

OPTN Liver & Intestinal Transplantation Committee

Descriptive Data Request

18 Month Monitoring Report of Liver and Intestine Acuity Circle Allocation Removal of DSA and Region as Units of Allocation

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Contents

Table with 2 columns: Section Name and Page Number. Includes sections like Purpose (3), Monitoring Plan (3), Data and Methods (3), A Note About COVID-19 (4), Executive Summary (6), Results (7), Section I. Liver Waitlist (7), Section II. Deceased Donor Liver Transplants (39), Section III. Offer Rates (89), Section IV. Liver Utilization (95), Section V. Intestine (104), and Conclusion (105).

Appendix	106
Additional Waitlist Registration Additions Information	106
Additional Waitlist Removal Rates Information	114
Additional Transplant Rates Information	123
Additional Waitlist Removals Information	132
Additional Deceased Donor Liver Transplant Information	134
Additional Utilization Information	152

Purpose

The purpose of this report is to look at high-level metrics revealing the performance of the system and any potential consequences that may require changes to policy, programming, or clinical practice. This report, performed on behalf of the Organ Procurement and Transplantation Network (OPTN) Liver and Intestinal Transplantation Committee, will be followed by further reports post-implementation. The OPTN will respond to further requests by the Committee as well as relay appropriate requests to the Scientific Registry of Transplant Recipients (SRTR) related to these changes.

Monitoring Plan

Monitoring of the effect of policy changes implemented on February 04, 2020 will focus on changes in the match process, waiting list population, liver transplant recipient population, and deceased donor utilization. Specifically analysis will provide comparisons pre- and post-policy implementation and include:

- Changes in the number of livers and intestines recovered and transplanted
- Impact on the national liver discard and utilization rates
- Changes in the median allocation Model for End-Stage Liver Disease (MELD) or Pediatric End-Stage Liver Disease (PELD) score at transplant
- Changes in the distance (in nautical miles, NM) from the donor hospital to the transplant center for deceased donor liver and intestine transplants
- Impact on the number of liver and intestine candidates removed from the waiting list by reported removal reason
- Changes in the sequence number of liver transplant recipient
- Changes in the time from an Organ Procurement Organization's (OPO) first electronic notification of an offer to cross clamp for deceased donor livers
- Waiting list drop out rates by exception status
- Changes in deceased donor liver transplant recipients by exception status, and associated allocation scores

Data and Methods

Data Sources:

These analyses use data from the OPTN waiting list, Potential Transplant Recipient (PTR) data, as well as the Transplant Candidate Registration (TCR), Transplant Recipient Registration (TRR), Transplant Recipient Followup (TRF), and Deceased Donor Registration (DDR) forms. Analyses are based on OPTN data as of November 19, 2021 and are subject to change based on any future data submission or correction.

Cohorts:

The cohorts examined contain periods of 546 days, or 18 months of data before and after the liver policy change, for most metrics, excluding post-transplant survival.

In the *Liver Waiting List* section, new registrations added to the liver waiting list are used. The pre- and post-policy eras are defined as 08/06/2018 - 02/03/2020 and 02/04/2020 - 08/03/2021, respectively. For waitlist dropout and transplant rates in this section, cohorts are defined as liver-alone registrations ever waiting during the pre- and post-policy periods. Multi-organ listings are excluded from rates. Adult (age 18 or older at listing) and pediatric (age <18 at listing) sections are included. A cumulative incidence section is also included looking at cumulative incidence of transplant and death or removal for too sick.

The *Deceased Donor Liver Transplants* section includes cohorts of deceased donor, liver-alone transplant recipients as well as deceased donor, liver multi-organ transplant recipients, labeled accordingly. Deceased donor liver-alone transplants are further broken into adult (age 18 or older at transplant) and pediatric (age <18 at transplant) sections, to elicit differences in patterns for these two groups. Cohorts of transplants are defined during 08/06/2018 - 02/03/2020 and 02/04/2020 - 08/03/2021 pre- and post-policy. Post-transplant patient survival is also included in this section, and contains cohorts of all-age deceased donor liver-alone transplant recipients from 08/06/2018 -

07/31/2019 and 02/04/2020 - 01/31/2021, pre- and post-policy, respectively, to account for the two-month data lag of reporting on transplant recipients in addition to the 30 days for reporting patient deaths and graft failure events with the amnesty policy.

