Liver allocation

James Trotter, MD
Baylor University Medical Center
Dallas, Texas

Pre-MELD problems (1990's)

- waiting time primary factor
- subjective measures of prioritization
  - "gaming of system" (ascites, encephalopathy)
  - "subjective upgrading"

Institute of Medicine findings

- large variation in waiting time
- waiting time irrelevant to need
- non-objective prioritization
- disparity of access

Organ Procurement and Transplantation: Assessing Current Policies and the Potential Impact of the DHHS Final Rule (1999)

Implications - organ allocaiton

"creation of a level playing field in organ allocation—

that is, organs are allocated based on patients' medical

need and less emphasis is placed on keeping organs

in the local area where they are procured."

Institute of Medicine, 1999

Institute of Medicine

1) devise objective scoring system

2) remove waiting time as criteria

~~3) increase OPO size to 9 million~~

MELD implementation

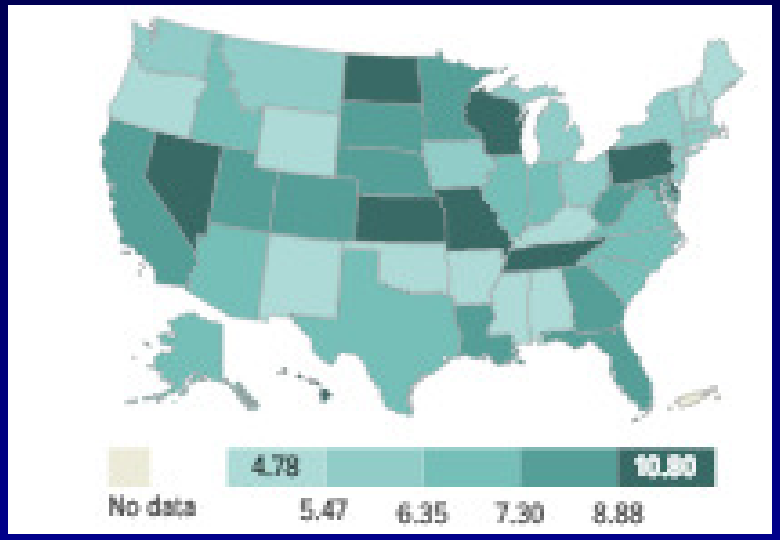
- HHS issues “Final Rule” in 2000
- MELD-based prioritization, 2002
  - waiting time removed
  - objective means of prioritization
  - no change in allocation area

ACOT - 2010

"ACOT recommends that the Secretary take steps to ensure the OPTN develops evidence-based allocation policies which are not determined by artibrary administrative boundaries such as OPO service areas, OPTN regions and state boundaries."

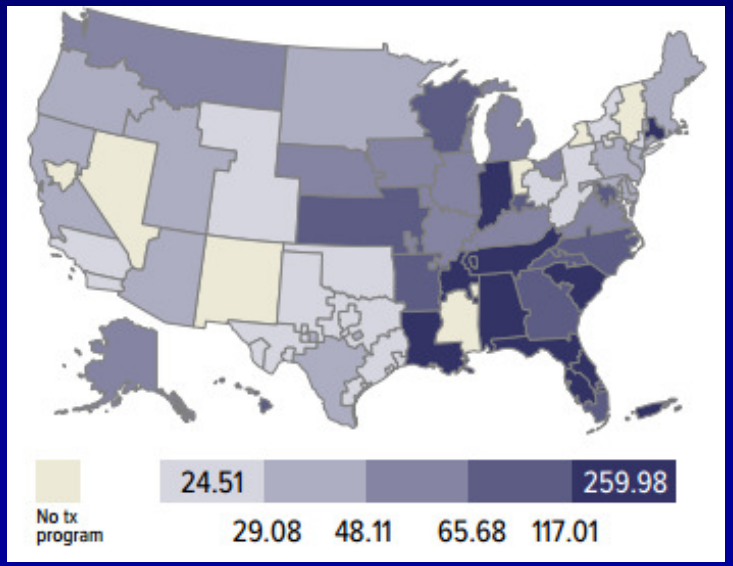
https://optn.transplant.hrsa.gov/contentdocuments/liver_concepts_2014.pdf

