Finances of Broader Sharing

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First, a thanks to the Ad Hoc members

Richard Gilroy, MD, Chair	Will Chapman, MD, Vice Chair
David Mulligan, MD	James Pomposelli, MD
David Axelrod, MD	Alan Reed, MD
Stephan Moore	Goran Klintmalm, MD
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The Ad Hoc Subcommittee on Finances of Broader Sharing seeks to

identify the intricate factors associated with cost in broader sharing.

Areas of Interest

- Where costs were not considered for the centers/OPOs/patients in the previous economic analyses?
- How does travel impact cost?
- How can we increase efficiency to decrease cost?
- What are the costs of alternative or parallel efforts such as increasing donation?

Previous Economic Assessment

Who may benefit or experience a decrease in cost?

- Patients
- Insurers and Government Payers

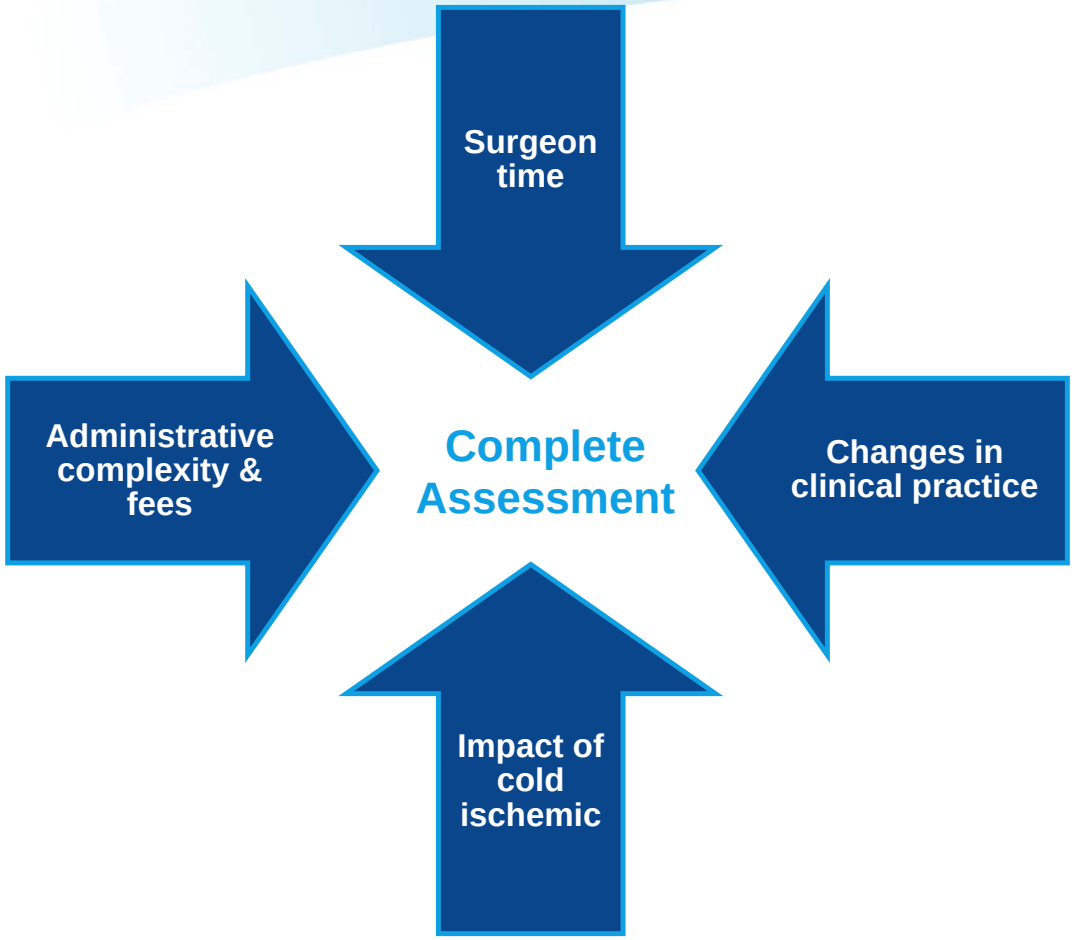
Whose costs may increase?

- Transplant Centers
- OPOs

Economic analysis suggests that redistricting is at minimum, ***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.*

Previous Economic Assessment



Overview

Element	Data Source(s)	Preliminary Assessment
Pre-Transplant & Wait listed costs	Medicare-OPTN Registry Link	- $142 million savings in 8 district --$185 million savings for 4 districts
Transplant Costs and relationship to MELD changes	Medicare-OPTN registry	- $110 million decrease (including a reduction of approximately 200 transplants per year)
Transportation costs	Modeling based on two OPOs, flight distance, travel times	+ $73 to $147 million increase over 5 years -- Estimates that use of Charter aircraft increases from 53% to 73% --Median cost per transplant estimated to be > $14,000 (4 district) and >$11,000 (8 district)
Post Transplant Costs,	Medicare data	Essentially unchanged
State Budget changes	Medicaid data by state and median meld b state	No data available on shift at a state level in costs
Total cost to ESLD management	Medicare data/UCH data	-- undefined
Insurance implications	Medicaid/private insurance data	No data available on loss of insurance or shift in policy
Wait list implications	SRTR data	Consider a review of wait list additions and change with share 35 and expected changes with Redistricting

Center Cost Survey

Organ Acquisition Cost

Transportation Method

Transportation Charge

Recovery Team Utilized

Donor OR Start Date/Time

Recipient OR Start Date/Time

Recipient Reperfusion Time

Recipient Total Hospital Charge

To identify the differential in cost to transplant centers and OPOs for acquisition of livers as a function of distance, specifically acquisition of livers locally compared to acquisition of livers regionally and nationally.

Liver Ad Hoc Subcommittee on Finances of Broader Sharing

Finance Survey Analyses

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Background

- Purpose: *"To identify the differential in cost to transplant centers for acquisition of livers as a function of distance, specifically acquisition of livers locally compared to acquisition of livers regionally and nationally.* These data will be incorporated into the economic analysis of Redesigning Liver Distribution to determine the cost to transplant centers for organ acquisition and associated activities of broader sharing in comparison to the current system."
- Ad Hoc Subcommittee hoping to analyze costs of broader sharing
  - "Real" (not modeled) data
- Survey sent to centers represented by Committee, Subcommittees, and additional centers for better representation (N=40)
  - No more than 50 txs per center (subcommittee recommendation)
- Sent out April 14, due back May 1

Deceased Donor Liver Transplants, 2014

Region	All Centers % of Transplants by Region (n=6449)	Centers Represented by Committee + Subcommittees % of Transplants by Region (n=2094, 32.5%)	# Liver Transplant Programs per Region (n=134)	# Liver Programs per Region, Committee Representation (n=16, 12%)	# Liver Programs per Region, Committee + Subcommittee Representation (n=20, 15%)
1	**3.7**	**3.3**	7	2	2
2	**11.5**	**11.8**	18	1	2
3	**18.3**	**10.5**	18	1	2
4	**9.2**	**5.8**	15	1	2
5	**14.6**	**16.6**	18	2	2
6	**3.0**	**4.2**	6	1	1
7	**8.0**	**8.3**	14	2	2
8	**7.1**	**9.4**	11	2	2
9	**5.1**	**11.7**	6	1	1
10	**8.8**	**2.2**	10	1	1
11	**10.5**	**16.3**	11	2	3

Variables Collected

Pre-filled	Organ Charges and Transportation Information	Times and Recipient Charges
Transplant Date	OAC	Donor OR Time/Date/Time Zone
Donor ID	Surgeon fee*	Cross-clamp Time/Date/Time Zone (Pre-filled)
Recipient Name	Tissue Typing fee*	Recipient OR Time/Date/Time Zone
OPO	Consult fee*	Recipient Incision Time/Date/Time Zone
Share Type	Preservation fee*	Recipient Reperfusion Time/Date/Time Zone
Lab MELD Score	Crossmatching fee*	Recipient charges
Allocation MELD Score	Registration fee*	
Recipient LOS	Transport charges*	
	Transport mode	
	Recovery team	

*Provided separately if not included in the OAC

Response

- 28 of 40 centers (70.0%) / 1039 of 1528 transplants in sample (68.0%)
  - 16.6% of all deceased donor whole liver transplants in 2014
    (Splits excluded, combined LI-IN transplants included)
- 9 of 11 Regions (1, 2, 3, 4, 5, 8, 9, 10, 11)
  - All but 6 and 7
- Transplant distribution (by design): 40% local, 60% non-local
- Allocation Score/Status Distribution of Sample (n=1039) (Mean lab M/P: 23.7, Median 22)
  - Status 1: 6.4%
  - M/P < 24: 28.9%
  - MP 24-34: 34.3%
  - MP 35+: 30.4%