Data in the *Offer Rates* section includes offers for liver-alone registrations ever waiting during 08/06/2018 - 02/03/2020 (pre) and 02/04/2020 - 08/03/2021, stratified by a number of candidate characteristics. Multi-organ listings are excluded from these rates.

A number of data sets are used to provide the metrics in the *Liver Utilization* section. Data on all deceased organ donors from which at least one organ was recovered for the purpose of transplantation was used for liver utilization rates, while the subset of these donors that had a liver recovered were used for liver discard rates as well as volume of deceased liver donors procured. The pre- and post-policy eras were defined as 08/06/2018 - 02/03/2020 and 02/04/2020 - 08/03/2021, respectively. Deceased donor liver match runs with a final acceptance during these pre- and post-policy eras are also used. Deceased donor, liver-alone transplants were used to evaluate donor-to-recipient age comparisons, defined by the periods also used in the *Deceased Donor Liver Transplants* section.

The *Intestine* section reviews new registrations added to the intestine waiting list, registrations removed from the intestine waiting list due to reasons of death or too sick to transplant, deceased intestine donors recovered, and deceased donor intestine transplants. The time periods defined for each data set are the same as the liver sections. This section includes both intestine-alone and intestine multi-organ transplants.

Additional information is provided in the *Appendix*, including characteristics of liver registrations, additional waitlist dropout and transplant rates, liver-alone registrations removed from the waitlist due to death or too sick, and additional deceased donor transplant information.

A Note About COVID-19

For all figures and tables, we note that the World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020 and a national state of emergency was declared in the U.S. on March 13, 2020. Based on the WHO's declaration of the pandemic and the national state of emergency, the post-implementation monitoring for this report contains roughly 17 months of COVID-19 Era data. Given the impact that has been seen on the U.S. transplant and donation community (unos.org/covid) the true impact of this policy change is very challenging to determine.

The COVID-19 crisis has created challenges to conducting routine outpatient activities, including clinical testing, which are needed to obtain information required for transplant candidates, recipients, and living donors. Current OPTN policy requires that transplant programs submit numerous data for transplant recipients and living donors. The emergency policy from the OPTN Executive Committee relaxed requirements for follow-up form submission. The intent of the policy is to prevent unnecessary exposure risk to transplant recipients and living donors and to alleviate data burden for centers in the midst of COVID-19 crisis.

The TRF and LDF Data Submission During COVID-19 Amnesty Period emergency policy temporarily suspended the requirements for data collection and submission for the living donor follow-up (LDF), organ specific transplant recipient follow-up (TRF), and recipient malignancy (PTM) forms. The suspension of these requirements is backdated to forms expected between March 13, 2020 and March 31, 2021. It did not suspend the requirement to report recipient death or graft failure, but extended the time frame for reporting that information for transplant recipients from 14 days to 30 days of knowledge of the event.

Methods

Counts and percentages are used to summarize categorical variables or characteristics, while density curves and distribution summaries (minimum, maximum, mean, median, percentiles) are provided for continuous characteristics. If statistical tests of comparison were performed, Chi-Square tests were used for categorical comparisons pre- vs. post-policy. Non-parametric Kruskal-Wallis and Mann-Whitney rank sum tests were used for comparisons in mean and median values pre- vs. post-policy, respectively, when the assumption of normality of the distribution may not hold. The Kolmogorov-Smirnov test was used to compare full distributions of continuous variables pre-

vs. post-policy. The Fligner-Killeen test compared the variance in median MELD at transplant (MMaT) pre- vs. post-policy, as it is a robust non-parametric test against departures from normality.

For waiting list dropout, (for reasons of death or too sick to transplant) rates, all liver-alone registrations ever on the waiting list were included, even if listed for less than one day or never active. For transplant rate and offer rate analysis, only liver-alone registrations on the waiting list for at least one day were included. These rate analyses are registration-based, not candidate-based. That is, a single candidate may have had a liver registration at multiple transplant centers. Each such registration was counted separately in the analysis and contributed to the appropriate eras and characteristic group. However, if a candidate had multiple registrations that, on the same day, were in the same characteristic group, this active person-day was only counted once in the transplant and offer rate denominator. While waiting time for each registration is contributed for each candidate, only one event per candidate is recorded. This is taken as the first occurrence.