Liver redistricting – new proposal

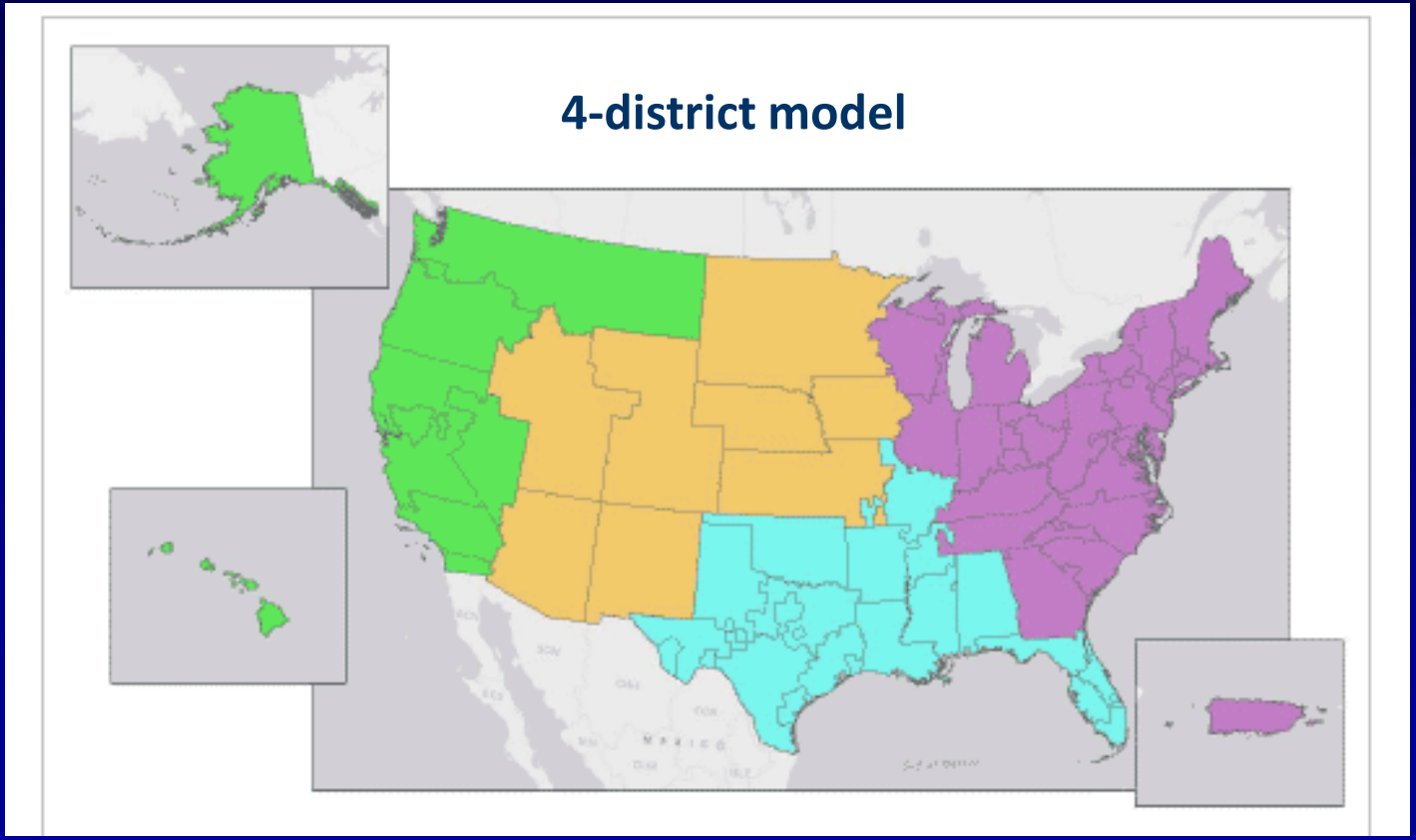


donation rate

transplant rate



Liver redistricting – new proposal



HOME | POLICY | HEALTHCARE

Liver battle pits Midwest, South against California, New York

36 3

By Sarah Ferris - 09/15/14 02:52 PM EDT

A heated redistricting battle has gripped the nation's heartland this fall, but instead of votes, the debate has centered on livers.

Dozens of lawmakers from the Midwest and South are lashing out against the national organ network's plan to redraw the map that governs its collection and distribution of livers.

GREATER NEW YORK HOSPITAL ASSOCIATION (212) 246.7100 GNYHA

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Home >> Press Room >> Skyline News >> Letters Call for Liver A... Email: Print Page:

Letters Call for Liver Allocation Changes

12/22/2014

On December 11, Representatives Eliot Engel (D-NY) and Devin Nunes (R-CA) sent a letter to the Health Resources and Services Administration (HRSA) in support of a recent United Network for Organ Sharing (UNOS) proposal that seeks to address the significant geographic disparities that exist within the current allocation system of livers available for transplant. The House letter was signed by 74 members of Congress from across the country, including 26 from New York.

Reason # 1

Wider areas of liver allocation don't

provide sufficient benefit (lives saved)

relative to its disruptive change in allocation.

Liver redistricting - proposal

Districts	Standard deviation, MELD @ transplant	% of Transplants with MELD scores <15	% of Transplants with MELD scores MELD >25	% Pediatric	Net total deaths (over 5 years)	Net waitlist deaths
4	1.87	2.5%	64.3%	8.7%	-553.8	-581.1
8	2.08	3.7%	59.6%	8.1%	-332.4	-342.1
Current System	3.01	5.8%	50.1%	7.5%	0	0
Regional	3.26	5.5%	54.3%	7.7%	-164.6	-122.4
National	1.66	1.9%	83.3%	10.4%	-343.6	-509.9

110/12,000 = 0.9 % lives saved per year

58 DSA's in US x 2 livers per year = 116 lives saved

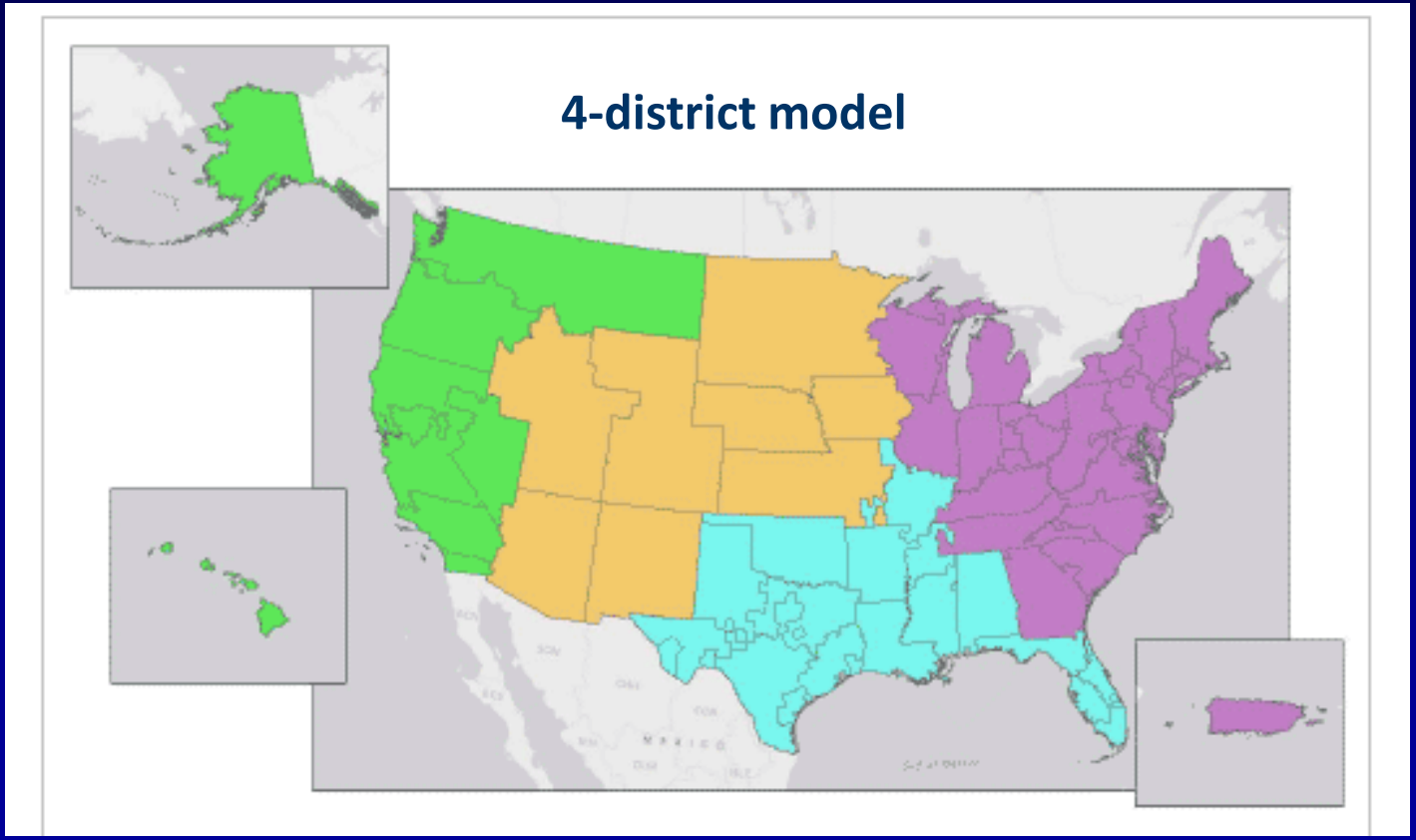
Reason #2

The impact of wider regional sharing (Share 35)

has not been fully assessed, esp. related to

logistical problems (travel time and cost) .

