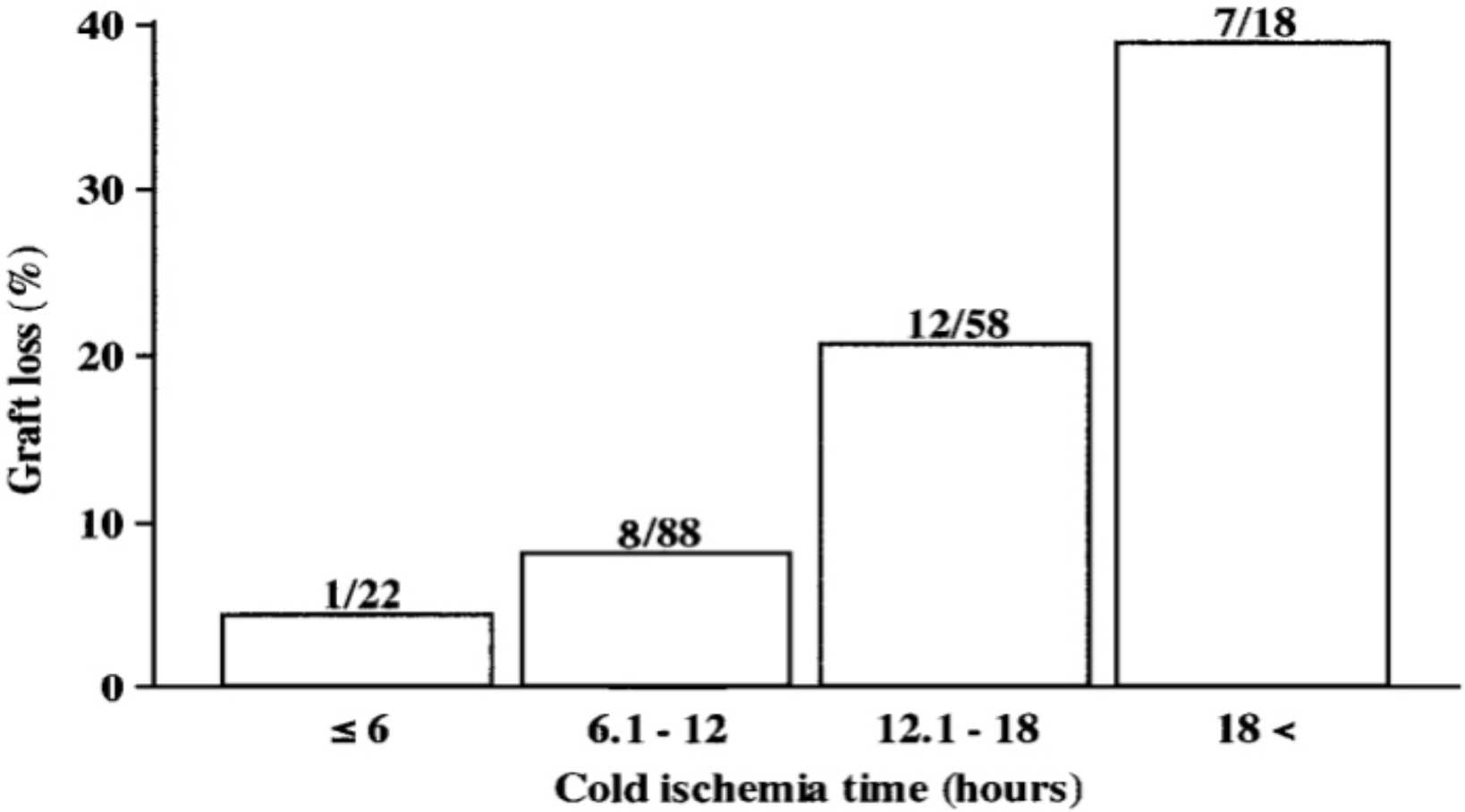
This is the LYFT formula that was proposed for kidney allocation.

Problems To Be Addressed.

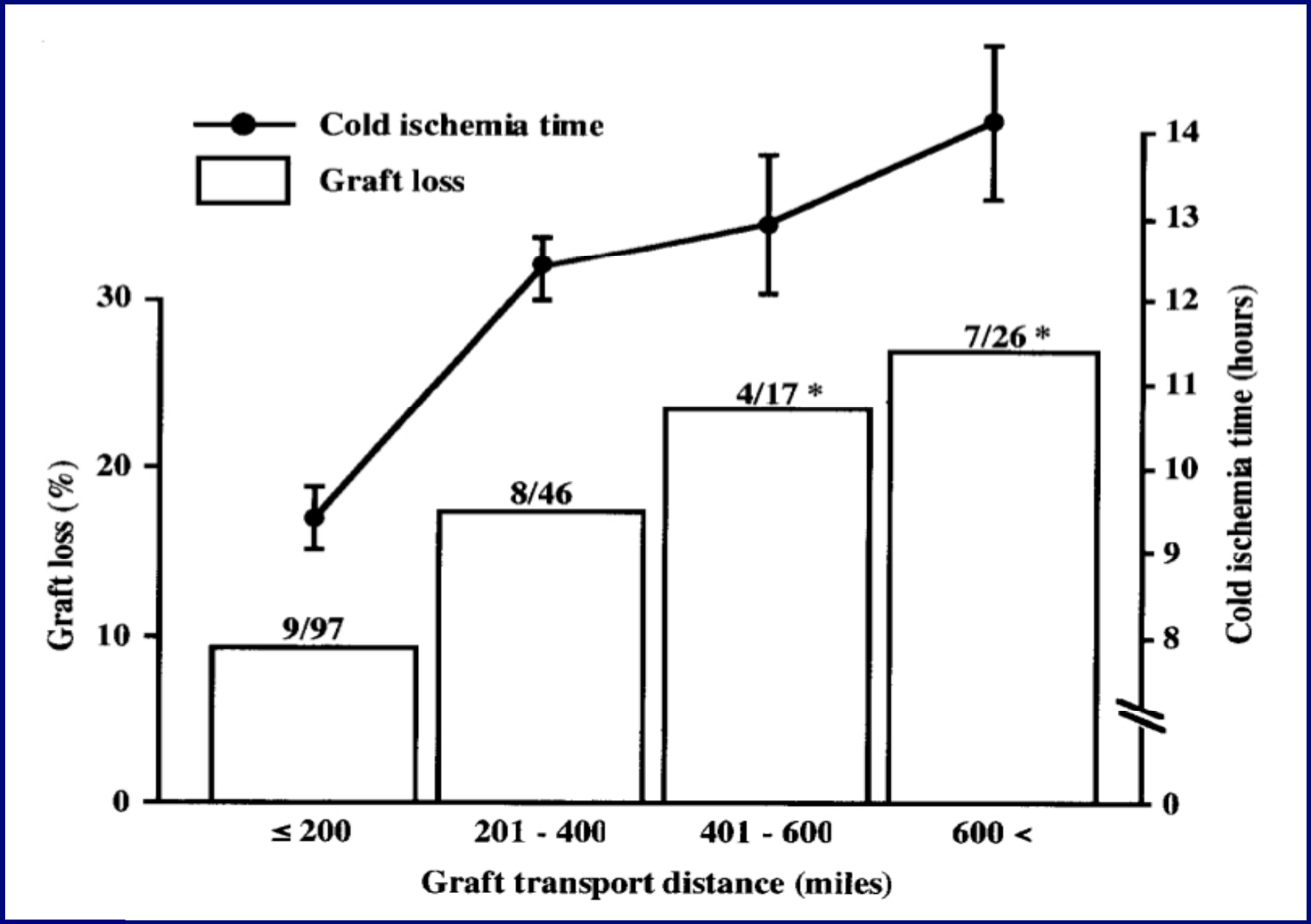
Proposal of last year (Regional MELD sharing) created a serious back lash.