Dropout rates expressed by removals per 100 person-years were calculated by dividing the number of removals for death or too sick to transplant by the number of years patients spent waiting. Dividing by the number of person-years serves to normalize the rates to account for often drastic differences in the number of candidates and durations of time waited (within each era) by different patient characteristics. For each time interval, all waiting time (active and inactive) within the interval was used to calculate person-years. Since some candidates may spend several months or years on the waiting list, a candidate may contribute waiting time to both eras, but a removal is attributed only to the era and characteristic group in which it occurred. Some candidates may also be multi-listed at a number of transplant programs and thus have multiple registrations. Waiting time for each registration is contributed for each candidate, but only one removal per candidate is included in the calculation.

Transplant rates as expressed by transplants per 100 active person-years were calculated by dividing the number of deceased donor liver-alone transplants by the number of active years patients spent waiting (expressed per 100). For each time interval, only active waiting time within the interval analyzed was used for the person-years calculation since candidates may only receive offers and thus transplants when in an active status. Since some candidates may spend several months or years on the waiting list, a candidate may contribute waiting time to both eras, but a transplant is attributed only to the era and characteristic group in which it occurred.

Offer rates as expressed by offers per active person-year were calculated by dividing the number of offers received by the number of active years patients spent waiting.

For dropout and transplant rates by exception status group and era, the associated waiting time from a candidate registration was attributed to the person-years under "HCC exception" if there was ever an approved liver MELD or PELD exception request for HCC diagnosis (within that era). This does not include HCC diagnoses submitted under "Other specify". Similarly, associated waiting time for a candidate registration was attributed to the person-years under "Non-HCC exception" if an approved liver MELD or PELD exception request for a diagnosis other than HCC occurred within that era. If a registration had multiple forms submitted within an era for both HCC and non-HCC exception types, the first of these that was submitted was used. All other candidates' person-years waiting was attributed to the non-exception status group. This exception status definition differs from that used when counting waiting list removals or transplants, where such group membership is defined as the exception status at the time of event rather than ever during the policy period; thus, counts may not align with events from rates based on these definitions.

Cumulative incidence of transplant and cumulative incidence of removal for death or too sick to transplant were based on a Fine-Gray competing risks analysis. For the purpose of these analyses, days waiting is total days on the waitlist, regardless of active status. A candidate is considered transplanted if they were removed from the waitlist after receiving either a deceased or living donor liver transplant. A death on the waitlist is defined as removal from the waitlist as a result of death or becoming too sick to transplant.

Post-transplant patient survival was calculated for the subset of deceased donor, liver-alone transplant recipients with at least six months of follow-up. Higher rates of patient status censoring were expected as a result of the amnesty policy. To account for this increase, survival analyses were run assuming recipients were alive unless their death was reported to the OPTN or identified in all (verified and unverified) external sources. Survival curves and point estimates were constructed using unadjusted Kaplan-Meier methodology and compared using the log-rank test.

Executive Summary

This report provides a review at 18 months under acuity circle (AC) allocation changes. Even with roughly 17 of the 18 months of the post-policy period during the COVID-19 pandemic, many of the results in this report continue to align with the intended outcomes of the policy change that were supported by the SRTR modeling predictions prior to the implementation of this proposal. Some of the main findings from this report include:

