

Liver Allocation Forum: Economic Implications of Redistricting

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Collaborators and Funding

- Economic analysis team
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- Support
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BACKGROUND

- Liver transplantation is highly resource intensive
 - Average Medicare spending exceeds \$100,000 per patient for direct care
 - Excludes organ acquisition cost
- Cost drivers
 - Severity of illness
 - Patient disease (e.g. Hepatocellular Carcinoma)
 - Demographic characteristics (age, gender, socioeconomic status)

Economic of Redistricting

- Goal:
 - Evaluate the impact of redistricting on the **total cost** of ESLD care for waitlisted population
- Cost of ESLD includes care for:
 - Waitlisted patients
 - Transplant episode
 - Post transplant care
 - Transportation costs

Economic Assessment

Pre-Transplant care

Transplant event

Cost of ESLD

Post-Transplant Care

Organ Transportation

Methodology

- Economic analysis
 - Linked Medicare-OPTN data set for patients transplanted from 2002-08
 - > 15,000 patients with Medicare primary insurance listed for transplantation
 - 35% of all liver transplants
 - Includes continuous updated MELD scores
- Simulation analysis
 - 5 year cohort of recipients listed for transplant

Economic Assessment

Transplant
Hospitalization

Post-Transplant Care

Cost of ESLD

Pre-Transplant care

Organ Transportation

MELD Score at Transplant

	Current Allocation (Share 35)	Fully Regional Sharing	8-district Regional Sharing	4-district Regional Sharing
6-15	7,004	7,691	7,761	7,498
16-25	11,754	9,667	8,595	7,387
25-30	2,800	3,142	3,798	4,631
30-35	3,868	4,228	4,480	4,859
35+	4,508	4,284	4,411	4,546

Transplant plus one-year follow-up

	Mean Cost	Total Cost
Share 35	\$ 99,576	\$2.984 billion
Regional sharing	\$ 99,242	\$2.879 billion
8 district sharing	\$ 99,950	\$2.873 billion
4 district sharing	\$ 98,472	\$2,852 billion

Post-transplant cost

	Cost per pt./ month (median)	Total Cost
Share 35	\$ 1,214.	\$488 million
Regional sharing	\$ 1,222	\$472 million
8 district sharing	\$ 1,235	\$479 million
4 district sharing	\$ 1,248	\$483 million