Allocation and distribution rules must be relevant to the clinicians.

Maybe changes to our system should be step wise to allow the community to adopt them and accept.



E Totsuka, J Fung et al *Surg. Today* 2002; 32: 792-799



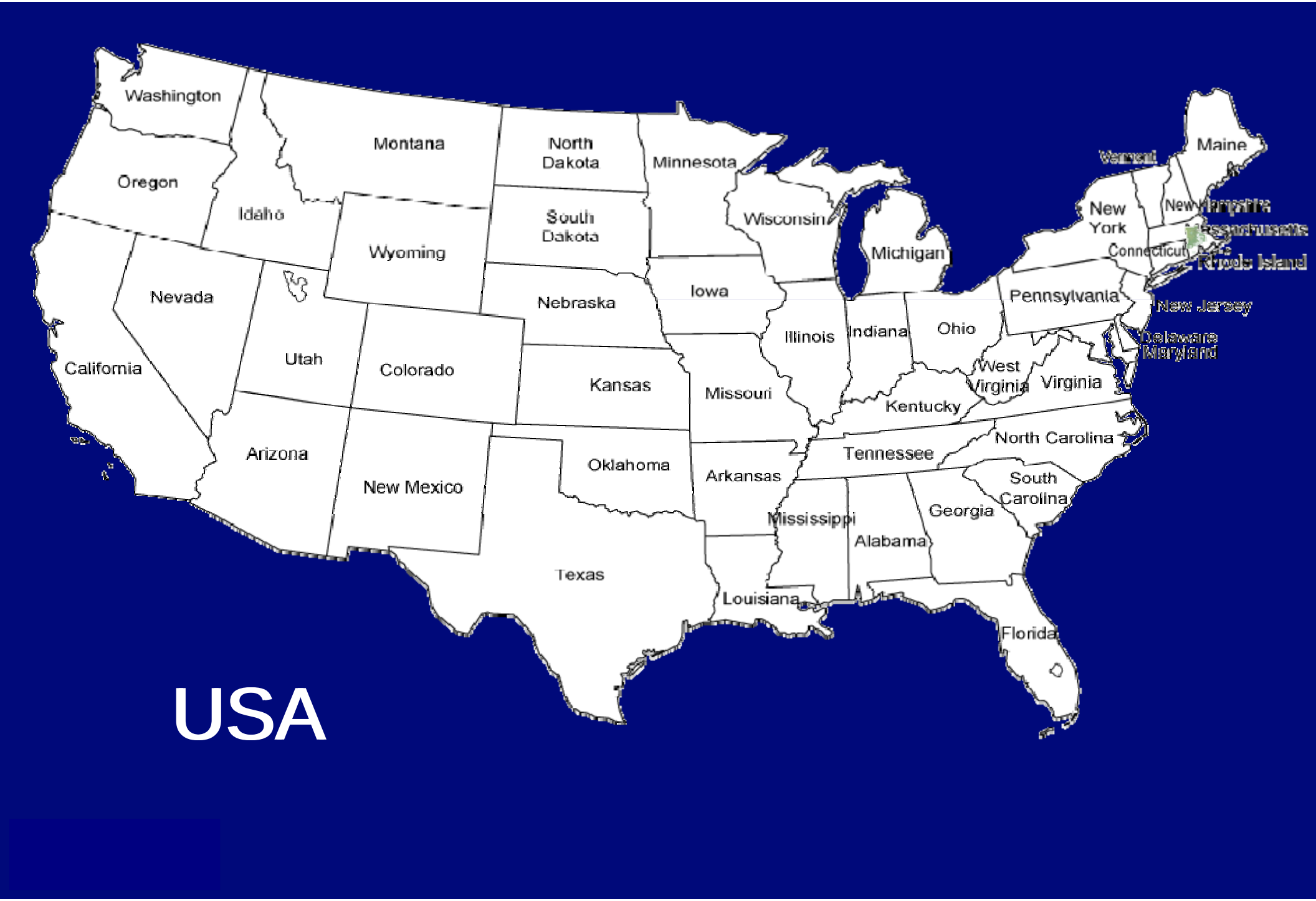
E Totsuka, J Fung et al *Surg. Today* 2002; 32: 792-799

Clinical Characteristics

	Survivors (n=163)	Nonsurvivors (n=130)	*P*
Age < 18 yr, %	53	33	.01
Gender, % F	62	53	.03
Urgent transplant	25	46	.01
Total ischemia time, hr.	6.2	8.7	.04
Biliary complication, %	7	11	.04
Retransplantation, %	9	19	.02

Rhode Island

Rhode Island


Washington
Oregon
California
Idaho
Nevada
Montana
Wyoming
Utah
Arizona
Colorado
New Mexico
North Dakota
South Dakota
Nebraska
Kansas
Oklahoma
Texas
Minnesota
Iowa
Missouri
Arkansas
Louisiana
Wisconsin
Illinois
Michigan
Indiana
Ohio
Kentucky
Tennessee
Mississippi
Alabama
Georgia
Florida
South Carolina
North Carolina
Virginia
West Virginia
Pennsylvania
New York
Maine
Vermont
New Hampshire
Massachusetts
Rhode Island
Connecticut
New Jersey
Delaware
Maryland
USA

Impact of Cold Ischemia Time: SRTR CSR

CSR Cohort Released 07/14/2009 - Transplants between 01/01/2006 and 06/30/2008

Characteristic Covariates	Reference Group	beta	hazard ratio	standard error	p-value
Ischemia Time (cold): 12 or more hours	**Less than 9 hours**	**0.441830436**	**1.56**	**0.085773065**	**<0.0001**
Ischemia Time (cold): 9 to 11 hours	**Less than 9 hours**	**0.143881453**	**1.15**	**0.061456386**	**0.0192**
Ischemia Time (cold): Missing	**Less than 9 hours**	**0.238194582**	**1.27**	**0.078837031**	**0.0025**

Deceased Donor Graft Survival Model Description, 1 Year (and 1 Month) after Transplant, Organ: Liver, Adult (Age 18+)