- Coinciding with the COVID-19 global pandemic, nationally, there were:
 - **448** more adult (age 18+ at listing) and **83** less pediatric (age <18 at listing) registrations added to the liver waiting list post-policy
 - **570** more adult (age 18+ at transplant) and **4** less pediatric (age <18 at transplant) deceased donor, liver-alone transplant recipients post-policy
 - **121** less adult (age 18+ at listing) and **12** less pediatric (age <18 at listing) registrations removed for death or too sick post-policy
 - **98** more simultaneous liver-kidney transplant recipients post-policy
 - **759** more adult (age 18+ at donation) and **24** less pediatric (age <18 at donation) deceased liver donors recovered post-policy
- Transplant rates significantly increased for liver-alone candidates with MELD or PELD scores 29 and higher and Status 1A/1B candidates
- The national median transplant score (MTS) for adults remained unchanged at 28, and decreased from 35 to 30 for pediatric transplant recipients
- Distances between donor hospital and transplant program increased for deceased donor, liver-alone recipients
 - Increased distances occurred most often for adult recipients with MELD scores 29 and higher or Status 1A
 - The proportion of national shares increased from 20% to 60% for pediatric recipients
 - Median cold ischemia time increased by 11 minutes for adult and 33 minutes for pediatric recipients
- Unadjusted post-transplant patient survival decreased from 94.0% pre-policy to 92.8% post-policy
- Offer rates increased for all MELD or PELD score or status groups post-policy
- The liver discard rate remained stable and the liver utilization rate decreased pre- to post-policy
- Nationally, there were:
 - **37** more intestine registrations added to the intestine waiting list post-policy
 - The same amount of deceased donor intestine transplants post-policy
 - **13** less deceased intestine donors recovered post-policy

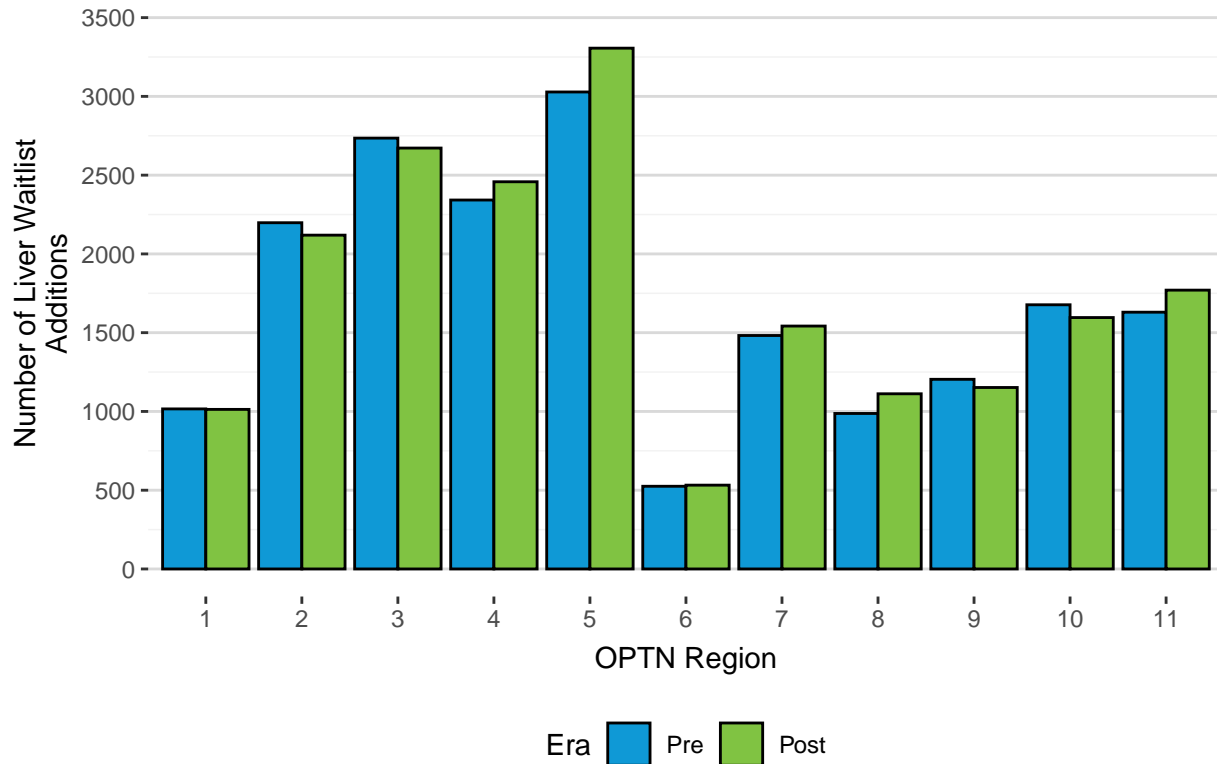
Results

Section I. Liver Waitlist

Adult Registration Additions

A registration was considered adult if the candidate was 18 years or older at listing. There were slightly more new adult liver waitlist registrations post-policy compared to pre-policy (percent change 2.4%). The proportions of waitlist additions among regions were fairly consistent.