Liver redistricting – new proposal



American Journal of Transplantation 2015; XX: 1–11
Wiley Periodicals Inc.

doi: 10.1111/ajt.13569

The Impact of Redistricting Proposals on Health Care Expenditures for Liver Transplant Candidates and Recipients

S. E. Gentry[1,2,3], E. K. H. Chow[1],

UHC estimated hospital costs ($4699 per case). In

Table 1: Impact of allocation scenarios, 5-year liver simulated allocation model

	Current allocation (Share 35)	Fully regional sharing	Eight-district regional sharing	Four-district regional sharing
Regions/districts	11	11	8	4
Number of pretransplant patients	72 043	71 888	71 910	71 902
Number of transplants	29 967	29 005	29 034	28 965
Modality of transportation, %				
Drive (if <2 h)	47	33	27	16
Airplane	53	66	73	84
Helicopter (if ≤100 miles)	0.35	0.44	0.24	0.15
Patient-months on waitlist, n				
MELD 6–20	628 338	660 580	674 691	671 506
MELD 20–29	97 261	100 882	97 557	101 538
MELD 30–40	8747	7725	6113	4509
Months on waitlist (average per patient)	10.2	10.7	10.8	10.8
MELD score at transplant, n				
6–15	7004	7691	7761	7498
16–25	11 754	9667	8595	7387
25–30	2800	3142	3798	4631
30–35	3868	4228	4480	4859
>35	4508	4284	4411	4546
Distance (median)	122	194	243	419
Transport time (median)	1.75	1.89	2.00	2.31
Lives saved (net)				
Waitlist	0	−96	276	490
Removed	0	−103	143	218
Posttransplant	0	220	−56	−32
Standard deviation of median MELD score at transplant (per OPO)	2.75	3.18	1.90	1.61

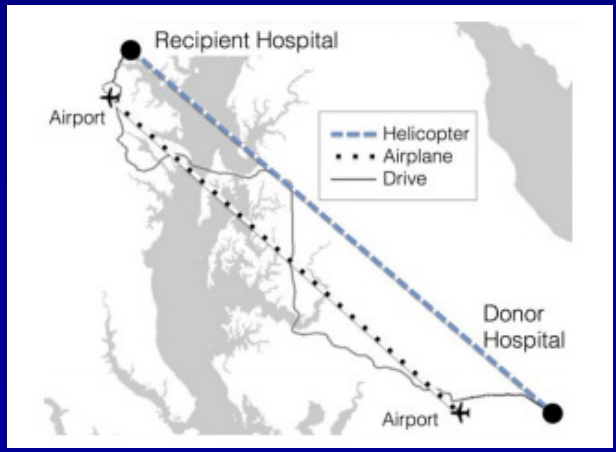
LIVER TRANSPLANTATION 20:1237–1243, 2014

ORIGINAL ARTICLE

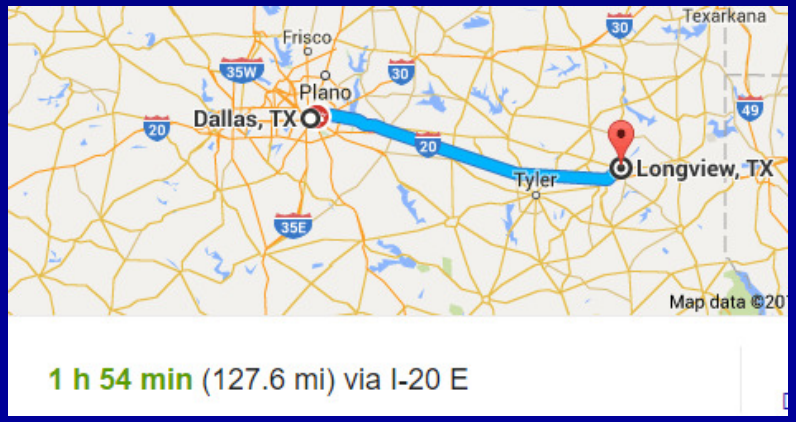
Impact of Broader Sharing on the Transport Time for Deceased Donor Livers

Sommer E. Gentry,[1,2] Eric K. H. Chow,[1] Corey E. Wickliffe,[1] Allan B. Massie,[1,3] Tabitha Leighton,[4] and Dorry L. Segev[1,3]

gated the relationship between the transport time and the CIT for deceased donor liver transplants. The median estimated transport time was 2.0 hours for regionally shared livers and 1.0 hour for locally allocated livers. The model-predicted transport mode was flying for 90% of regionally shared livers but for only 22% of locally allocated livers. The median CIT was 7.0 hours for regionally shared livers and 6.0 hours for locally allocated livers. Variation in the transport time accounted for only 14.7% of the variation in the CIT, and the transport time on average composed only 21% of the CIT. In conclusion, nontransport factors play a substantially larger role in the CIT than the transport time. Broader sharing will have only a marginal impact on the CIT but will significantly increase the fraction of transplants that are transported by flying rather than driving.
Liver Transpl 20:1237-1243, 2014.