SRTR

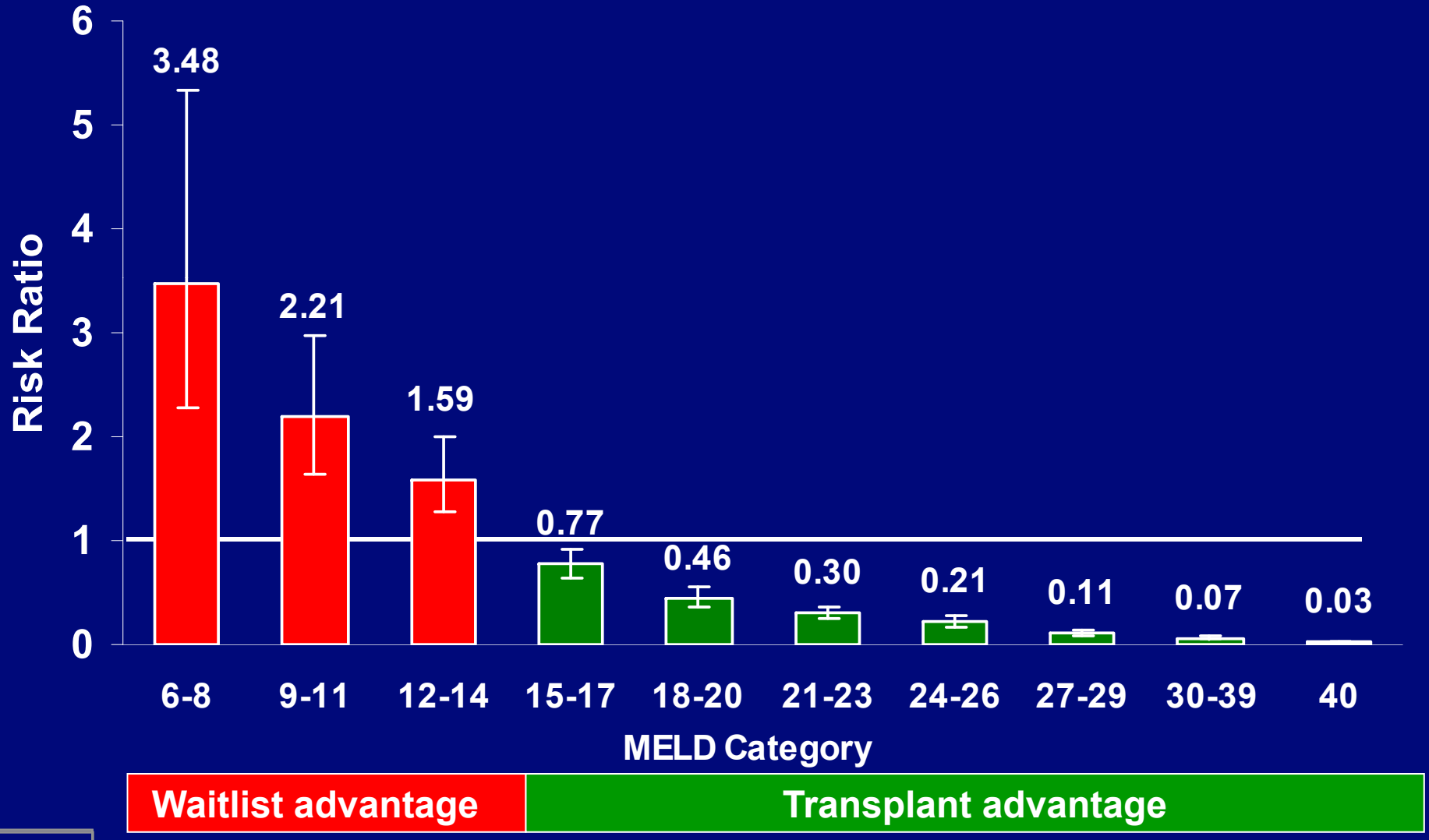
Results

- When adjusting for distance, the risk of graft failure increased by 2.0% per hour of cold ischemia time (HR=1.020, p<0.0001).
- When adjusting for cold ischemia time, the risk of graft failure increased by 0.9% per 100 nautical miles traveled (HR=1.009, p=0.0141).
  - adjusting for distance slightly decreased the estimated impact of cold ischemia time
  - adjusting for cold time cut the estimated impact of distance considerably.
- Effect on graft failure rates is much stronger for cold ischemia time than for distance

Results

- After adjusting for all other factors in the model (including cold ischemia time), length of stay increased by 0.07 days with every 100 nautical mile increase in the distance between donor hospital and recipient transplant center ($p < 0.05$).
- Length of stay increased by 0.32 days for every additional hour of cold ischemia time ($p < 0.001$).

Conditional Relative Mortality Rates By MELD Transplant vs. Waitlist (Average Donor)



SRTR

Every MELD category P<0.0005 except MELD 15-17 P=0.01

Merion et al. Am J Transplantation 2005; 5: 307.

Methods

- Study Population
  - Data from candidates on the liver waitlist and all donor organs that became available between 1/1/2006 and 12/31/2006 were included in the simulations.
- Analytical Approach
  - We used the liver simulated allocation system (LSAM) to compare concentric circle sharing systems above various MELD/PELD thresholds to the current allocation system. Results were averaged over 10 separate runs.
- We compared the numbers of deaths broken out by type, the median distance traveled between the donor hospital and recipient center, and the percent shared under each modeled allocation system.