Figure 1. Adult Registrations Added to Liver Waitlist by OPTN Region of Listing Center and Era



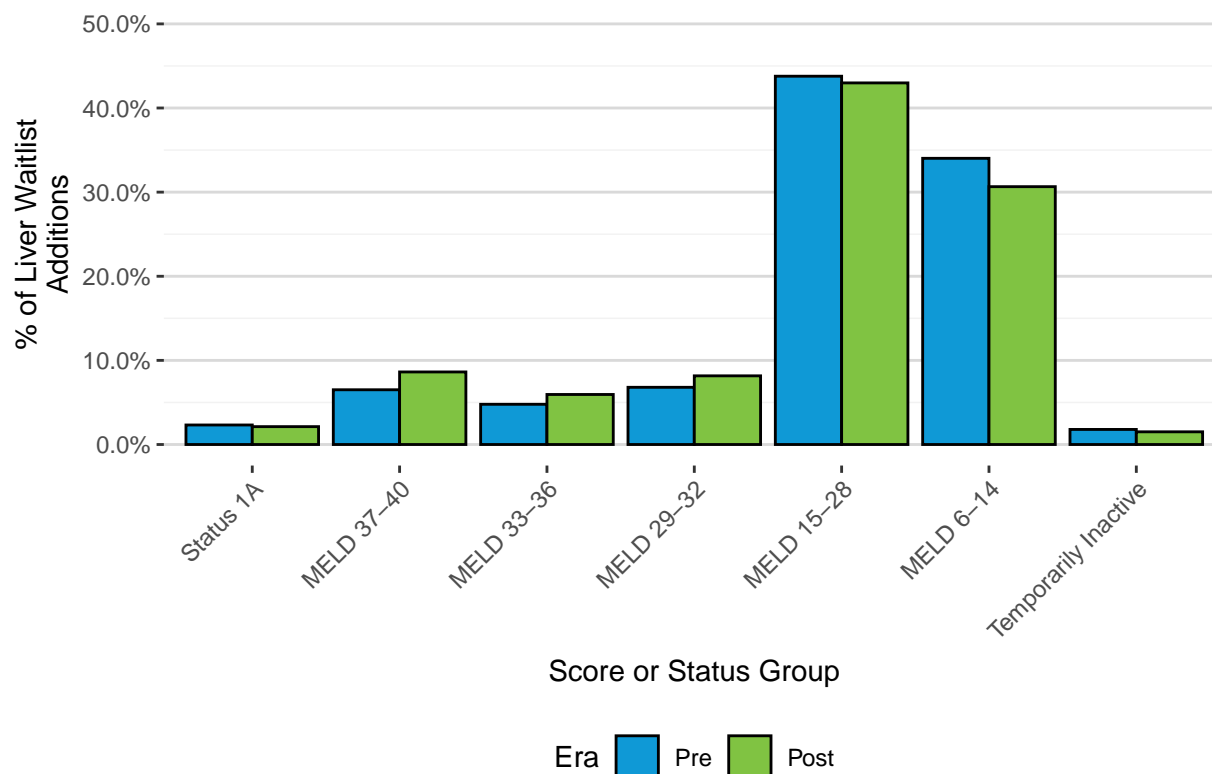
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 1. Number and Percent of Adult Registrations Added to Liver Waitlist by OPTN Region of Listing Center and Era

OPTN Region	Pre-Policy	Post-Policy
1	1016 (5.4%)	1013 (5.3%)
2	2198 (11.7%)	2119 (11.0%)
3	2735 (14.5%)	2672 (13.9%)
4	2342 (12.4%)	2458 (12.8%)
5	3028 (16.1%)	3306 (17.2%)
6	525 (2.8%)	532 (2.8%)
7	1482 (7.9%)	1542 (8.0%)
8	987 (5.2%)	1112 (5.8%)
9	1204 (6.4%)	1152 (6.0%)
10	1677 (8.9%)	1596 (8.3%)
11	1630 (8.7%)	1770 (9.2%)
Total	18824 (100.0%)	19272 (100.0%)

Post-policy there was a slightly larger proportion of adult registrations added to the waitlist with higher MELD scores (MELD 37-40, MELD 33-36, MELD 29-32) and a slightly smaller proportion of registrations added with lower MELD scores (MELD 15-28, MELD 6-14).