Liver redistricting – new proposal



American Journal of Transplantation 2015; XX: 1–5
Wiley Periodicals Inc.

doi: 10.1111/ajt.13436

Brief Communication

Financial Impact of Liver Sharing and Organ Procurement Organizations' Experience With Share 35: Implications for National Broader Sharing

H. Fernandez[1], J. Weber[2], K. Barnes[3], L. Wright[3]

Table 2: Liver import/export impact

	Before Share 35	After Share 35	Total change	Percent change
Imports				
Total number	208	296	88	42.3
Average cost	$47 448	$50 428	$2980	6.3
Total cost	$9 869 176	$14 926 748	$5 057 571	51.2
Surcharge total	$494 285	$1 080 406	$586 121	118.6
Total flight cost	$199 787	$456 521	$256 733	128.5
Exports				
Total number	157	334	177	112.7
Average cost	$29 756	$31 813	$2057	6.91
Surcharge total	$210 400	$419 562	$209 162	99.4
Total cost	$4 671 658	$10 625 407	$5 953 749	127.4
Total				
Total cost of liver imports	$9 869 176	$14 926 748	$5 057 572	–
Total cost of liver exports	$4 671 658	$10 625 407	$5 953 749	–
Total change in overall costs	–	–	$11 011 321	–

Extrapolated nationally = $68M increase

American Journal of Transplantation 2015; XX: 1–11
Wiley Periodicals Inc.

doi: 10.1111/ajt.13569

The Impact of Redistricting Proposals on Health Care Expenditures for Liver Transplant Candidates and Recipients

S. E. Gentry[1,2,3], E. K. H. Chow[1],

Table 2: Estimated 5-year Medicare spending for following redistricting

	Current allocation (Share 35)	Fully regional sharing	Eight-district sharing	Four-district sharing
Medicare spending				
Pretransplant care, $ (per patient-month)	1638 million (6038)	1647 million (5998)	1506 million (5934)†	1461 million (5928)†
Transplant and 1 year (without organ acquisition), $ (per patient)	5607 million (187 120)	5485 million (189 099)†	5569 million (191 811)*	5655 million (195 228)*
Posttransplant care, $ (per patient-month)	488 million (1214)	472 million (1222)†	479 million (1235)†	483 million (1248)†
Transportation (total), $ (per patient)	269 million (8988)	297 million (10 243)†	345 million (11 874)†	422 million (14 552)†
Total cost (care and transportation), $	8003 million	7901 million†	7899 million†	8020 million

Reported costs are averages over 10 iterations of a 5-year liver simulated allocation model from 2006 to 2011. Transplant and 1-year care includes cost for the entire year, regardless of whether the patient survived 1 year after transplant. Transportation (round-trip) costs were estimated by $1108 by driving, $4742 by helicopter, and $8.40 multiplied by round-trip distance plus $7767 by plane. Costs were adjusted to 2013.

†$p < 0.001$ vs. Share 35.

*$p < 0.03$ vs. Share 35.

American Journal of Transplantation 2016; 16: 383–384
Wiley Periodicals Inc.

doi: 10.1111/ajt.13571

Editorial

Organ Allocation: The Only Way to Predict Your Future Is to Know Your Past

G. B. G. Klintmalm*

"Medicare payments based on fixed DRG rates, . . .not actual institutional cost"

"organ acquisition costs were not included"

"analysis is based entirely on mathematical models that potentially do not include all of the necessary cost and payment data"

"need data reflecting the costs of transplanting and caring for sicker transplant patients. . . . avoid using mathematical models, with their incomplete representation of the transplant process and concomitant error potential."

Commentary

Modeling the Allocation System

Principles for Robust Design Before Restructuring

Sanjay Mehrotra,[1,2,3] Vikram Kilambi,[1,2] Richard Gilroy,[4] Daniela P Ladner,[3] Goran B Klintmalm,[5] and Bruce Kaplan[4]

(*Transplantation* 2015;99: 278–281)

"unclear how redistricting produces such reductions in pretransplant costs.

the … increase in average MELD at transplant … by the elimination of local allocation … would suggest that

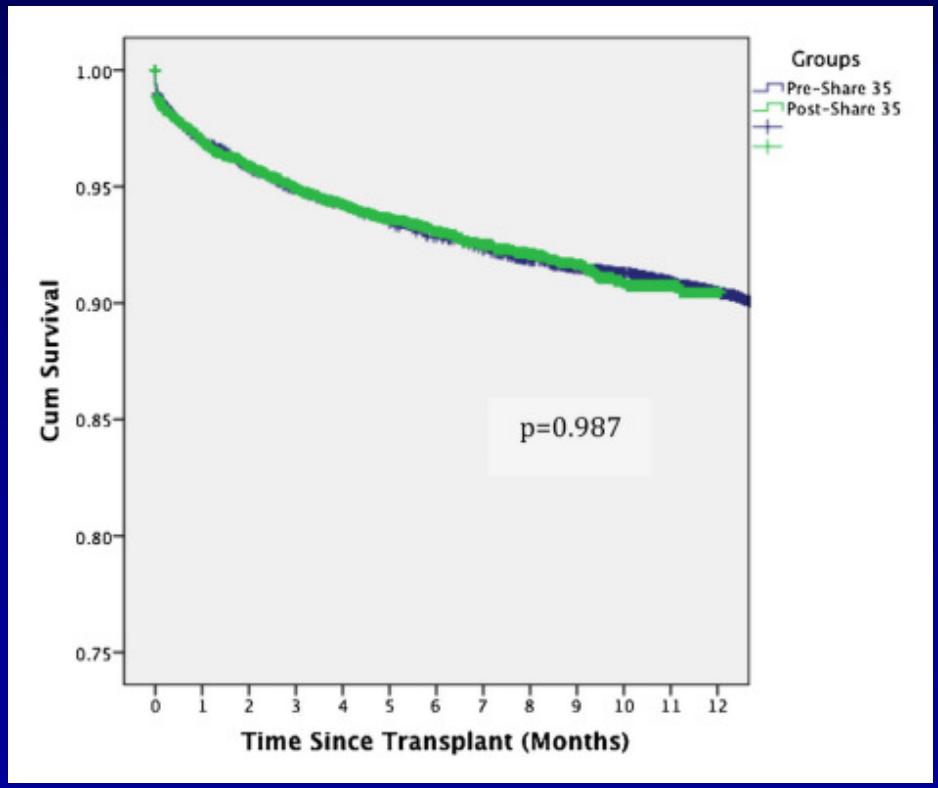
sicker patients are being transplanted and that pretransplant costs would henceforth increase."