31.6% Exceptions

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Responders vs Non-Responders vs Non-surveyed Deceased Donor Transplants in 2014

	Surveyed – Responded	Surveyed – Did Not Respond	Not Surveyed
Median 2014 Transplant Volume	106	92	44
Median MELD Lab Score @ Tx	21	25	22
Median LOS	9	11	11
% Exceptions	35.9	33.3	39.8
Median Distance Organs Traveled	86	95	71
% Local	66.1	55.0	65.0
% Regional	27.6	40.7	30.9
% National	6.4	4.4	4.1

Values in this chart represent all deceased donor whole liver transplants performed in 2014

Data Completeness

Field	% With Complete Data
OAC	99.9%
Surgeon fee	41.2%
Tissue Typing fee	9.5%
Consult fee	0.9%
Preservation fee	1.8%
Crossmatching fee	19.7%
Registration fee	75.7%
Transport charges	66.0%
Transport mode	87.7%
Recovery team	97.7%
Donor OR Time/Date/Time Zone*	100.0%
Recipient OR Time/Date/Time Zone*	98.5%
Recipient Incision Time/Date/Time Zone*	98.4%
Recipient Reperfusion Time/Date/Time Zone*	98.3%
Recipient charges	92.4%

*Note: Some date values provided by the respondents were found to be in error and required correction (9.2%)

Initial Analyses

- Calculate cost and time differentials
  - Organ acquisition costs
  - Time from donor OR time to recipient reperfusion time
    - Intermediate time points (cross clamp, recipient OR start time)
- Apply differentials to projected increases in:
  - Sharing (average increase in cost from local to non-local, e.g.)
  - Mileage (average increase in cost per mile increase in organ travel distance, e.g.)

Results:
MELD/PELD and Share Type, Transport Mode

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Status/Allocation Score by Share Type

	Status 1		M/P < 23		M/P 24-34		M/P 35+		Total
	N	%	N	%	N	%	N	%	N
Local	9	13.4	138	46.0	214	60.1	59	18.7	420
Regional	50	74.6	95	31.7	115	32.3	244	77.2	504
National	8	11.9	67	22.3	27	7.6	13	4.1	115
Overall	67	100	300	100	356	100	316	100	1039

Status/Allocation Score by Transport Mode

	Status 1		M/P < 23		M/P 24-34		M/P 35+		Total
	N	%	N	%	N	%	N	%	N
Missing	8	11.9	19	6.3	62	17.4	36	11.4	125
Ambulance	2	3	10	3.3	25	7	10	3.2	47
Flight	49	73.1	169	56.3	158	44.4	225	71.2	601
Ground	5	7.5	42	14	57	16	22	7	126
Internal	0	0	37	12.3	27	7.6	5	1.6	69
Other	3	4.5	23	7.7	27	7.6	18	5.7	71

Status/Lab Score by Share Type

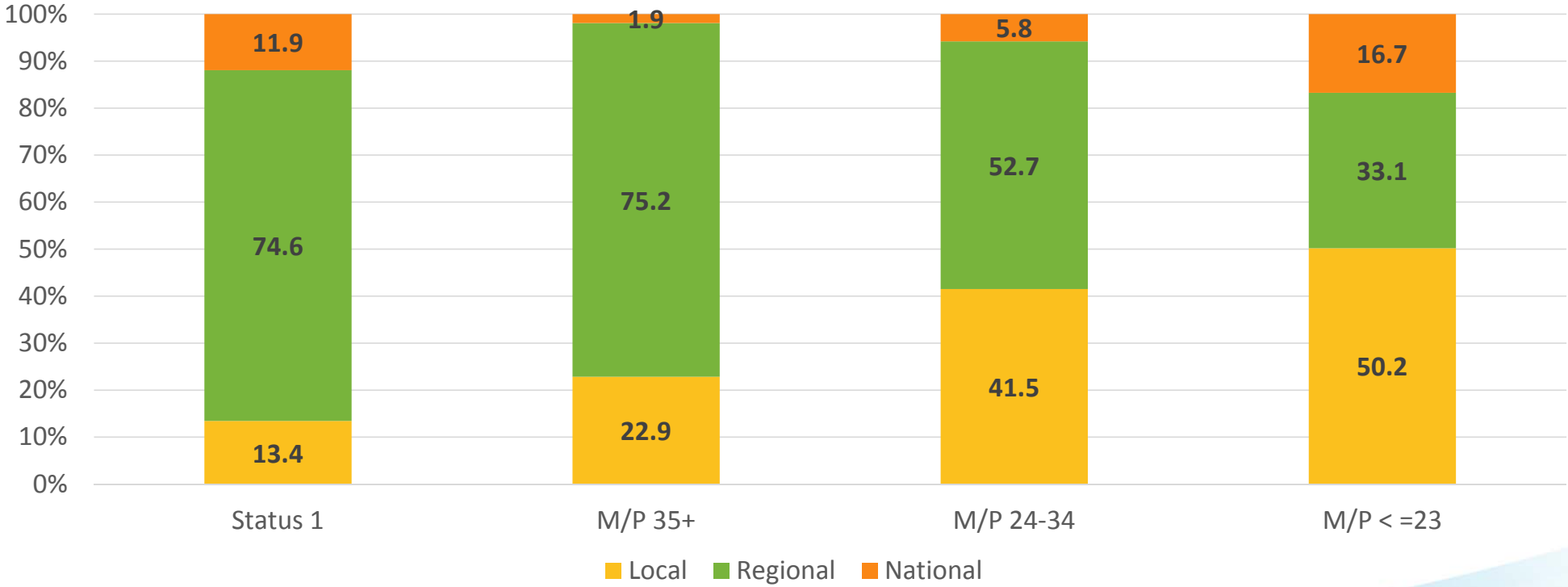
	Status 1		M/P < 23		M/P 24-34		M/P 35+		Total
	N	%	N	%	N	%	N	%	N
Local	9	13.4	270	50.2	93	41.5	48	22.9	420
Regional	50	74.6	178	33.1	118	52.7	158	75.2	504
National	8	11.9	90	16.7	13	5.8	4	1.9	115
Overall	67	100	538	100	224	100	210	100	1039

Status/Lab Score by Transport Mode

	Status 1		M/P < 23		M/P 24-34		M/P 35+		Total
	N	%	N	%	N	%	N	%	N
Missing	8	11.9	66	12.3	18	8	33	15.7	125
Ambulance	2	3	26	4.8	12	5.4	7	3.3	47
Flight	49	73.1	269	50.0	142	63.4	141	67.1	601
Ground	5	7.5	82	15.2	27	12.1	12	5.7	126
Internal	0	0	51	9.5	14	6.3	4	1.9	69
Other	3	4.5	44	8.2	11	4.9	13	6.2	71

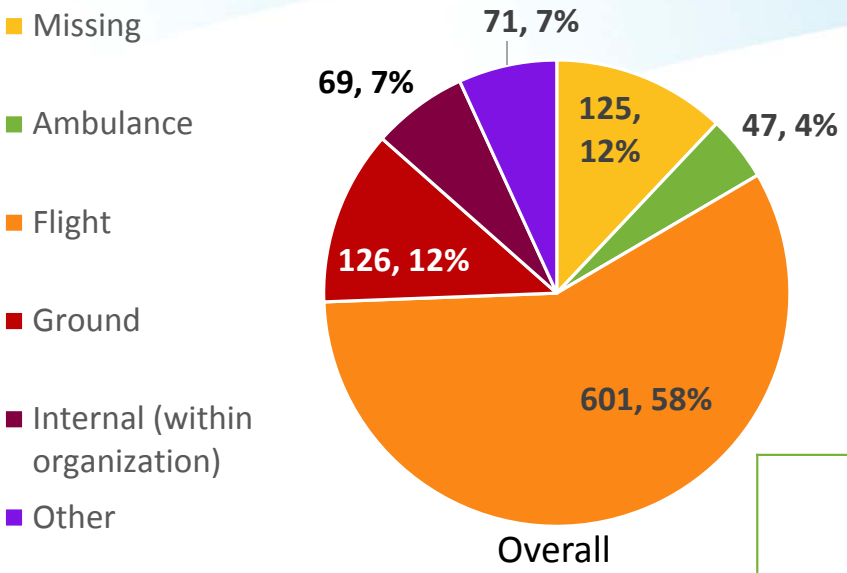
Status/Lab Score by Share Type

	Status 1	M/P 35+	M/P 24-34	M/P < =23
Donor Age	28	34	42	43
DRI	1.3	1.3	1.4	1.4



Median values shown for donor age and DRI

Organ Transport Mode



	Missing		Ambulance		Flight + Other		Ground		Internal		Total
Local	101	24.0%	41	9.8%	109	26.0%	102	24.3%	67	16.0%	420
Regional	24	4.8%	5	1.0%	456	90.5%	17	3.4%	2	0.4%	504
National	0	0%	1	0.9%	107	93.0%	7	6.1%	0	0%	115
	125	12.0%	47	4.5%	672	64.7%	126	12.1%	69	6.6%	1039