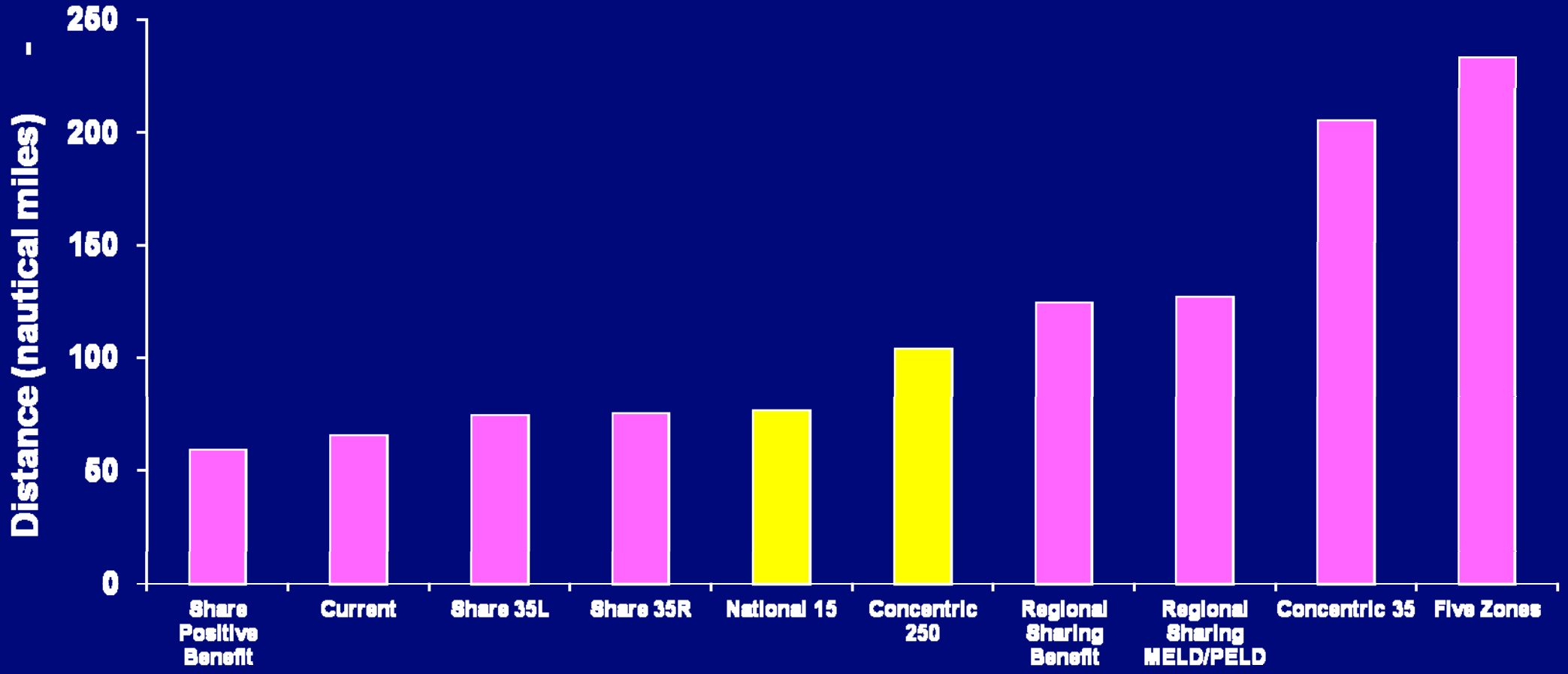
Comparison of Allocation Rules for Adult Deceased Donor Livers

Current System	National 15
Local – Status 1A	Regional – Status 1A
Regional – Status 1A	Regional – Status 1B
Local – Status 1B	Local – MELD/PELD ≥ 15
Regional – Status 1B	Regional – MELD/PELD ≥ 15
Local – MELD/PELD ≥ 15	National – Status 1A
Regional – MELD/PELD ≥ 15	National – Status 1B
Local – MELD/PELD < 15	National – MELD/PELD ≥ 15
Regional – MELD/PELD < 15	Local – MELD/PELD <15
National – Status 1A	Regional – MELD/PELD <15
National – Status 1B	National – MELD/PELD <15
National – MELD/PELD	