American Journal of Transplantation 2015; XX: 1–6
Wiley Periodicals Inc.

doi: 10.1111/ajt.13500

One Size Does Not Fit All—Regional Variation in the Impact of the Share 35 Liver Allocation Policy

K. J. Halazun[1,*], A. K. Mathur[2,3], A. A. Rana[4],



American Journal of Transplantation 2015; XX: 1–6
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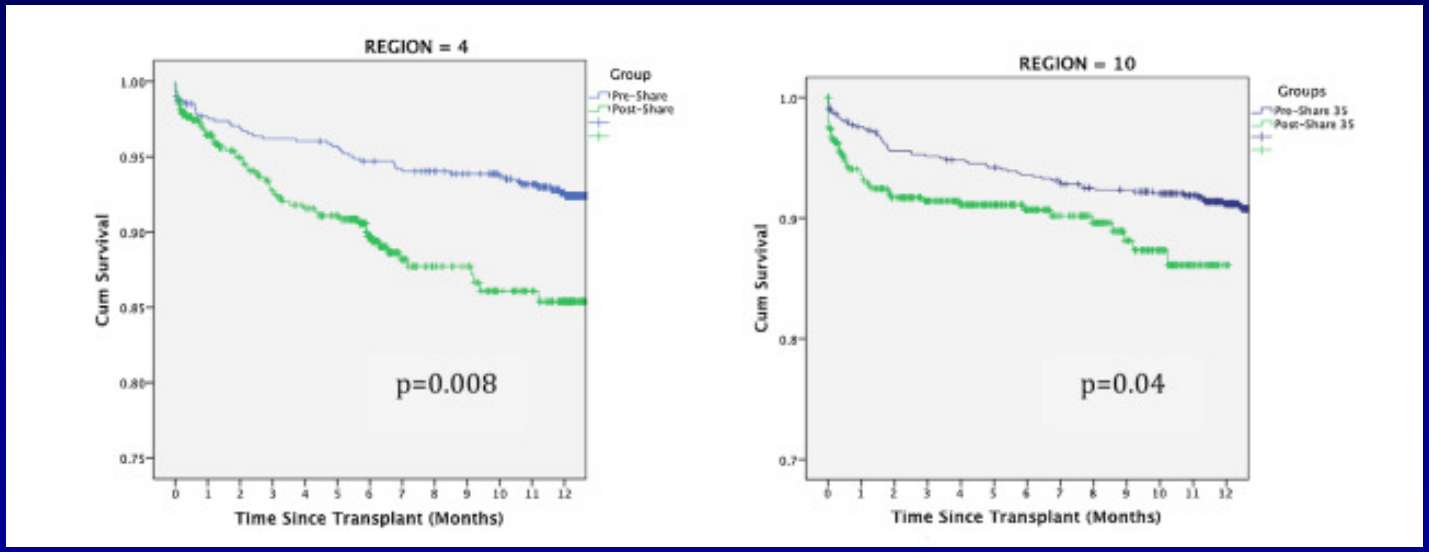
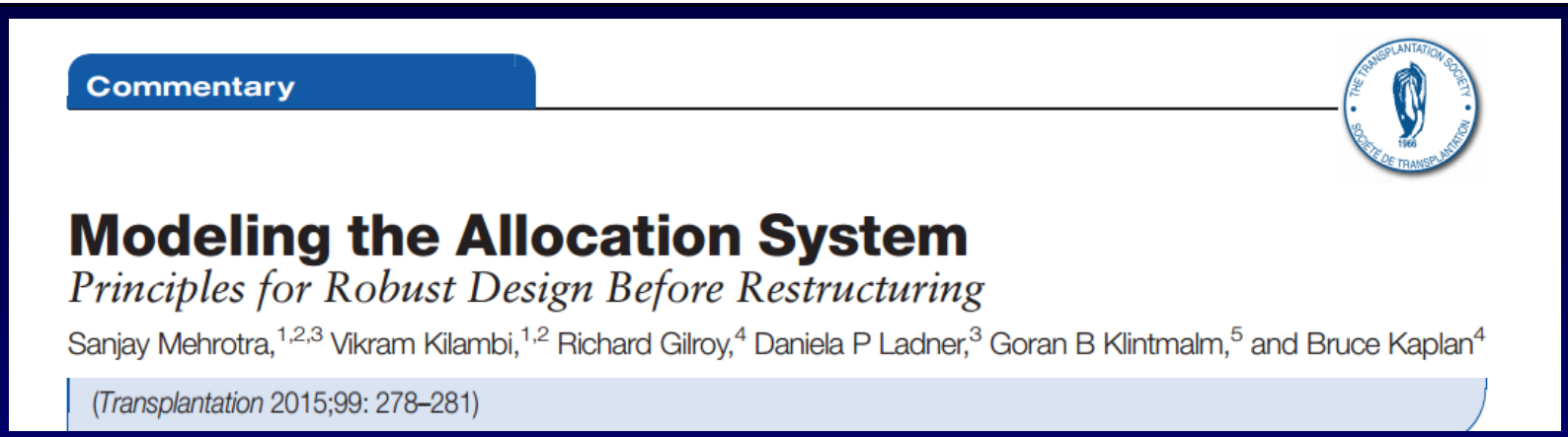
One Size Does Not Fit All—Regional Variation in the Impact of the Share 35 Liver Allocation Policy

K. J. Halazun[1,*], A. K. Mathur[2,3], A. A. Rana[4],





statewide sharing itself may . . . be superior to redistricting, UNOS would nevertheless be prudent to develop and assess a counter proposal, if only to better reevaluate redistricting subsequently.

other promising and effective strategies are worth the committee's consideration before undergoing the substantive changes prompted by redistricting.

Reason # 3

Redistricting penalizes good DSA's, rewards the bad DSA.

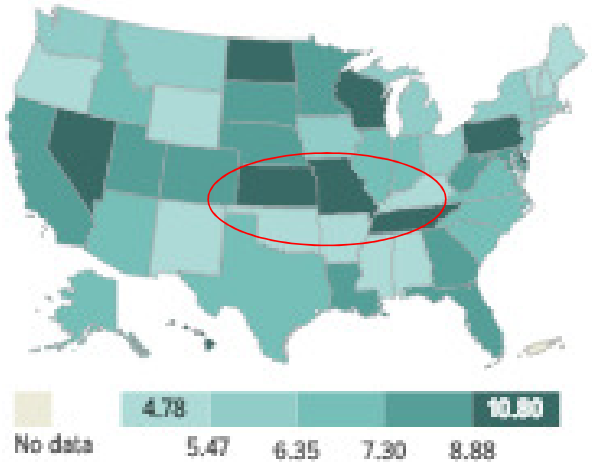
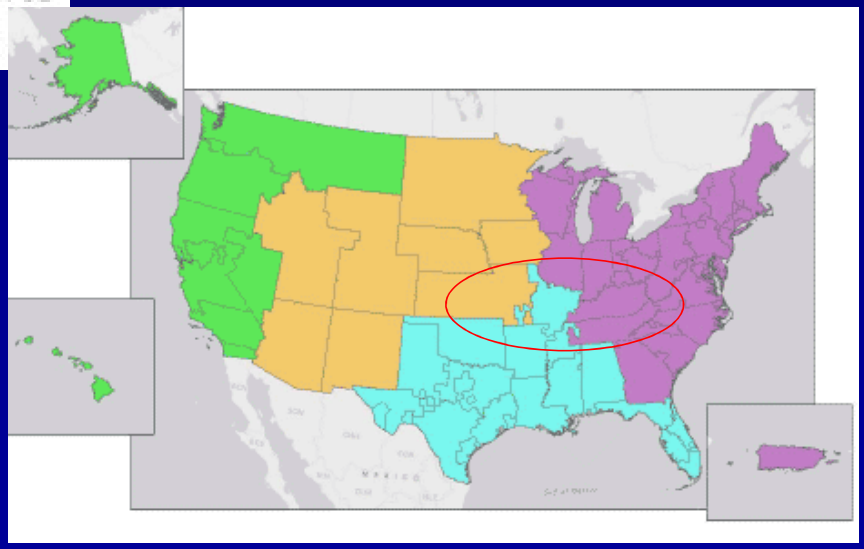