Note: “Other” determined to have both ground and flight components

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Results:
Organ Charges

Total Organ Charges

Variable	N	Min	Median	Max
OAC	1038	$0	$37,700	$83,310
Surgeon	428	1,250	4,500	47,620
Tissue Typing	99	270	1,000	3,171
Consult	9	1,000	10,000	10,000
Preservation	19	665	1,700	7,500
Crossmatching	205	333	1,687	14,698
Registration	787	622	957	957
Transport	686	83	8,832	91,962
Total Organ Charges*	1039	7,874	48,123	134,649

*Total Organ Charges = Sum of OAC → Transport Charges
In some cases, other charges (Surgeon, TT, consult, etc.) were included in the OAC and cannot be broken out

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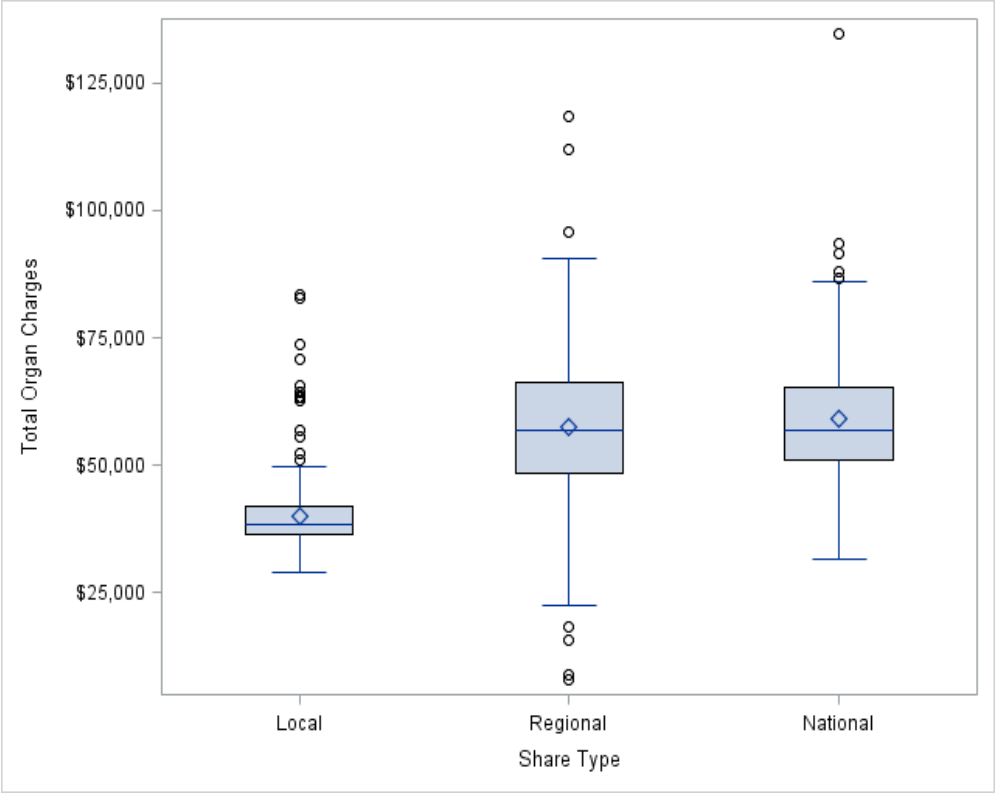
Distribution by Share Type



Median Total Charges Related to Organ Procurement, by Share Type

Total charges include: OAC, surgeon's fees, tissue typing, consults, preservation, cross-matching, OPTN/UNOS registration fee, and transport charges