Economic Assessment

Transplant
Hospitalization

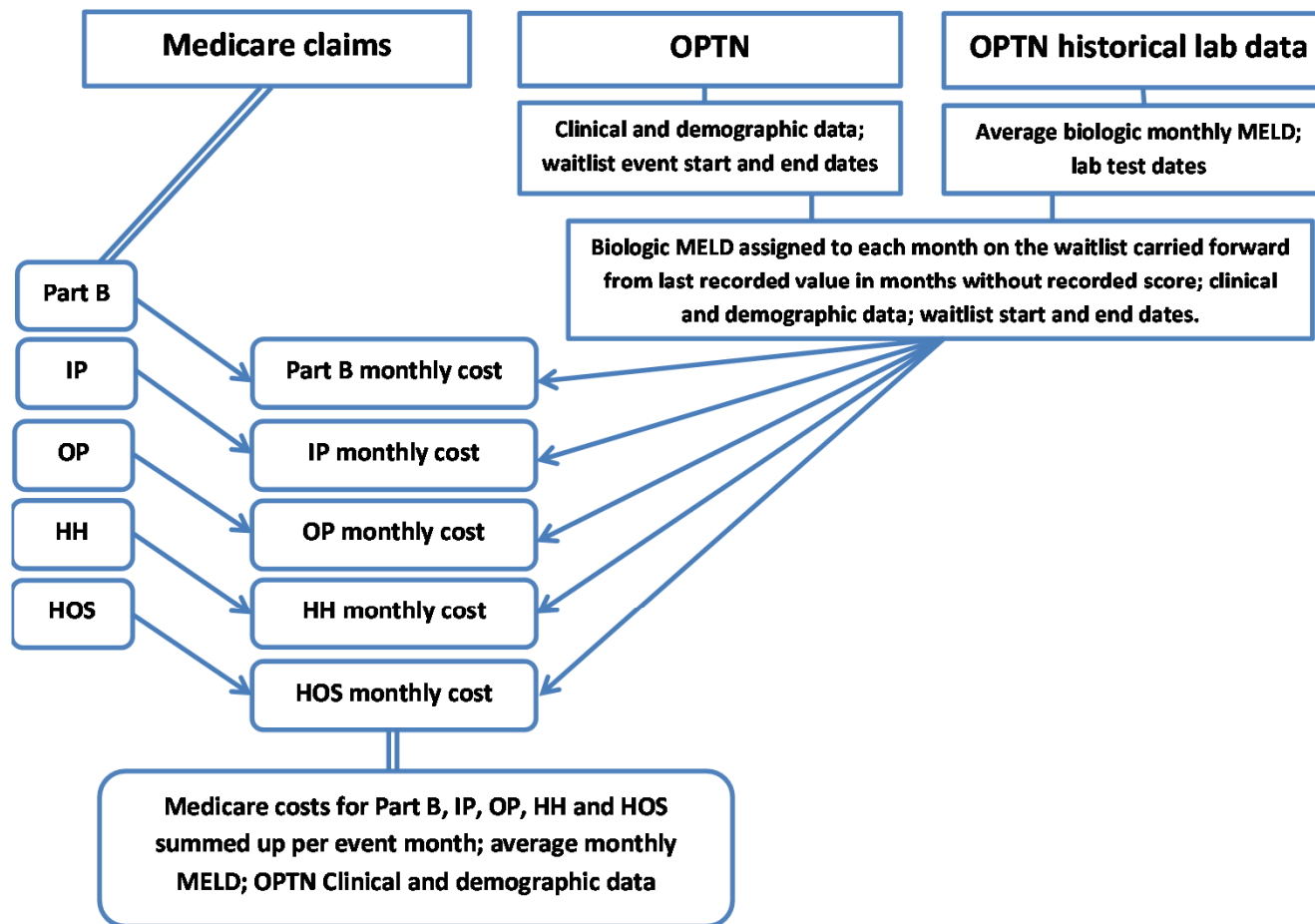
Post-Transplant Care

Cost of ESLD

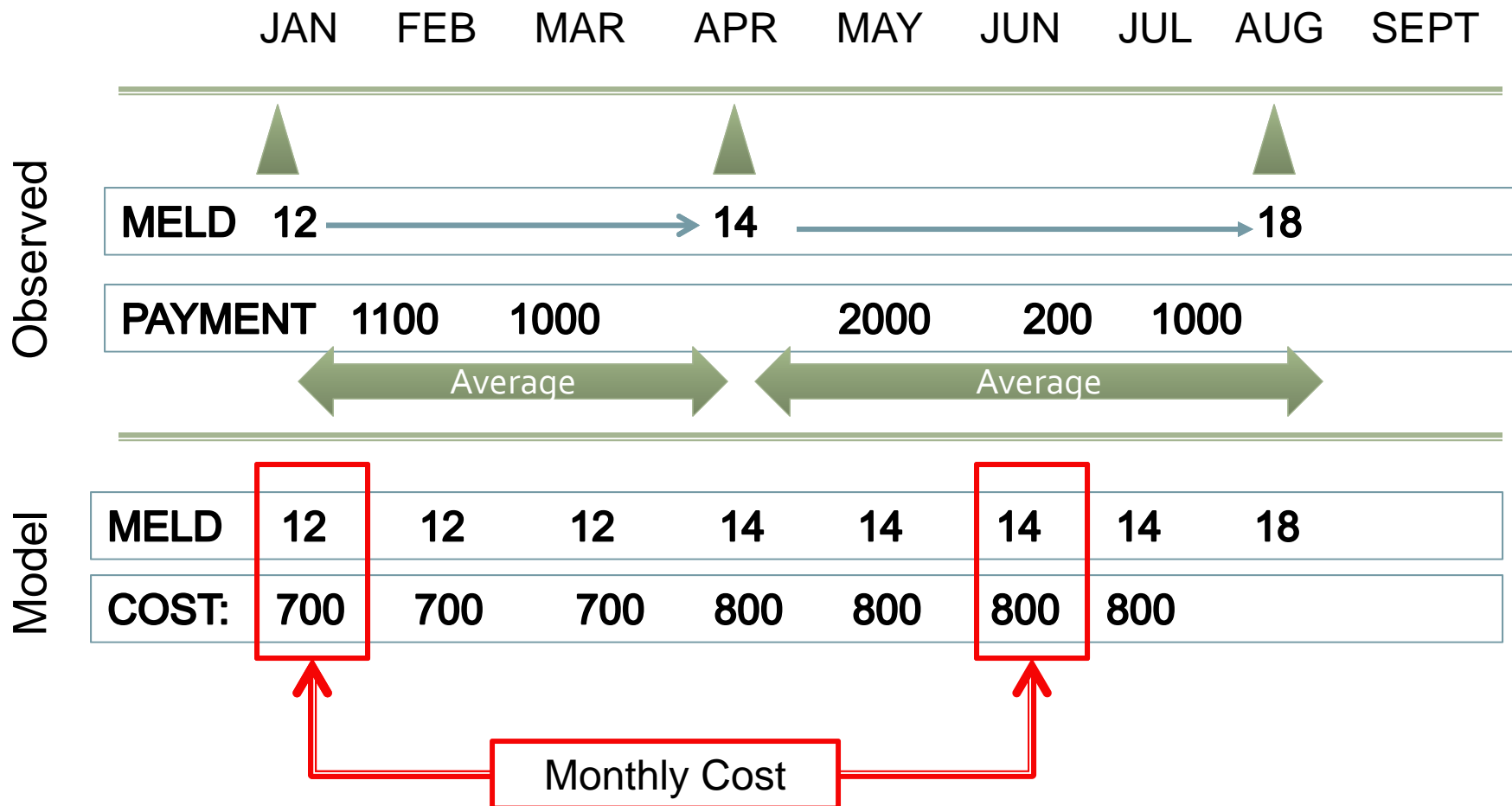