Blue = Current System, Green = National 15

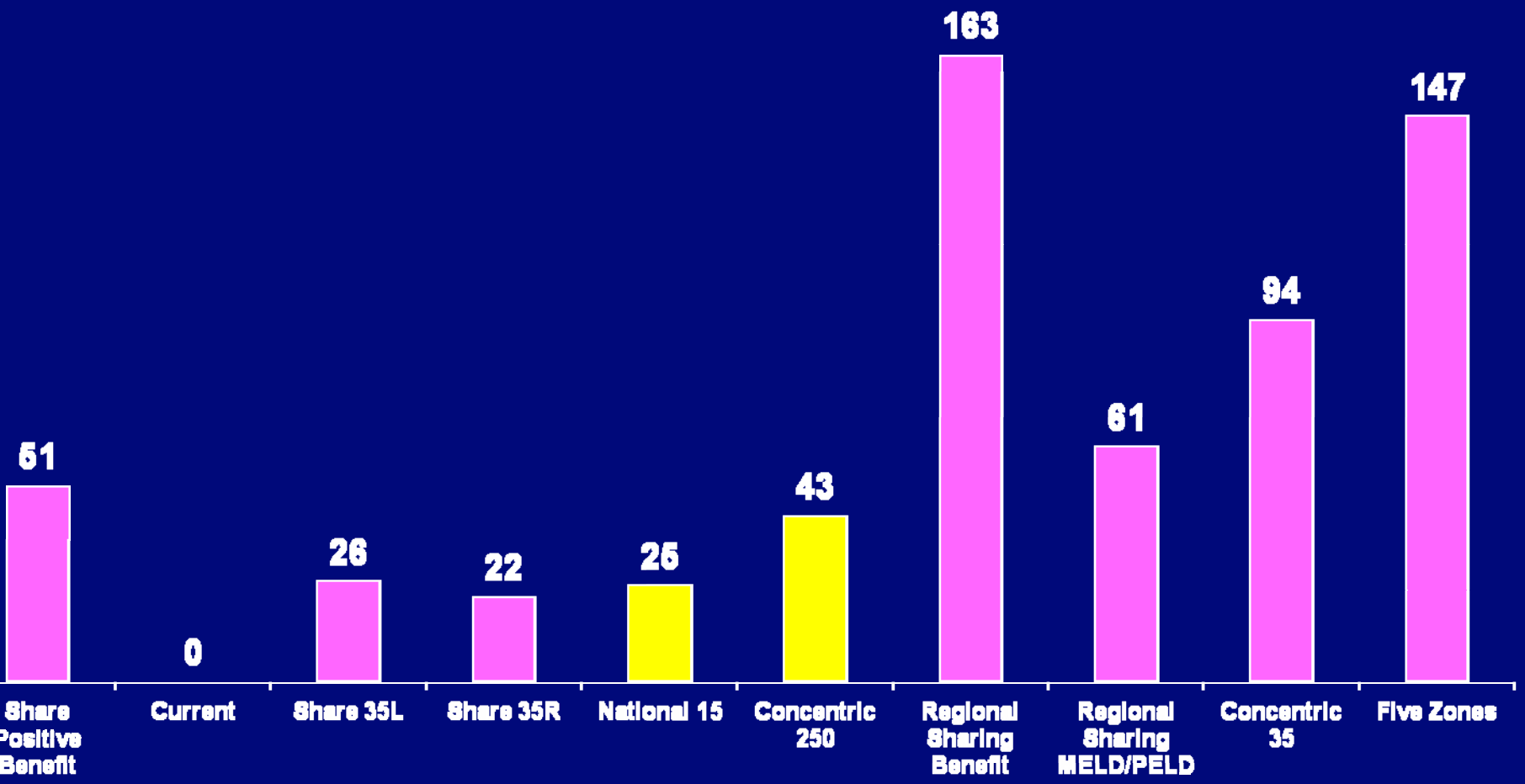
SRTR

Median Distance Between Donor Hospital and Transplant Center

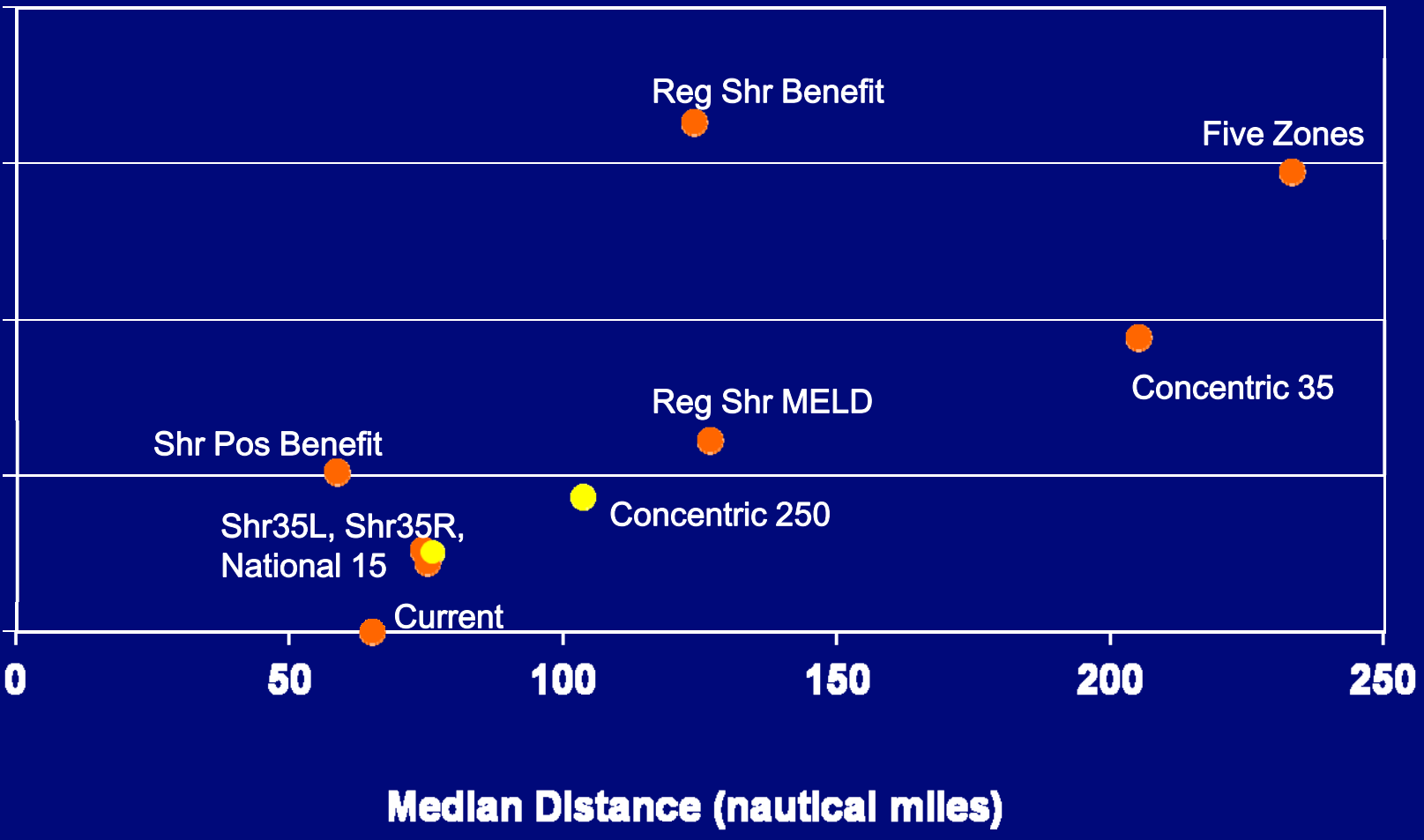


SRTR

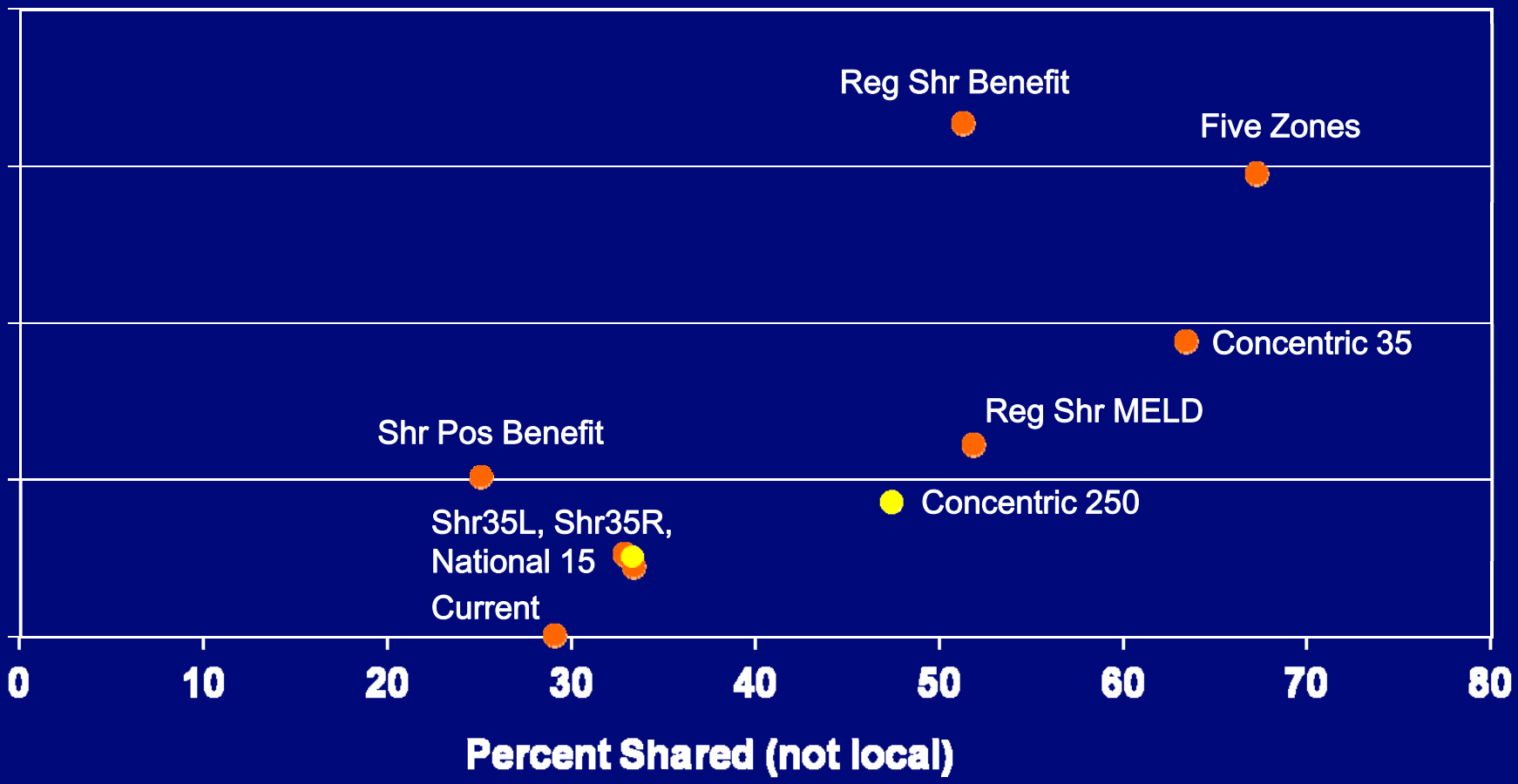
ecrease in Total Deaths (vs. Current)