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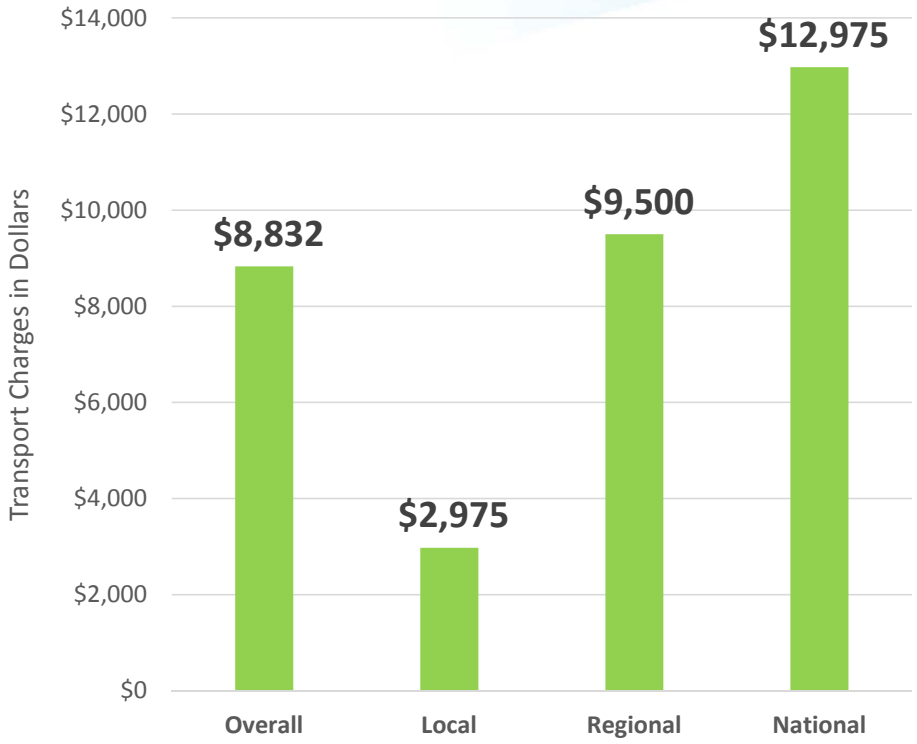
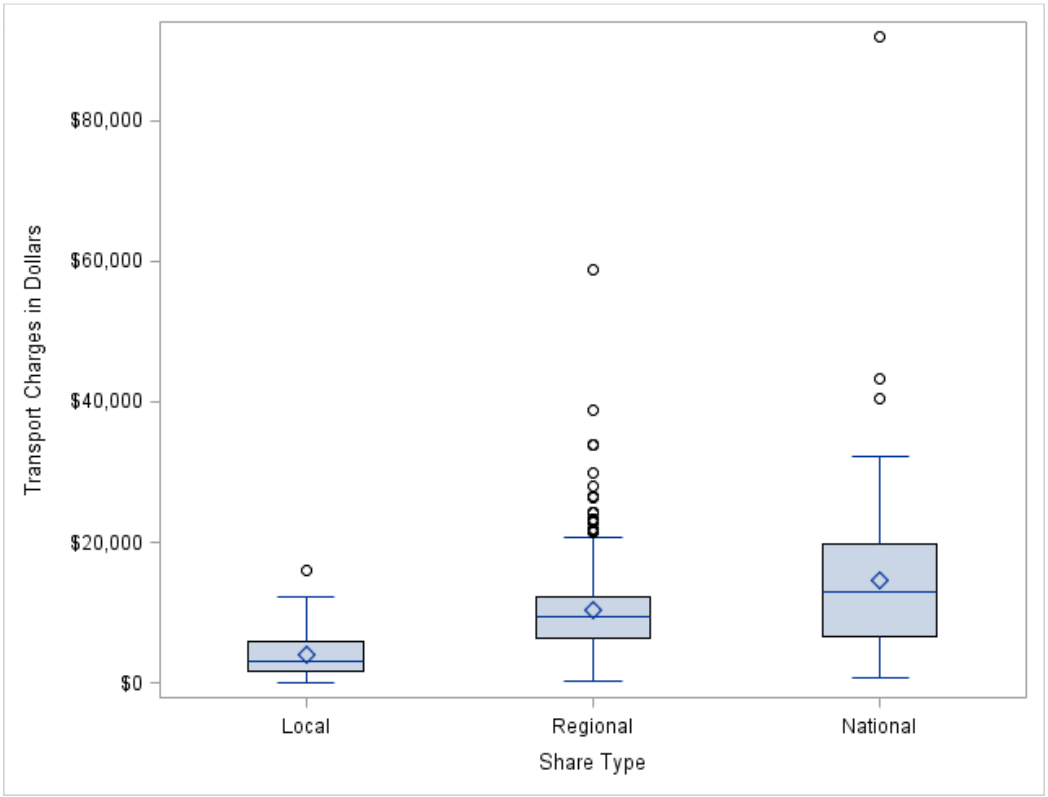
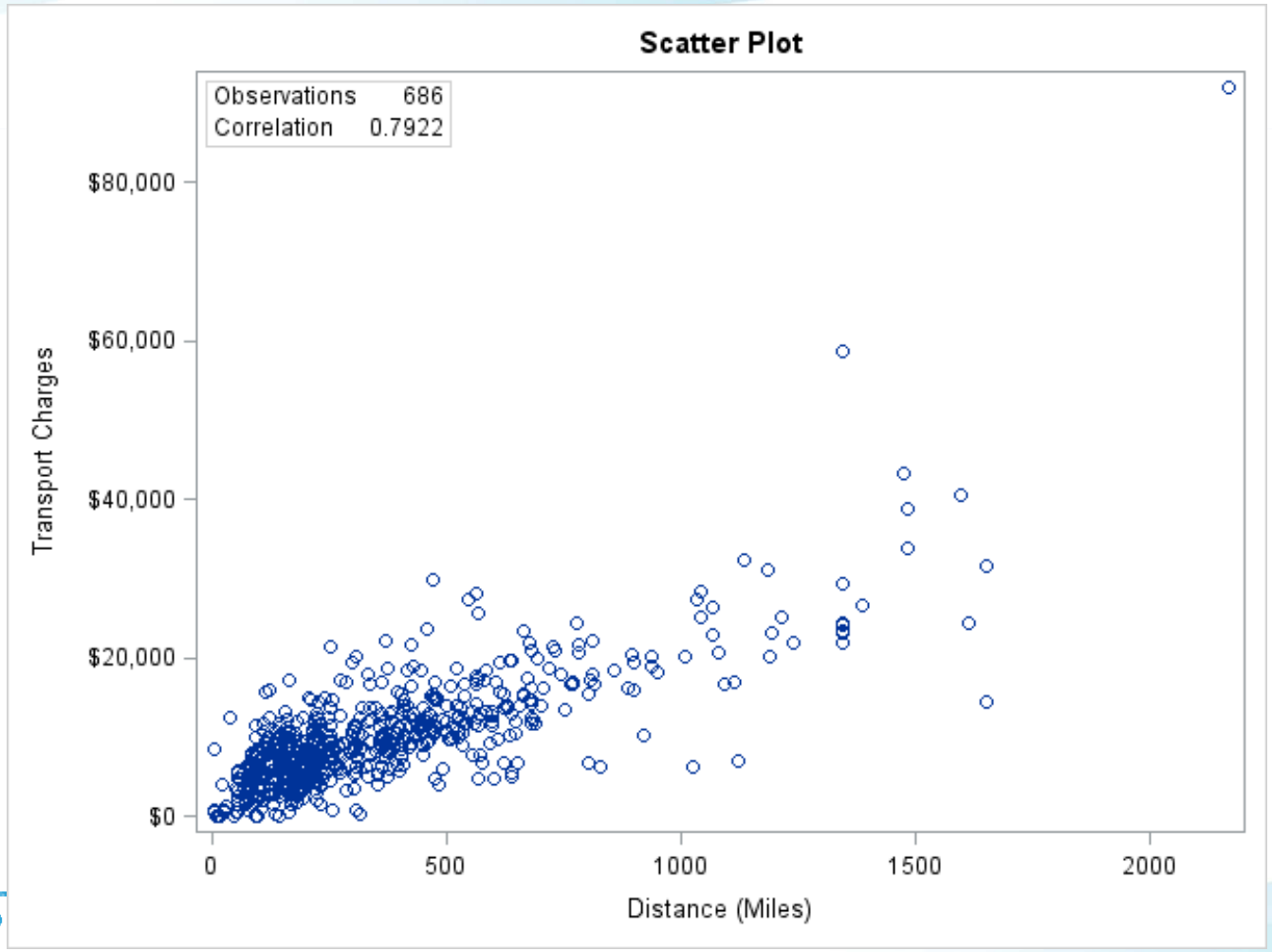
Median Transport Charges, by Share Type





Distance was positively correlated with transplant charges (r=0.79) and total organ charges (r=0.64)

Transport Charges and Distance



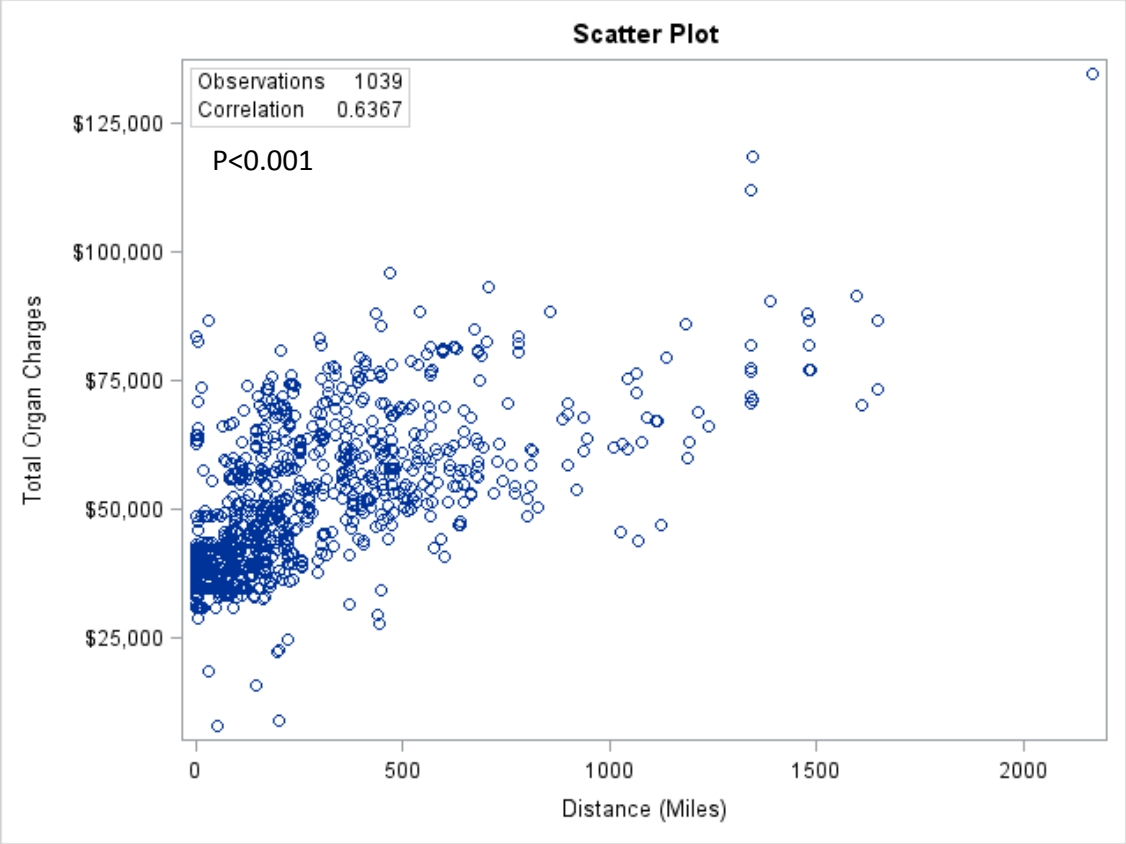
Median Transport Charges by Transport Type* and Share Type

Share Type	Ground (n=126)	Ambulance (n=47)	Flight (n=601)	Other** (n=71)
Local	$550	$110	$3,982	$8,298
Regional	$3,750	$3,500	$9,796	$8,841
National	$3,500	$6,925	$13,099	$15,482
Overall	$1,359	$110	$9,300	$9,493

* Transport mode of 'internal' incurred no transport costs (n=60)