Pre-Transplant care

Organ Transportation

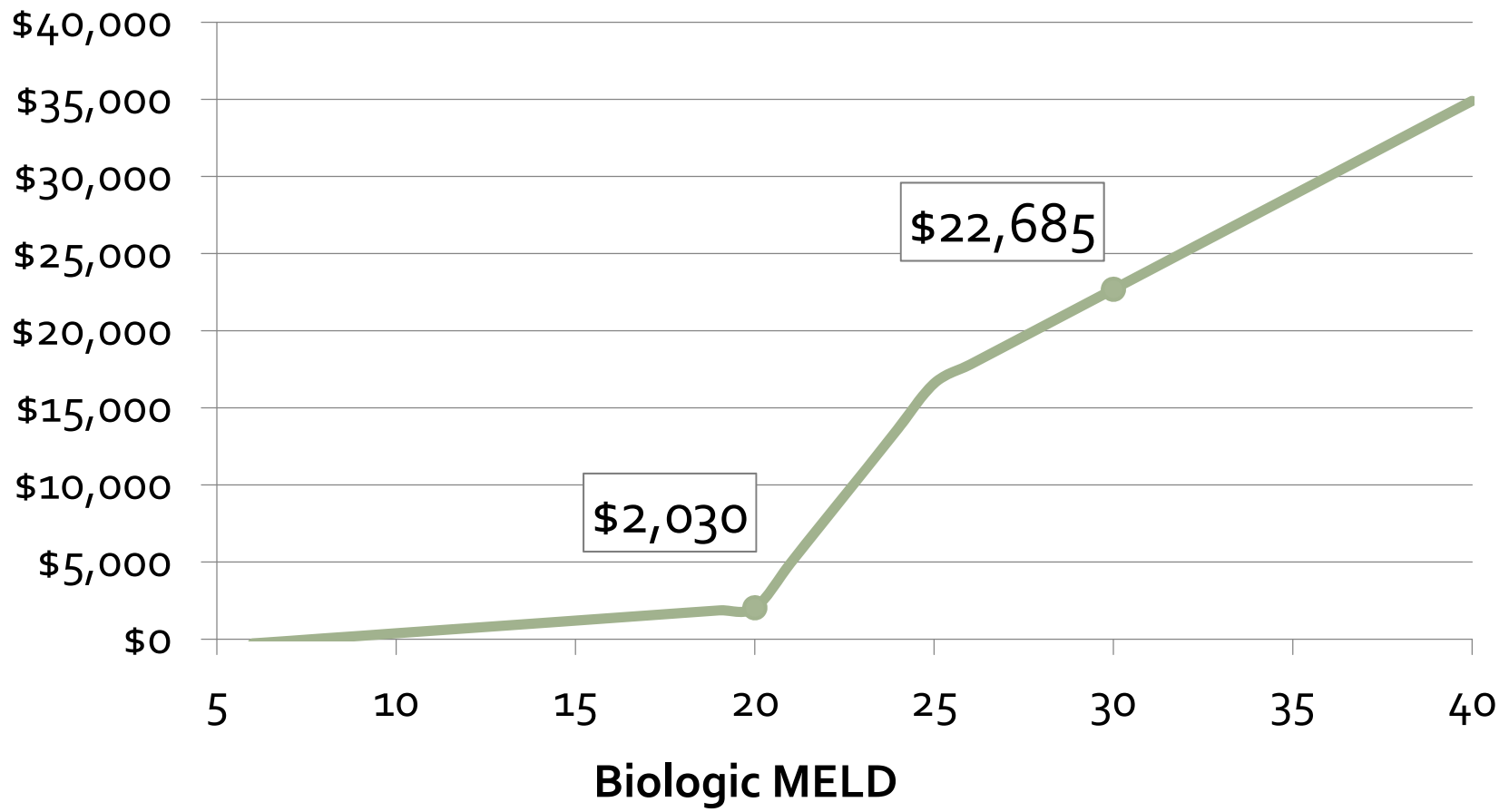
Pre-Transplant: Data integration



Methods: Sample Patient