Median Distance vs. Decrease in Total Deaths



Percent Shared vs. Decrease in Total Deaths

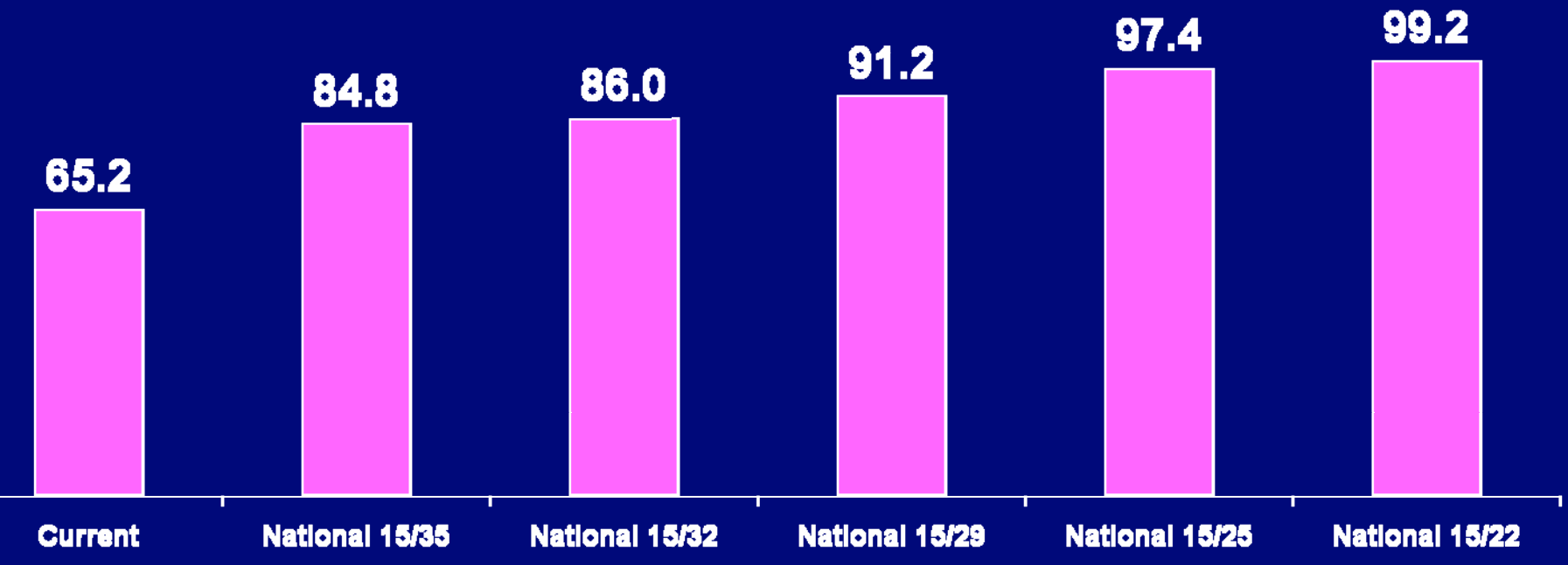


Comparison of Allocation Rules for Adult Deceased Donor Livers

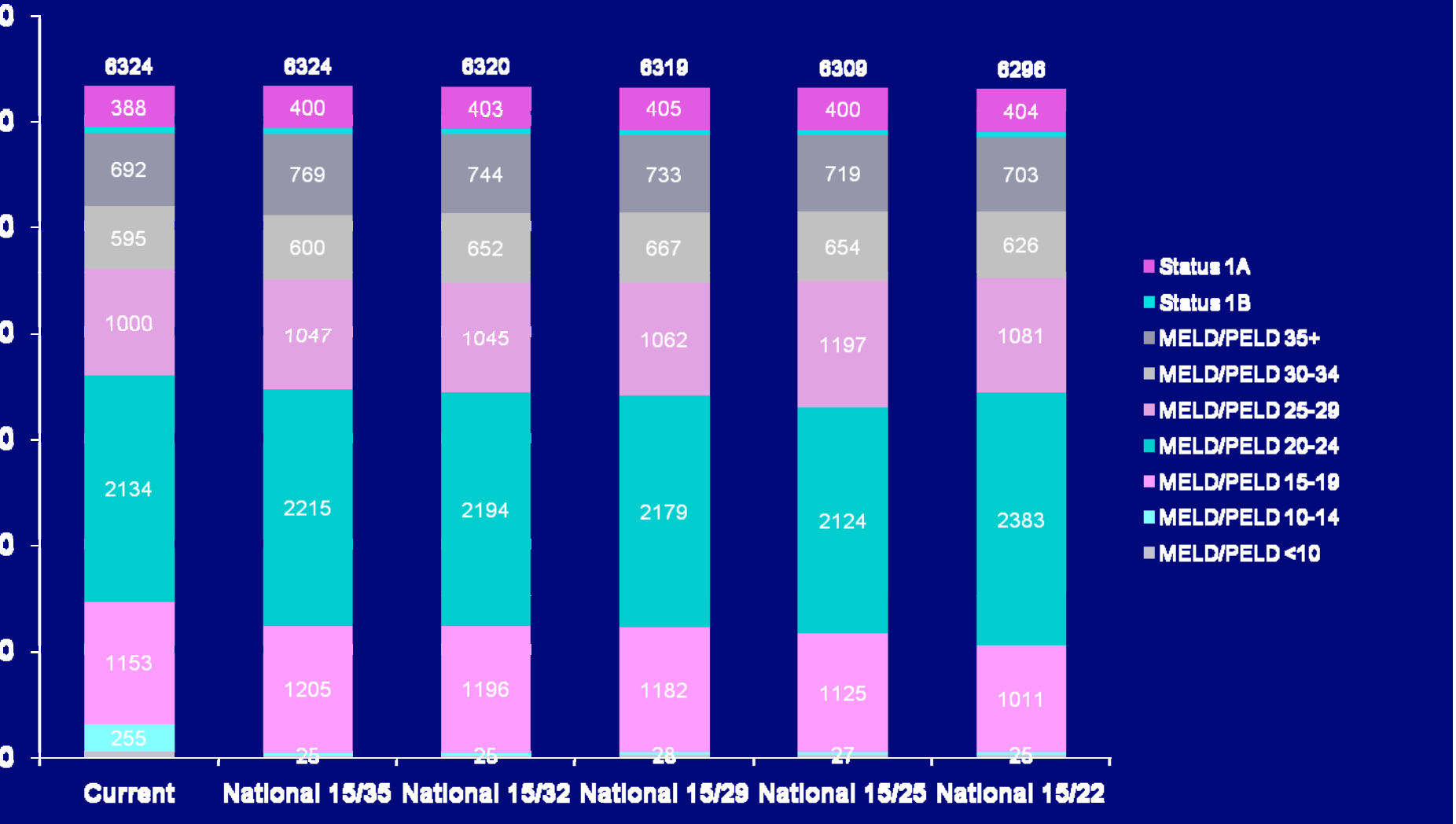
urrent System	National 1535 (32, 29, 25, 22)
- Status 1A	Regional Status 1A
nal – Status 1A	Regional Status 1B
- Status 1B	Local MELD/PELD ≥ 35 (32, 29, 25, 22)
nal – Status 1B	Regional MELD/PELD ≥ 35 (32, 29, 25, 22)
- MELD/PELD ≥ 15	Local MELD/PELD 15-34 (31, 28, 24, 21)
nal – MELD/PELD ≥ 15	Regional MELD/PELD 15-34 (31, 28, 24, 21)
- MELD/PELD < 15	National Status 1A
nal – MELD/PELD < 15	National Status 1B
al – Status 1A	National MELD/PELD ≥ 15
al – Status 1B	Local MELD/PELD < 15
al – MELD/PELD	Regional MELD/PELD < 15
	National MELD/PELD < 15