**This slide illustrates the similarities between "flight" and "other" (combined ground + flight)

Correlation of Total Organ Charges and Organ Travel Distance



Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	42557	460.5146	92.41	<.0001
Distance (Miles)	1	31.49	1.184	26.59	<.0001

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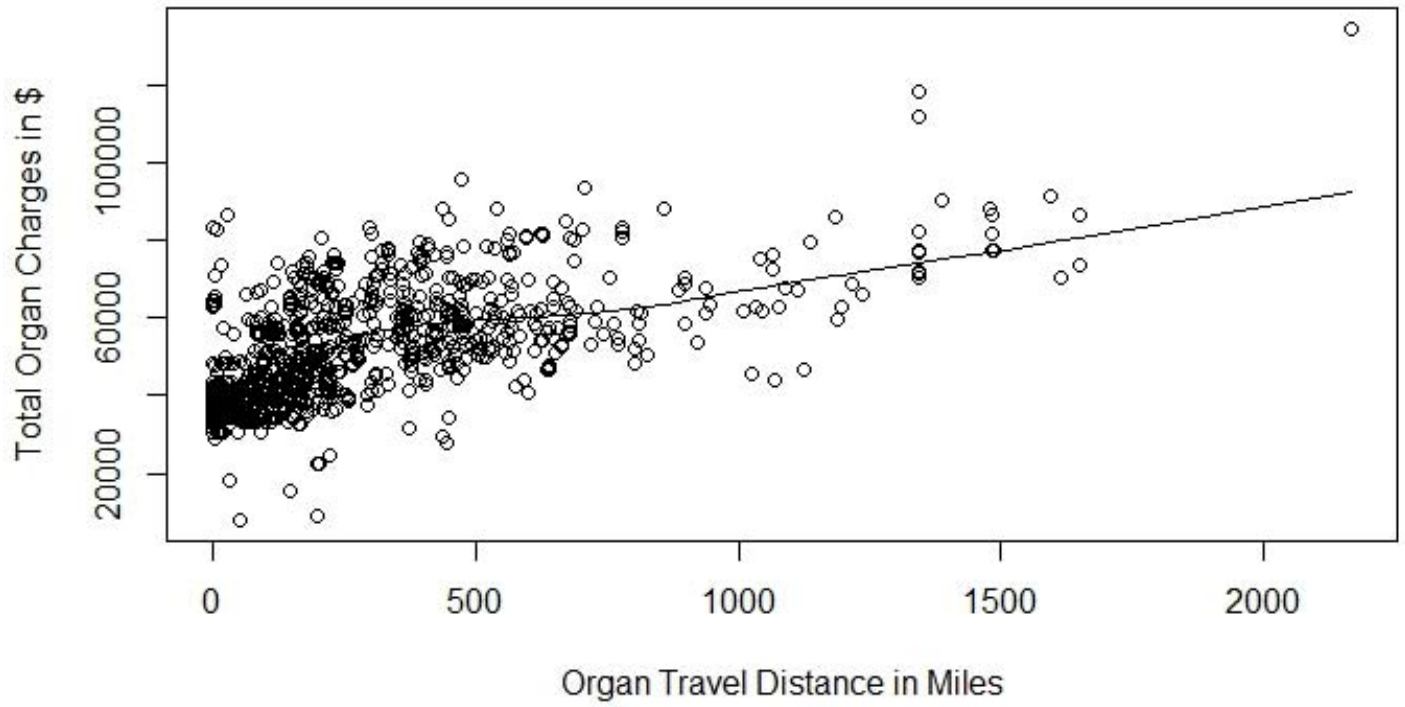
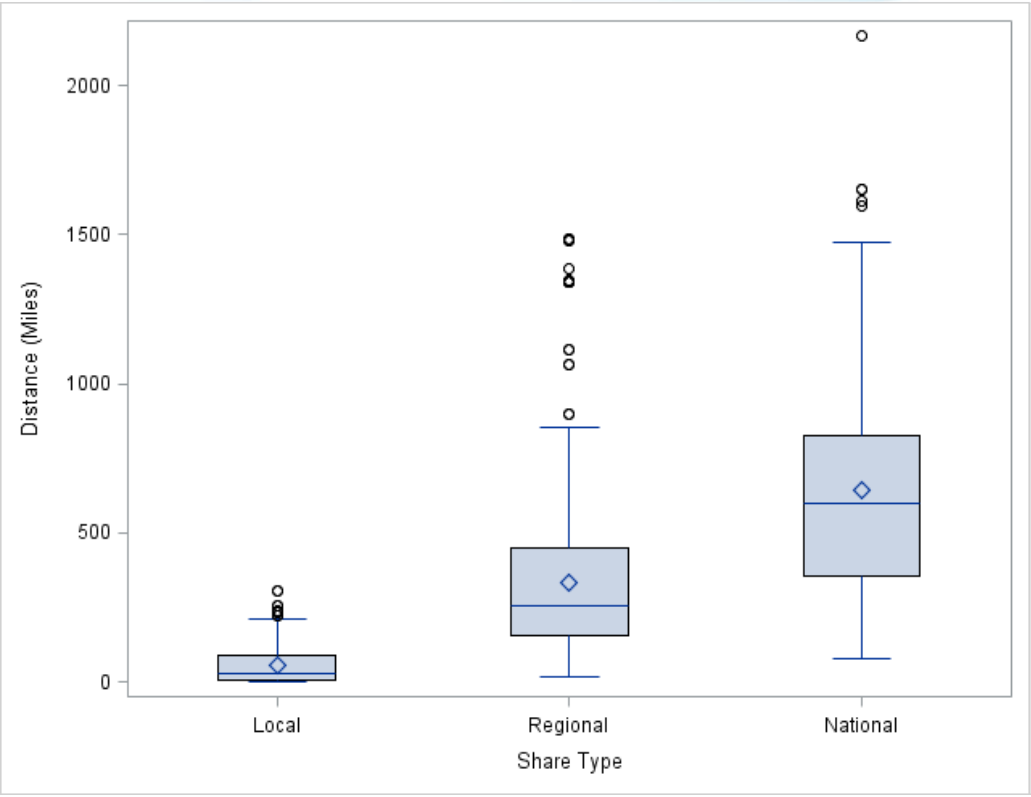
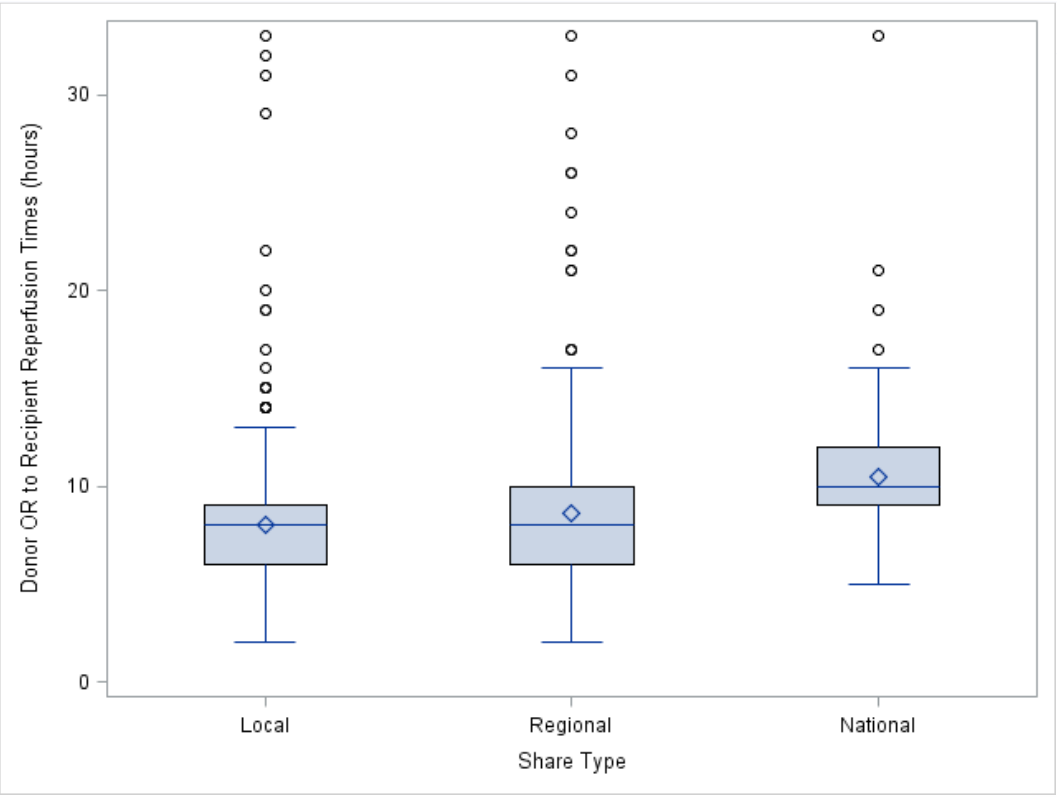
Total Organ Charges and Organ Travel Distance