Figure LI 2.2 Deceased donor liver donation rates (per 1000 deaths),



American Journal of Transplantation 2015; 15: 2117–2125
Wiley Periodicals Inc.

Increasing the Number of Organ Transplants in the United States by Optimizing Donor Authorization Rates

D. S. Goldberg[1,2,3,*], B. French[2,3], P. L. Abt[4] and R. K. Gilroy[5]

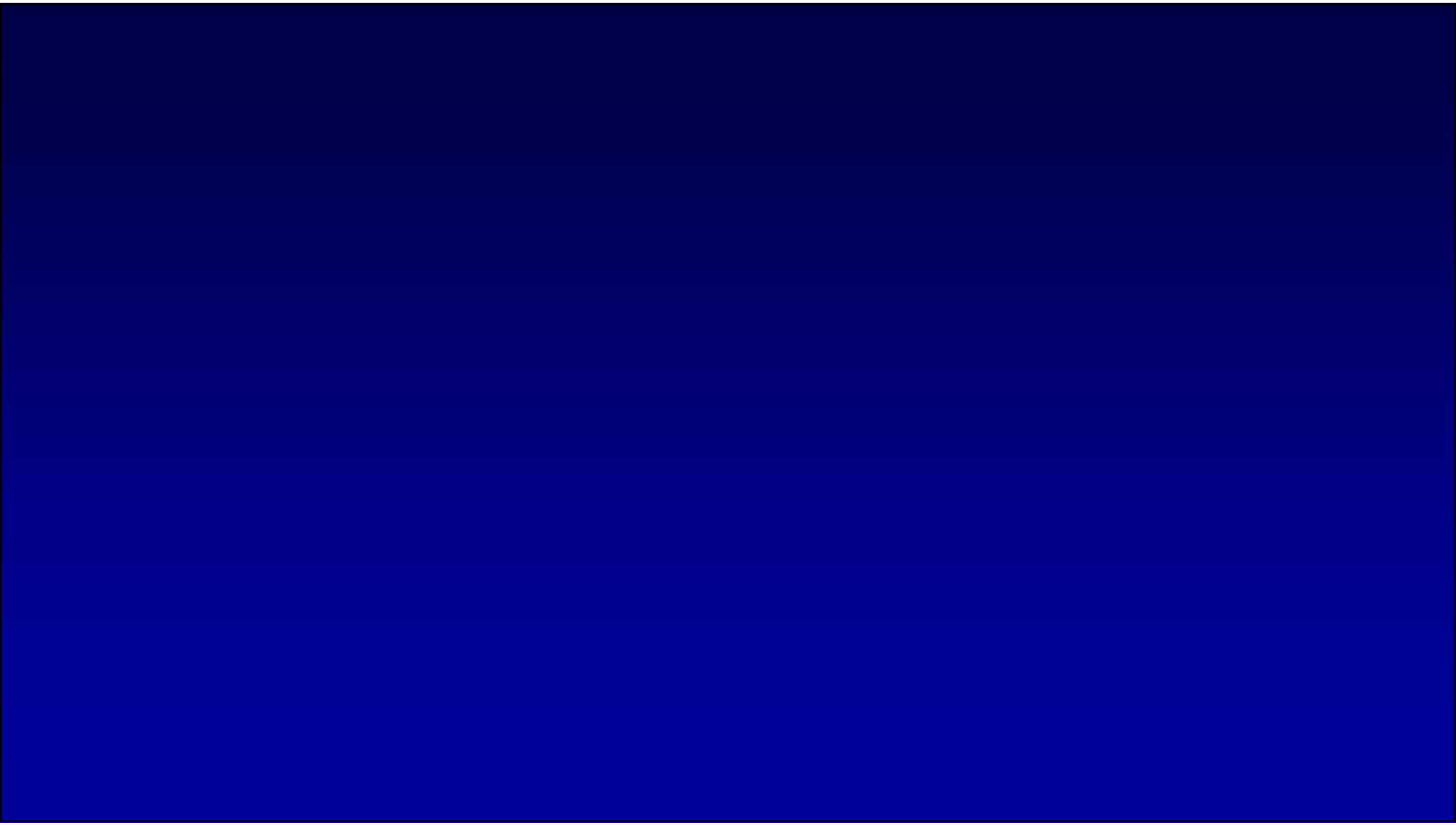
Abbreviations: DCD, donation after cardiac death; DSA, donor service area; HRSA, Health Resources and Services Administration; KDPI, kidney donor profile

Table 1: Potential increase in transplantable organs with increased donor authorization rates, 2008–2013[1]

Organ	DSAs with authorization below the median[1]	DSAs with authorization below the 75th percentile[2]
Kidney	1385	2931
Liver	660	1366
Lung	257	600
Heart	231	488
Pancreas	134	293
Intestine	13	29
Total	2679	5710[3]

Regional sharing of organs

Pros	Cons
equalize transplant MELD and death rate	greater travel, $, CIT
	worse outcomes?
more equitable organ allocation	rewards bad DSA's



Response

- I disagree that equal access to liver transplant can be obtained by redistricting.
- The goal cannot be achieved.
- The narrative has been created to normalize MELD, but it will not change access.