Current System, Green = Two Tiered Sharing Systems

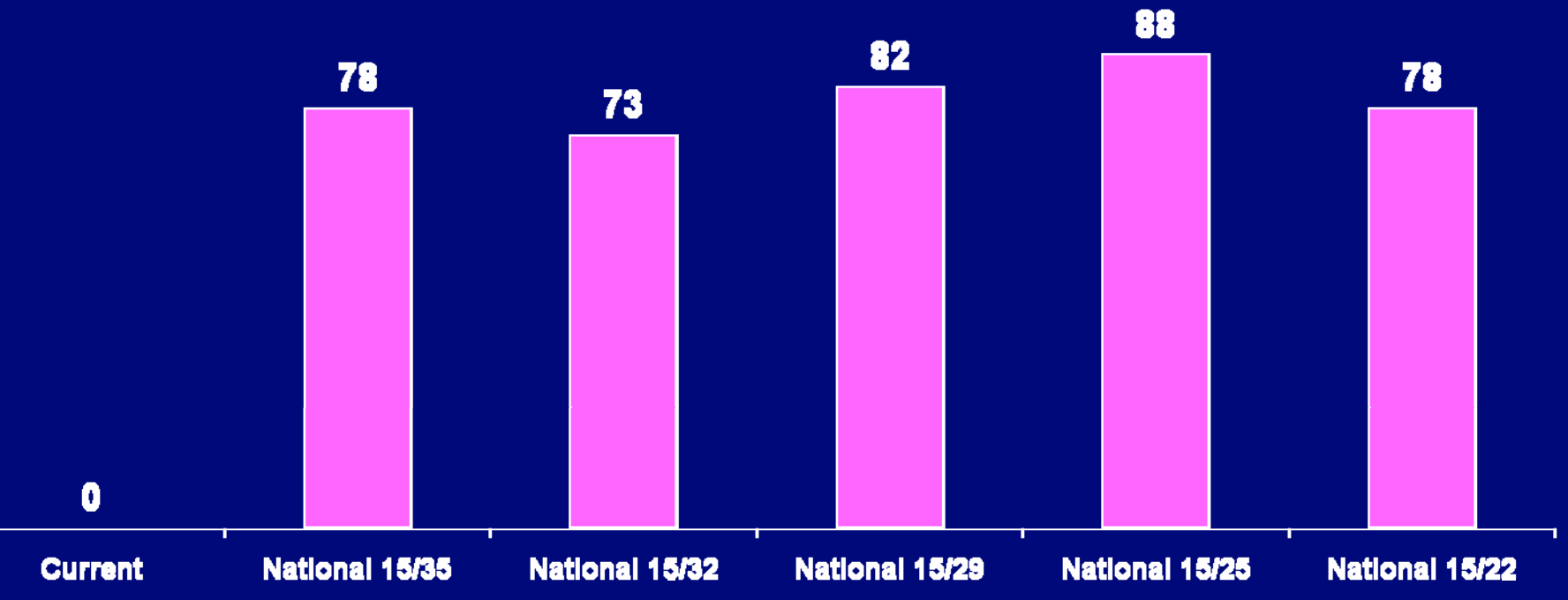
Median Distance Between Donor Hospital and Transplant Center