Results:
Analyses of Time
(Donor to OR through Recipient Reperfusion)

Distribution of Organ Travel Distance and Total Time by Share Type





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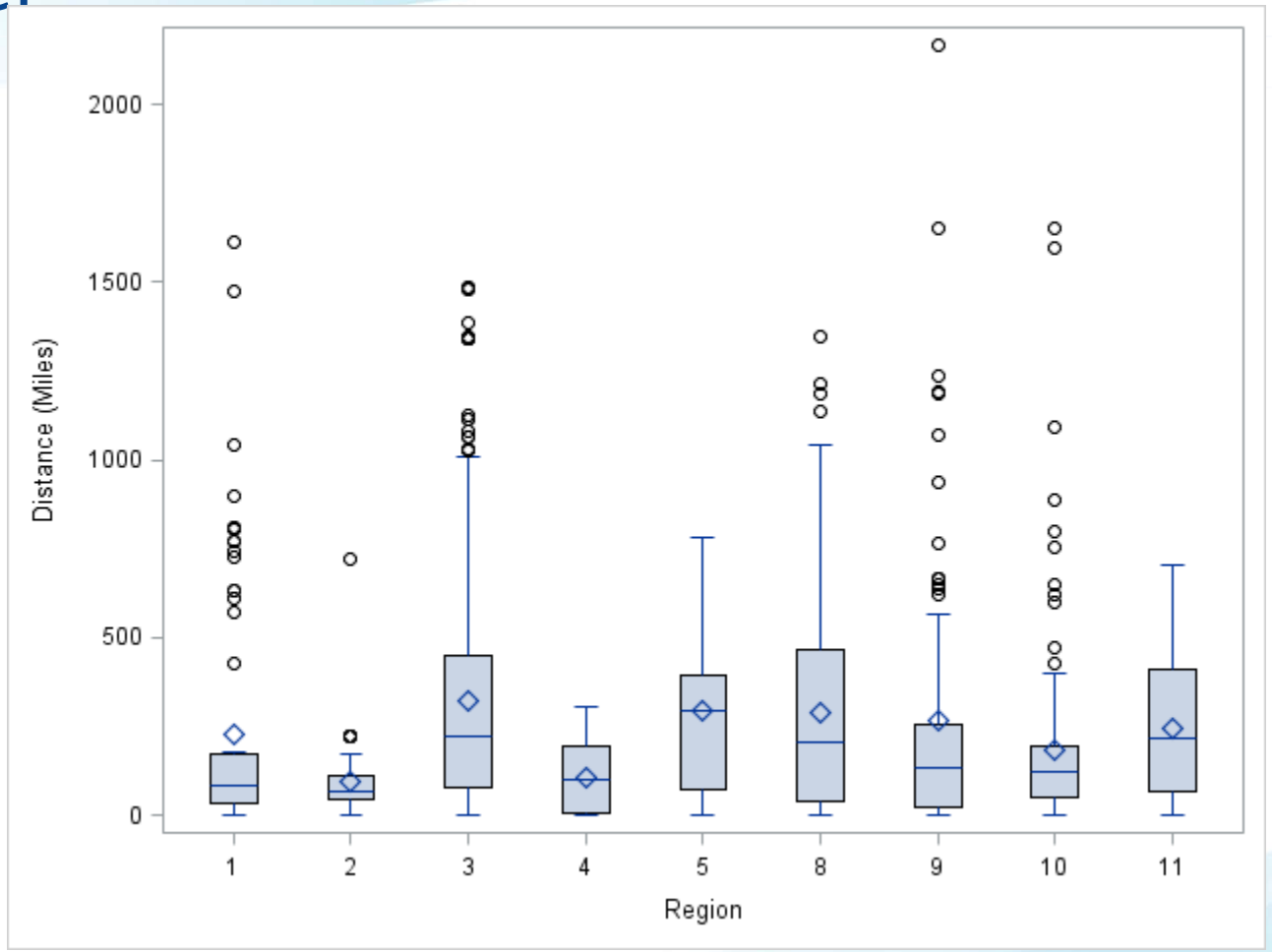
Distribution of Organ Travel Distance by Region of Transplant Center

Region	# Centers
1	3
2	2
3	8
4	2
5	1
6	0
7	0
8	4
9	2
10	3
11	3
Total	28



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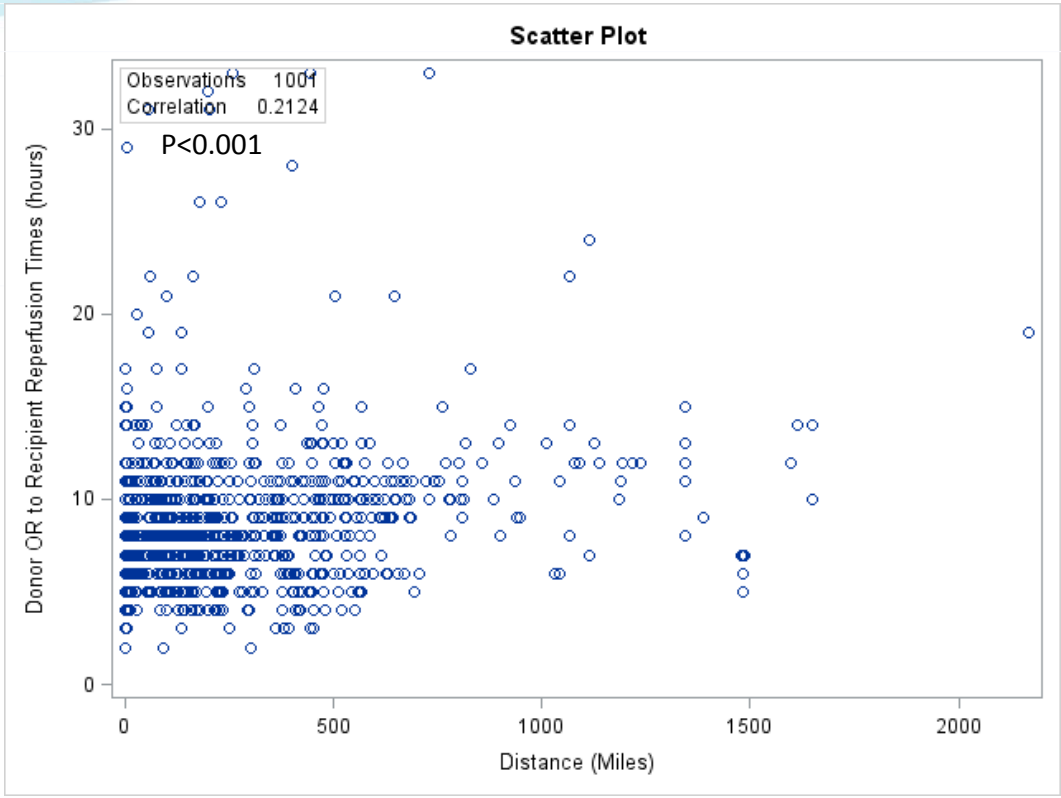
Correlation of Total Time* and Organ Travel Distance

Share Type	N	Min	25 %tile	Mean	Median	75 %tile	Max
Local	407	2	6	8	8	9	33
Regional	481	2	6	8.6	8	10	33
National	113	5	9	10.4	10	12	33
Overall	1001	2	6	8.6	8	10	33