Response

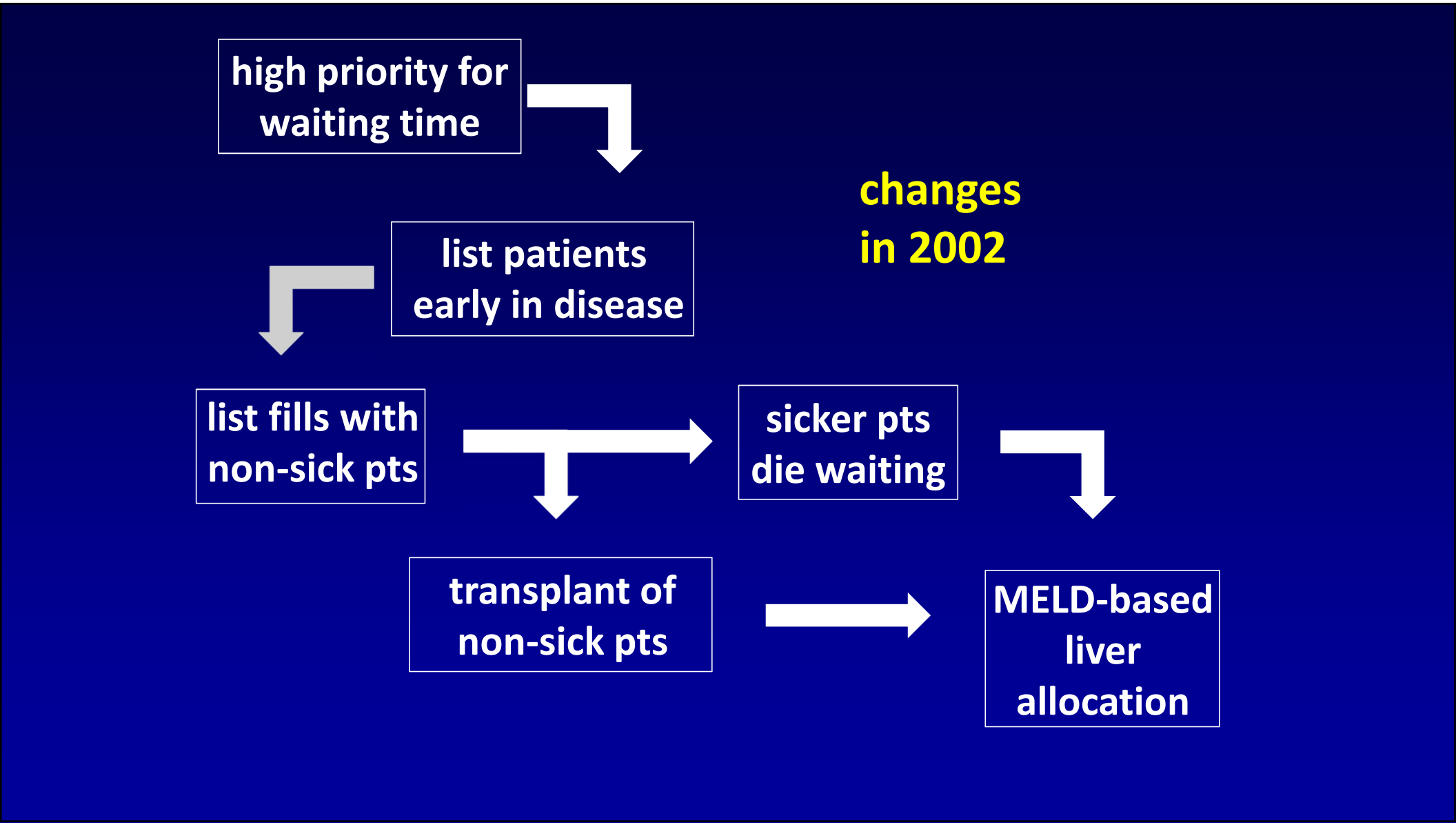
- While equal access is a laudable goal, other far more significant, insoluble problems prevent this.
  - Redistricting will not solve these problems.
  - Redistricting will not increase access for many patients.