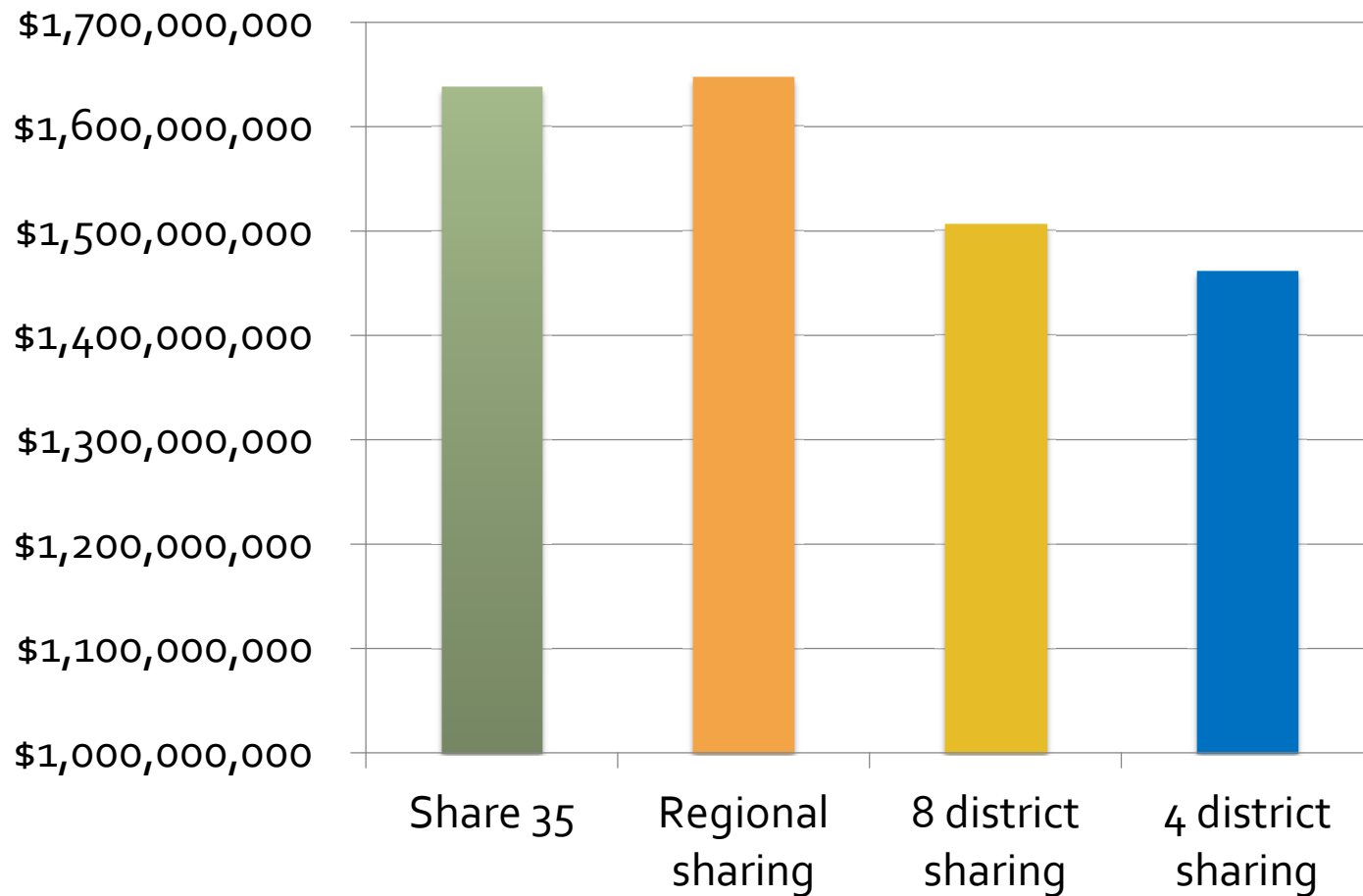
Adjusted cost per month by MELD



Impact on Pre-Txp Severity of Illness

Patient-months on Waitlist	Current Allocation (Share 35)	Fully Regional Sharing	8-district Regional Sharing	4-district Regional Sharing
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	8,747	7,725	6,113	4,509