*calculated as hours between time donor taken to OR and recipient reperfusion

Results:
Analyses of Recipient Charges

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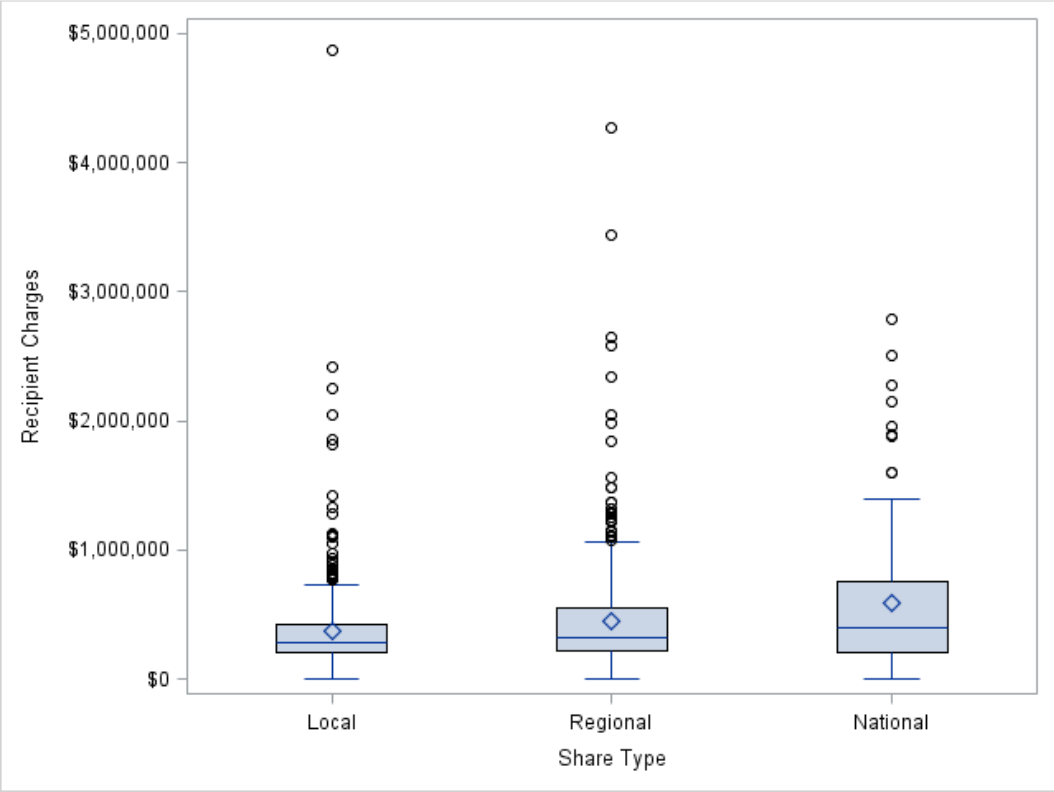
Distribution of Recipient Charges by Share Type



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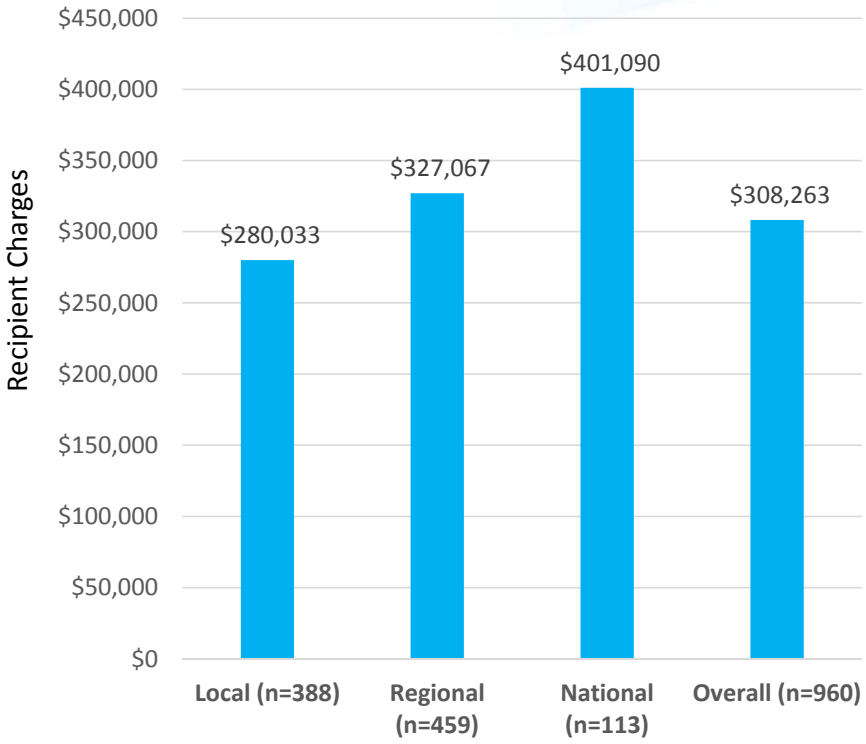
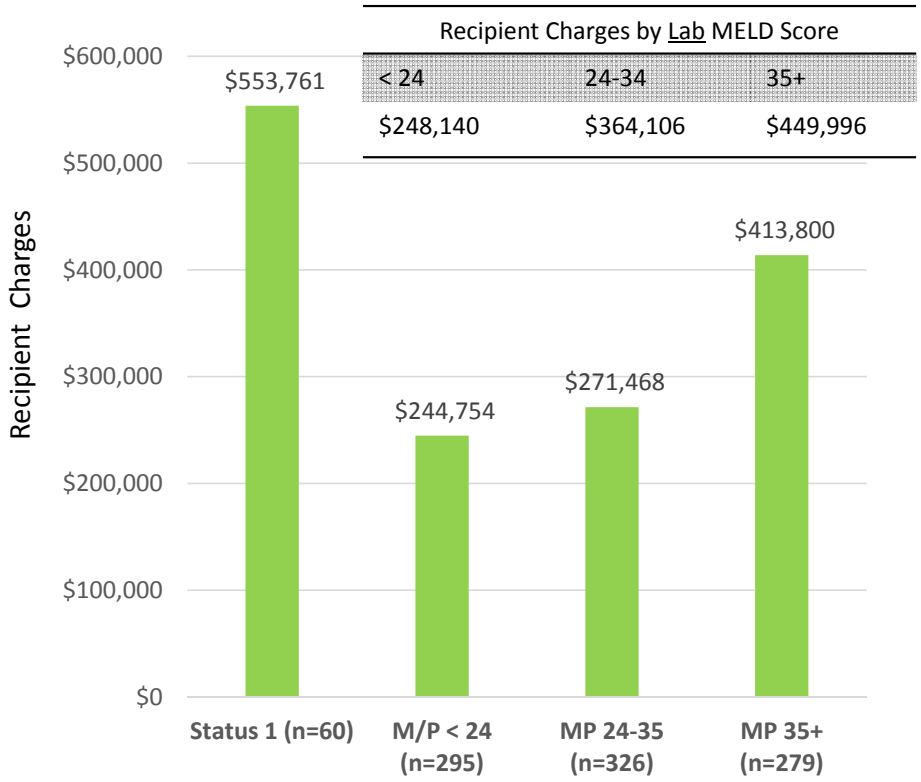
Median Recipient Charges, by Share Type and Allocation Status/Score



% Status 1	2.1%	9.6%	7.1%	6.3%



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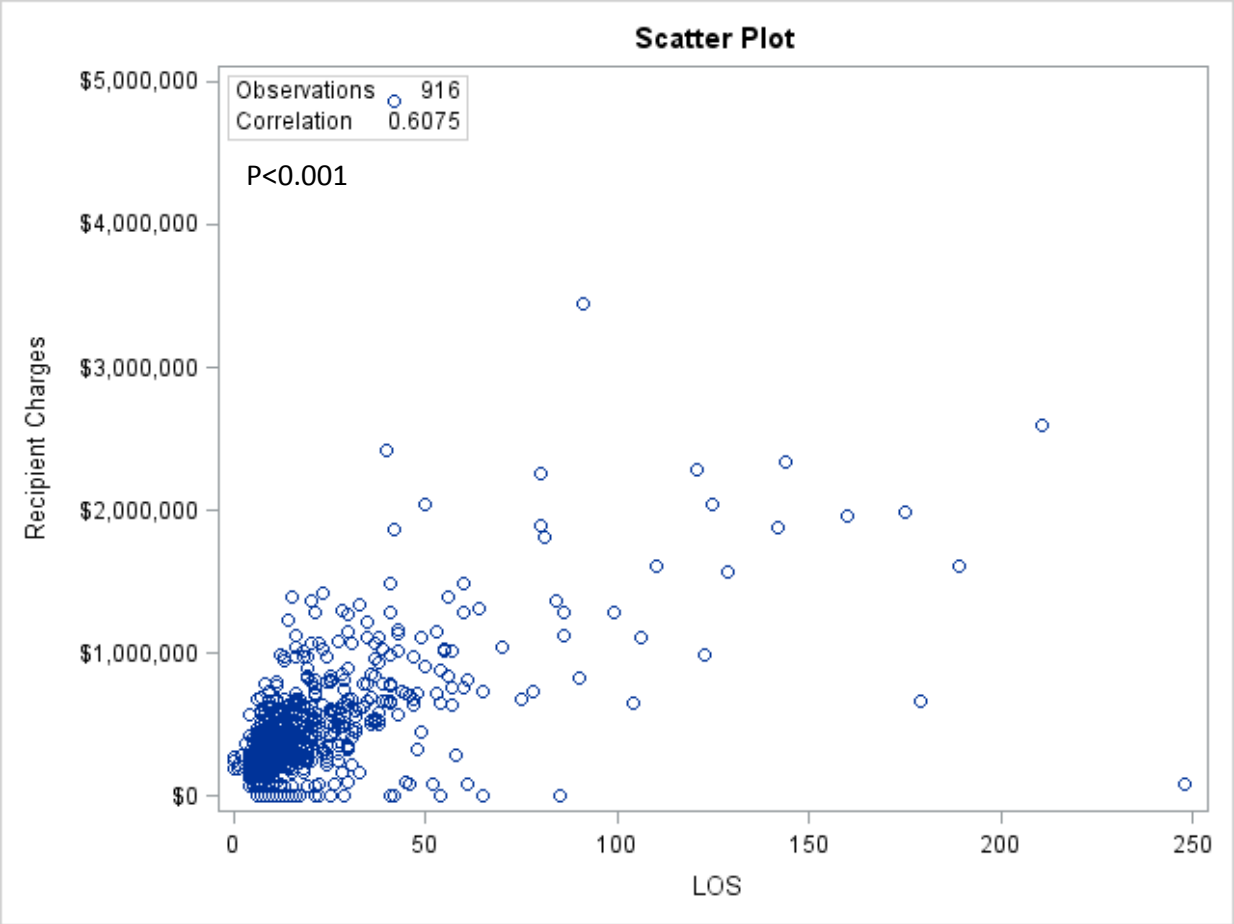
Correlation of Recipient Charges and LOS in Days