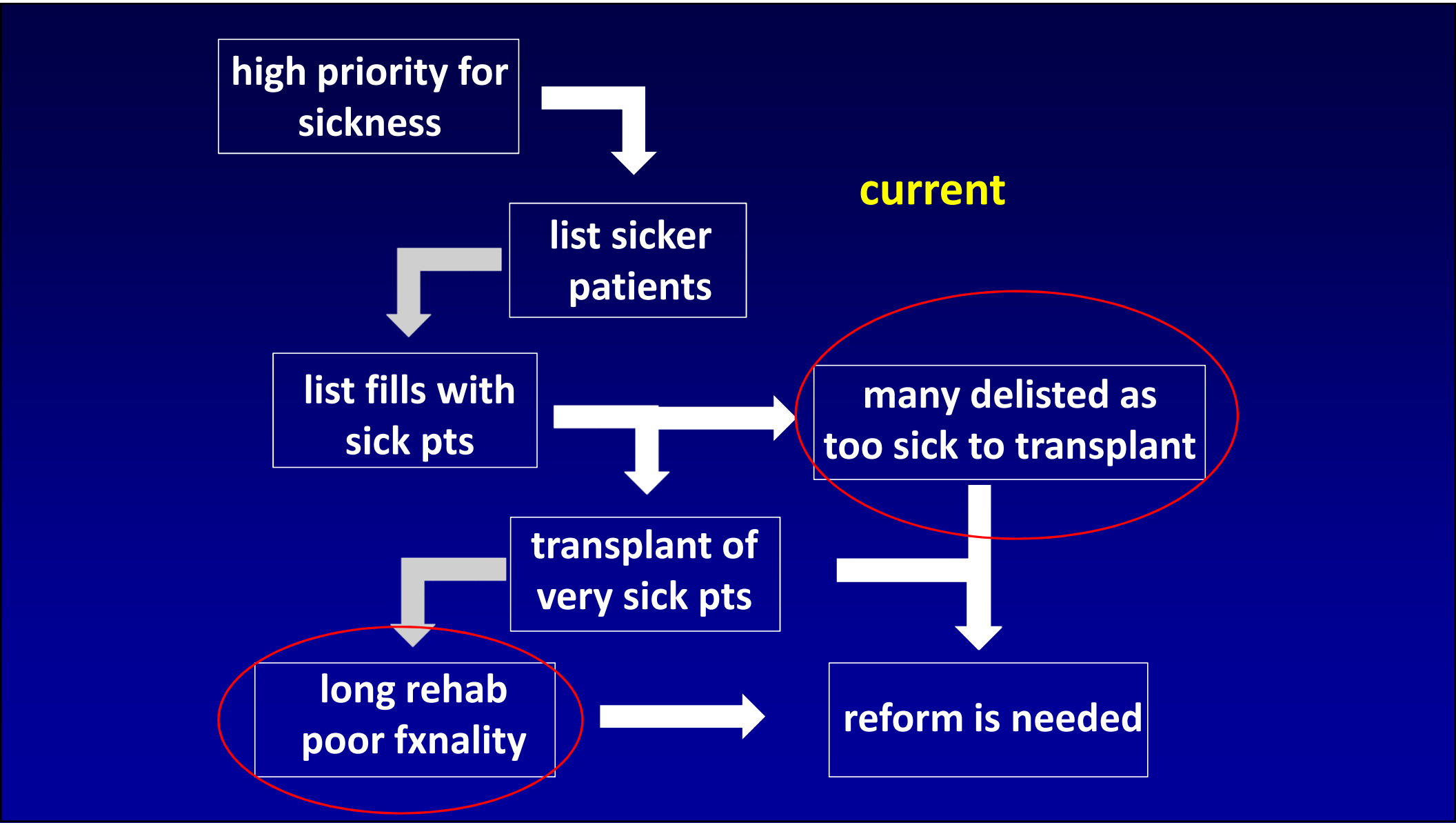
Response

- solve local liver allocation problems locally
  - don’t rely on other regions to solve your problems
  - increase deceased donation
  - increase living donation
  - reduce liver listing

Response

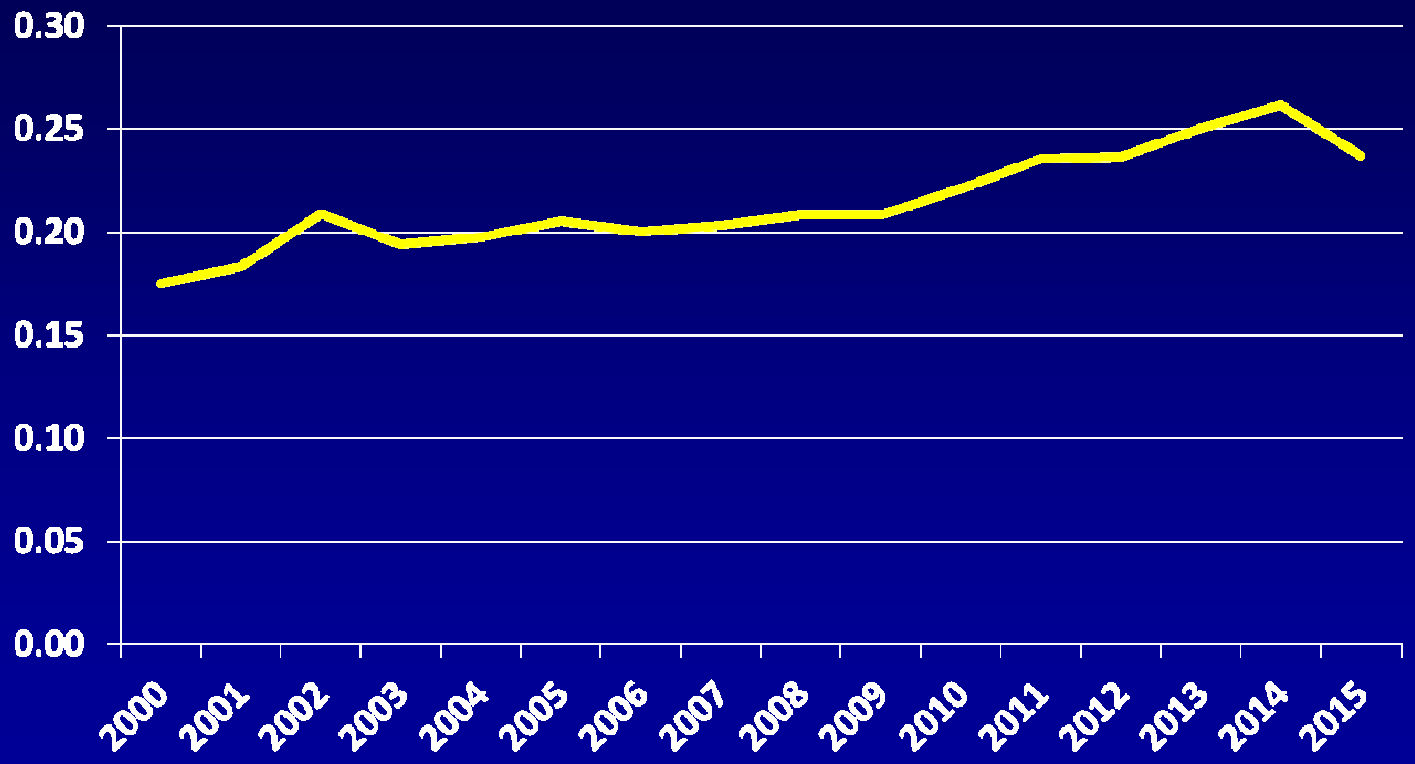
- I am not convinced that transplanting the sickest patients and using mortality as the metric is better than the pre-MELD days.
  - Prioritizing non-compliant patients
  - Penalizing compliant patients
  - There are things worse than death.
  - No MD judgment allowed.
  - Many abuses currently exist (MELD exceptions, bait and switching, etc.


high priority for waiting time
list patients early in disease
list fills with non-sick pts
sicker pts die waiting
transplant of non-sick pts
MELD-based liver allocation
changes in 2002


high priority for sickness
list sicker patients
list fills with sick pts
transplant of very sick pts
long rehab poor fxnality
current
many delisted as too sick to transplant
reform is needed

Removed from list

% died on list+too sick to transplant



Regional sharing of organs

Pros	Cons
- equalize transplant MELD and death rate	- longer cold time
	- more distance traveled
- more equitable organ allocation	- worse outcomes?
	- local donation impact
	- doesn't "go far enough"
	- small center impact

Liver redistricting - concerns

- long-travel times (logistics/cost)
- penalizes good DSA's, rewards laggards
- effects of share-35 not fully assessed
- worsen outcomes
- not supported by: organ-rich, low-MELD regions: MO, KS, SC, TN, TX

Problems with allocation

- national disparity to transplant access
- non-objective criteria for prioritization
- perception of “unfair” system
- public upheaval, Congressional review

Pre-MELD allocation system

- waiting time
- severity-of-illness
  (subjectively assessed)
    - encephalopathy
    - ascites