Pre-transplant total costs / 5 years



Economic Assessment

Transplant
Hospitalization

Post-Transplant Care

Cost of ESLD

Pre-Transplant care

Organ Transportation

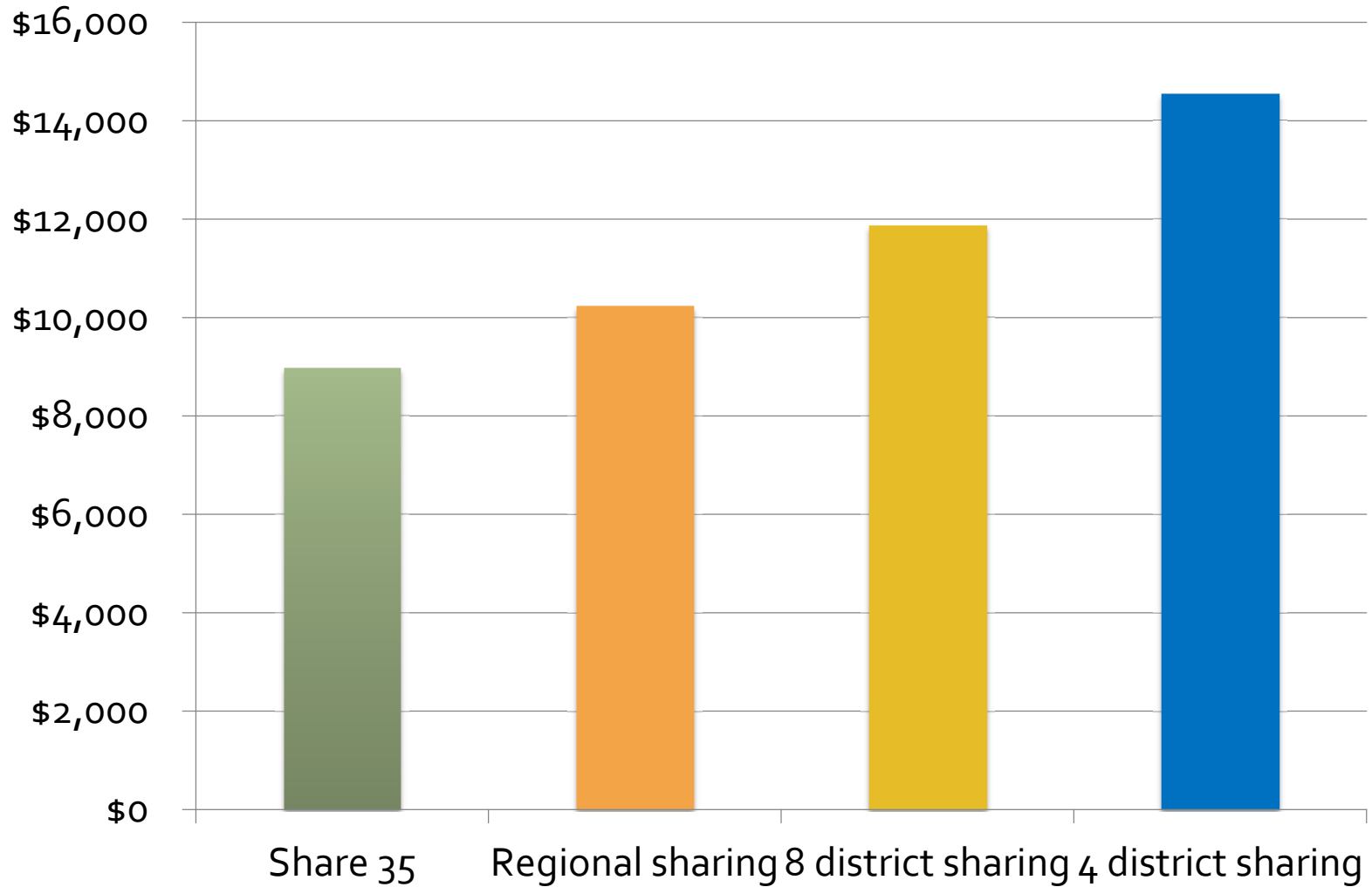
Transportation cost model

- Transportation cost estimates from:
 - *Lynch RJ, Mathur AK, Hundley JC, Kubus J, Pietroski RE, Mattice BJ et al. Improving organ procurement practices in Michigan. Am J Transplant 2009*
- Transport by car: \$1108
- Transport by helicopter: \$4742
- Transport by charter fixed-wing plane:
 - The fixed-wing cost is distance dependant
 - Fixed cost + price per mile