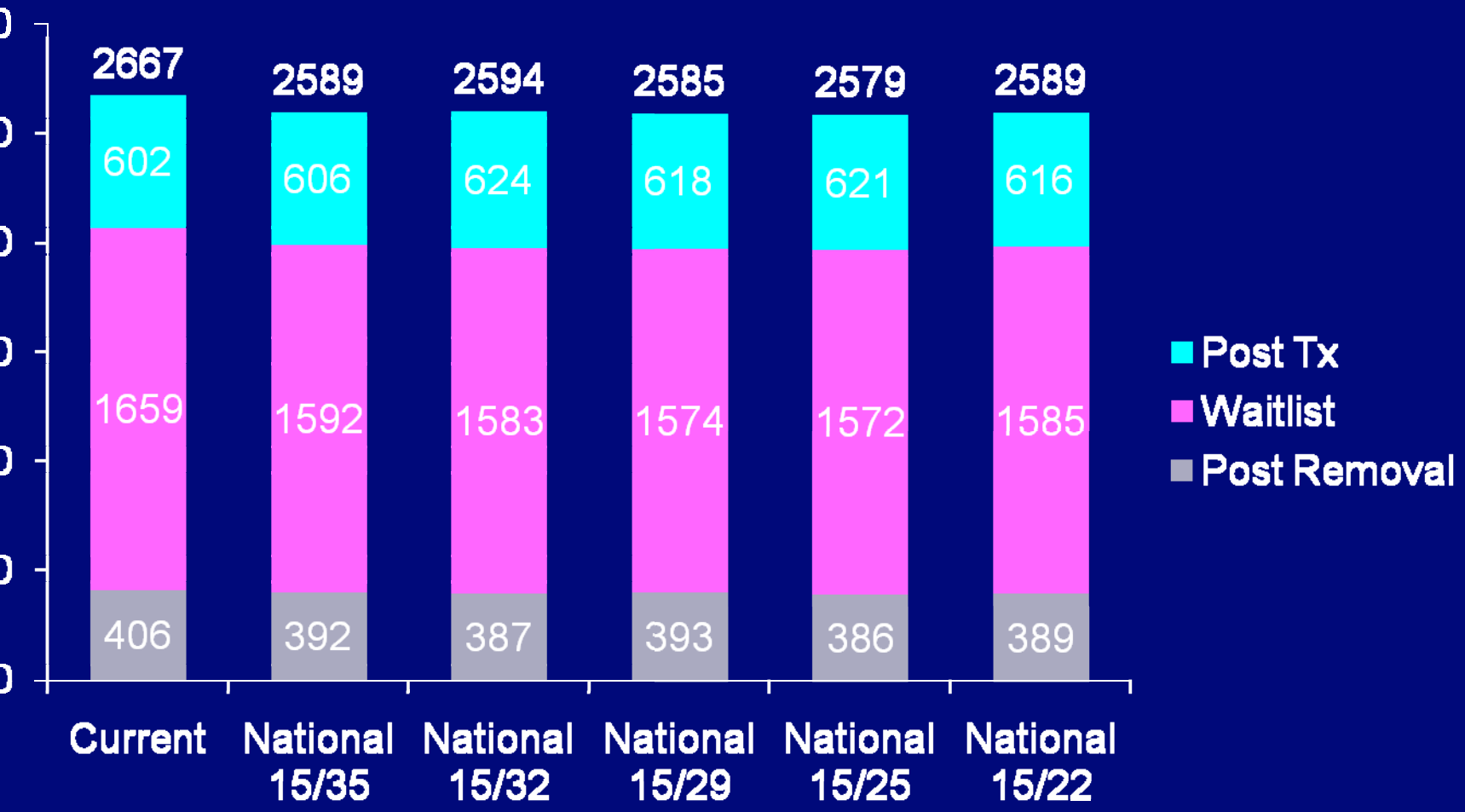
Number of Transplants by MELD



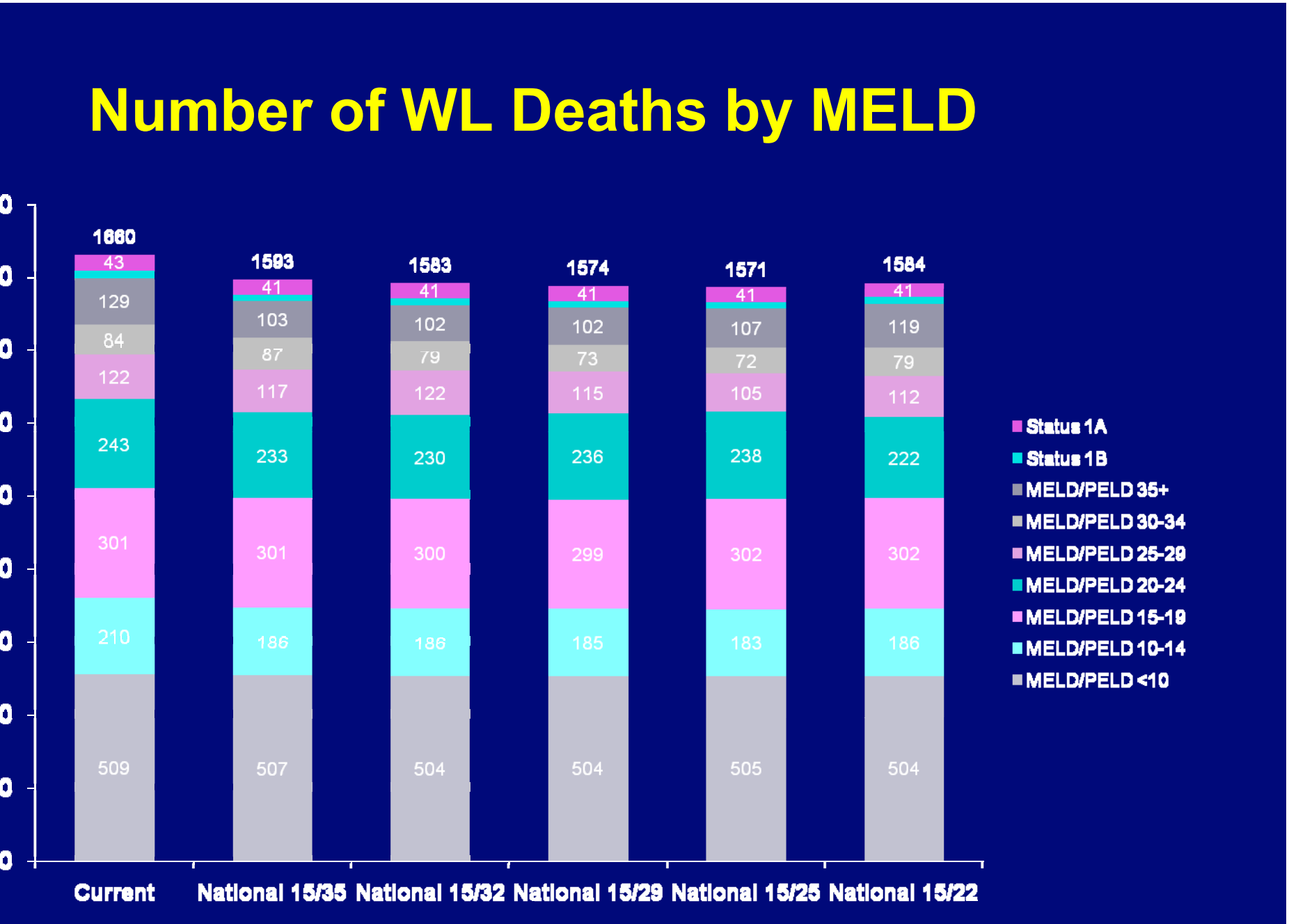
ecrease in Total Deaths (vs. Current)



Number of Deaths by Type



Number of WL Deaths by MELD



Summary

f the two tiered systems resulted in higher median nces traveled between the donor hospital and plant center compared to the current allocation rules

he distance increased as the MELD score for the upper reshold was reduced

f the two tiered systems resulted in fewer total deaths pared to current allocation rules in the simulations.

he decrease in the number of deaths ranged from 73 to 3.

Risk-Equivalent-Threshold

aring for high MELD – 35/32/29

estion is: There is a local donor. Does a recipient
h MELD of 36 who is 300 miles away truly have a
ferent risk of dying on WL than my local recipient
h a MELD of 34?

T means when sharing regional for high MELD, if
local recipient has a MELD of 35/32/29 minus ≤3
/29/26) no sharing takes place.

Summary

nimize transplantation for patients with MELD <15 as
risk of dying is higher with than without transplant.

plement National sharing for MELD <15

rease organ availability for patients with the highest
k of dying - while minimizing long distance organ
rieval, organ discards, CIT impact on marginal
nor grafts, post transplant morbidity 2nd to CIT,
nter cost, not supporting low performing OPO's.

plement Regional sharing for high MELD (35/32/29)
h or without Risk-Equivalent-Threshold

Are We Missing Something?

of the proposed allocation principles are based on
nplex statistical evaluations based on SRTR data.

nicians, we must have a system that makes clinical
se and may also give us support in decision making
ather to do or not to do a transplant.

urvival Outcomes Following Liver Transplantation,
FT, by Emond and Brown may be an alternate approach.
T 2008;8:2537-2546

Are there other approaches we should consider?