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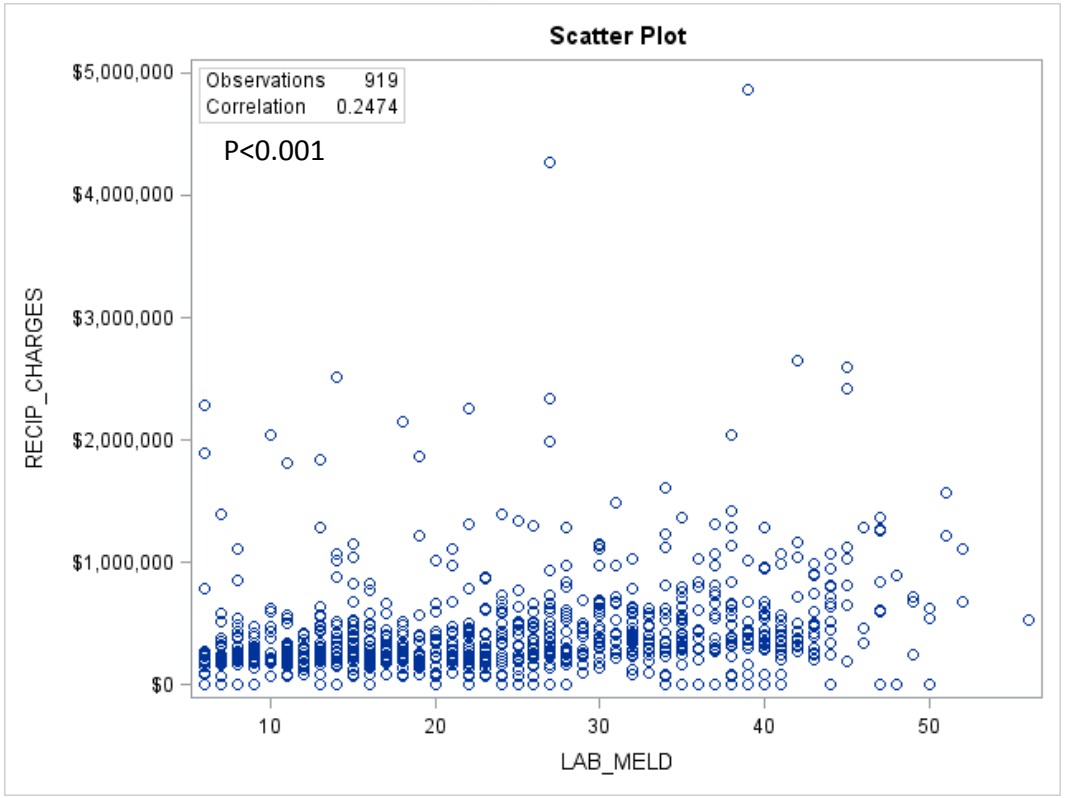
Correlation of Recipient Charges and Lab MELD Adult Recipients Only



Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	207422	30175	6.87	<.0001
Lab MELD	1	8770.46	1134	7.73	<.0001

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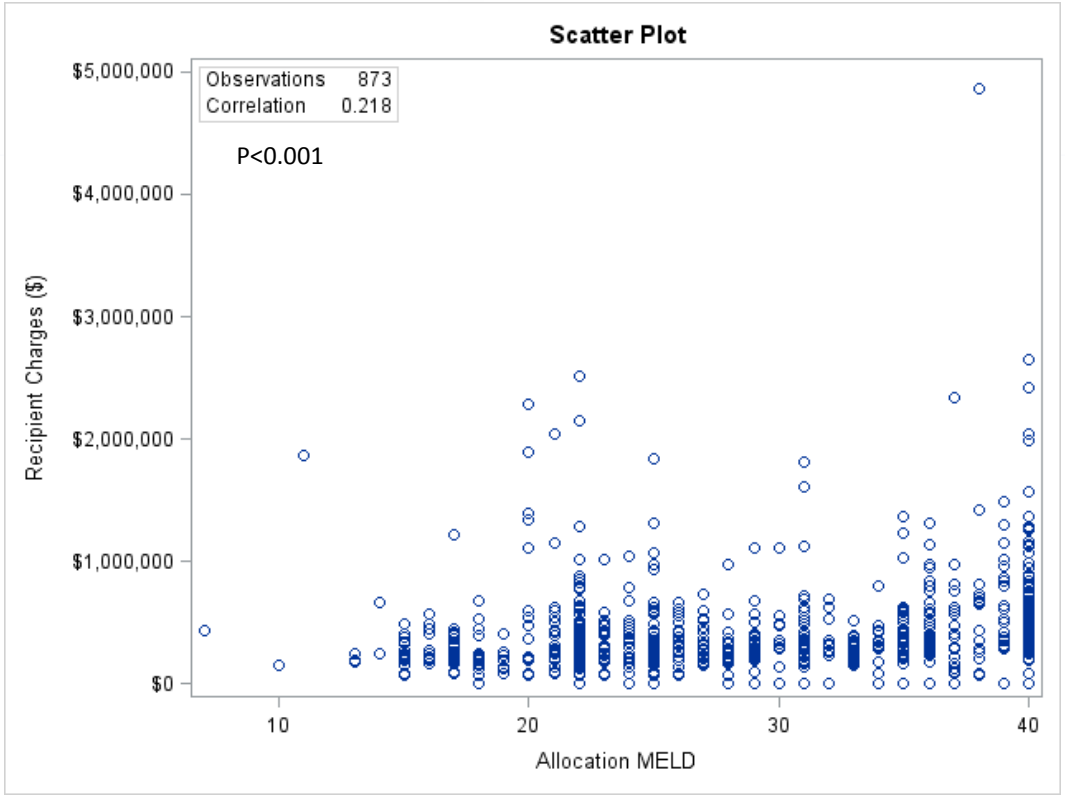
Correlation of Recipient Charges and Allocation MELD Adult Recipients Only (non-Status 1)



Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	99215	47257	2.10	0.036
Allocation MELD	1	10543	1599	6.59	<.0001

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Caveats

- Some charges included in OAC (e.g., transport charges) so do not appear in separate categories
- Some regions were not represented (Regions 6 and 7)
- Some were under-represented (Region 5, only one program)
- Charges may not represent actual costs

Summary

- M/P 35+ Transplants:
  - Most likely Regional shares (77.2%)
  - Most likely use air transport (71.2%)
- Transport Mode: 65% flights
- Organ charges (total): increase with sharing/distance, r=0.64
- Transport charges: increase with sharing/distance, r=0.79
- Distance and total time (Donor OR to Recip Reperfusion) weakly correlated
- Recipient charges correlated with LOS (r=0.61); weakly with MELD score (r=0.24)

Now the SRTR will present the updated findings.

Thank you!