Transport mode: Impact of Redistricting

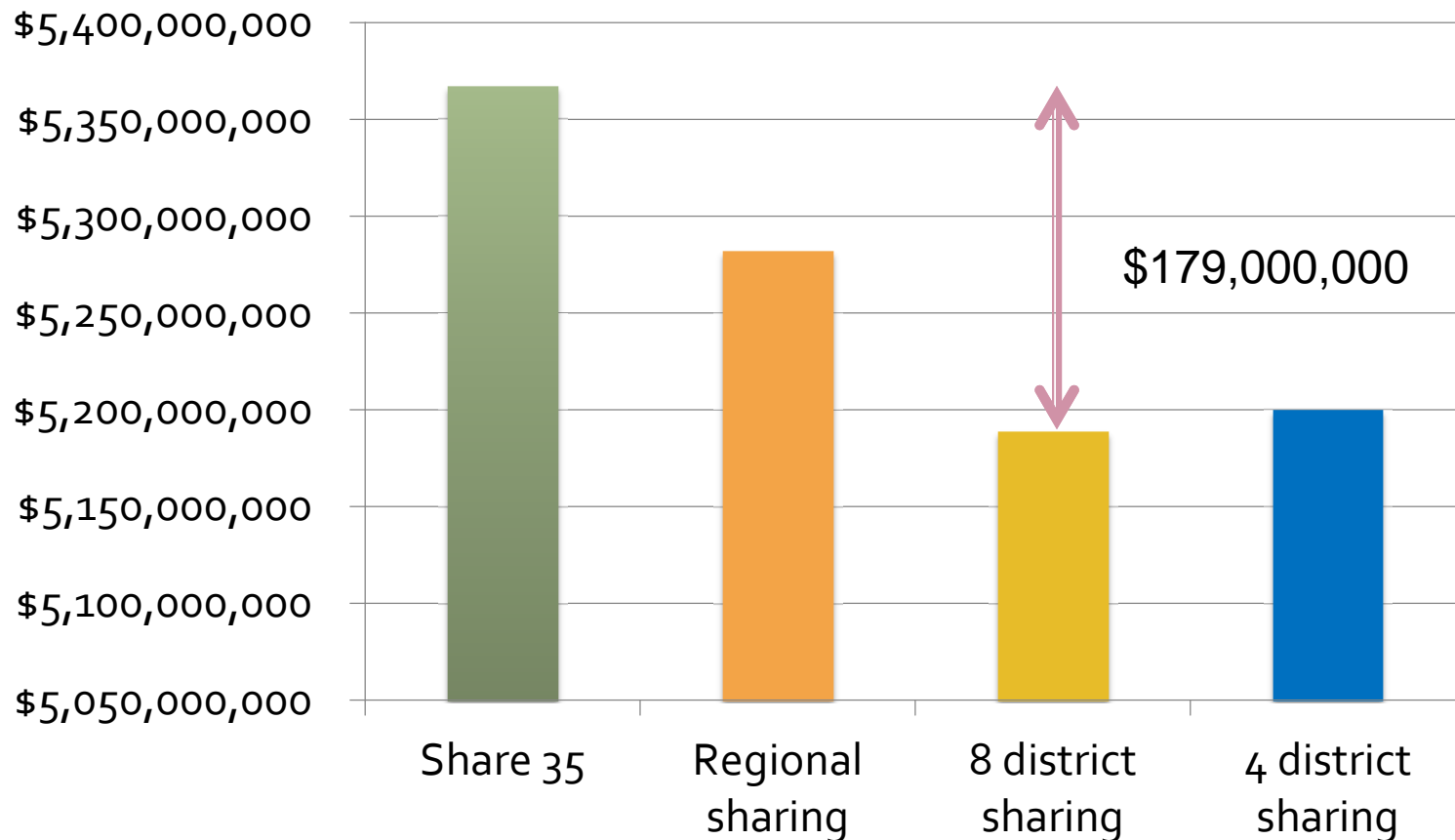
	Current Allocation (Share 35)	Fully Regional Sharing	8-district Regional Sharing	4-district Regional Sharing
<i>Airplane</i>	47%	33%	27%	16%
<i>Drive</i>	53%	66%	73%	84%
<i>Helicopter</i>	0.35%	0.44%	0.24%	0.15%

Transportation costs

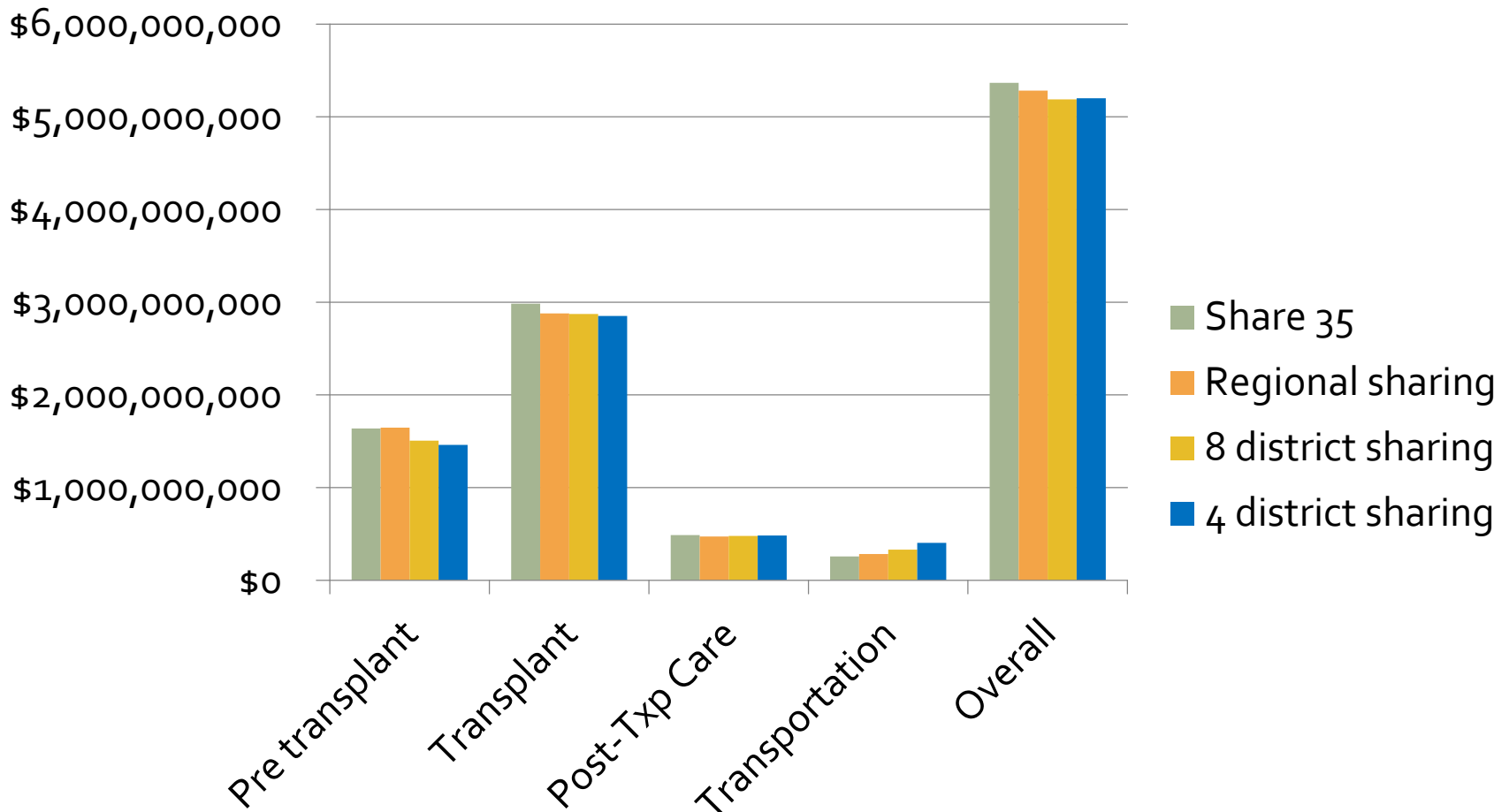


Total estimated cost per 5 years

Estimated costs for all waitlisted and transplanted (5 years)



Consolidated cost estimates



Who benefits from redistricting?

- Patients
 - Improved survival and reduced time at high MELD on the waiting list
 - 57% fewer patient months at a MELD > 30
- Insurers and Government Payers
 - Lower overall costs for patients with ESLD
 - Particularly public payers as patients are less likely to travel to low MELD regions

Whose costs may increase?

- Transplant centers in lower MELD regions
 - Higher MELD score at transplant
 - Increased transportation expenditures and staff expenditures
 - Increased pressure to use higher risk organs to meet demand
- Transplant centers in high MELD regions
 - Higher transportation costs to ship organs
 - Increased surgical staff cost if local teams do not recover the organs

Key Caveats

- Economic data is derived from Medicare payments
 - Actual costs may differ as DRG based payments may not reflect true “cost” of care
- Simulation analysis does not reflect changes in clinical practice
 - Increase competition will increase acceptance of marginal organs
- Unaccounted for costs:
 - Surgeon time
 - Administrative complexity
 - Impact of cold ischemic time

Summary

- Allocation policy is about fair, effective, and effective use of a limited resource
- Economic analysis suggests that redistricting
 - At minimum, is **cost effective**, and likely **cost saving** for the **health care system**
- Shift to an accountable care model of population based care may better distribute the cost savings between providers and payers