Figure 2. Adult Registrations Added to Liver Waitlist by MELD Score or Status at Listing and Era



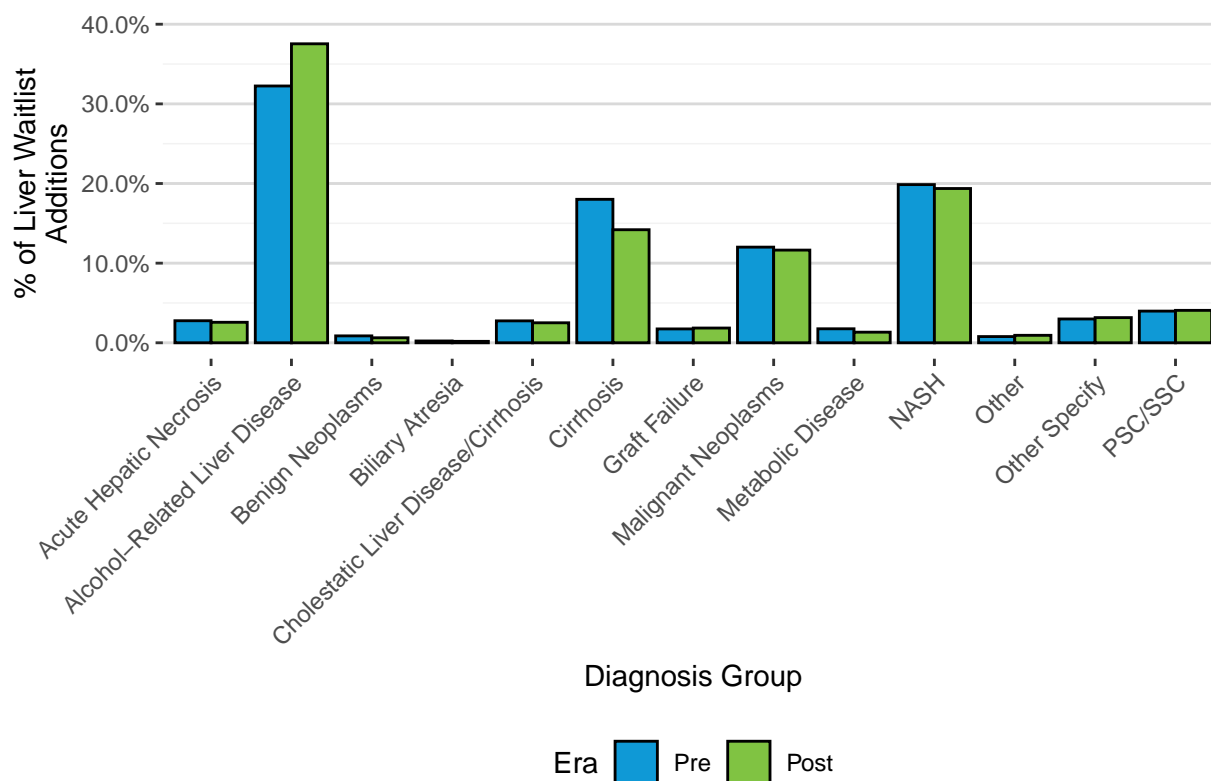
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Table 2. Number and Percent of Adult Registrations Added to Liver Waitlist by MELD Score or Status at Listing and Era

Score or Status Group	Pre-Policy	Post-Policy
Status 1A	437 (2.3%)	409 (2.1%)
MELD 37-40	1225 (6.5%)	1662 (8.6%)
MELD 33-36	900 (4.8%)	1146 (5.9%)
MELD 29-32	1280 (6.8%)	1573 (8.2%)
MELD 15-28	8241 (43.8%)	8284 (43.0%)
MELD 6-14	6404 (34.0%)	5907 (30.7%)
Temporarily Inactive	337 (1.8%)	291 (1.5%)
Total	18824 (100.0%)	19272 (100.0%)

Proportions of waitlist additions by diagnosis groups remained consistent pre- and post-policy with a notable increase (percent change 19.2%) in the number of waitlist additions with an alcohol-related liver disease post-policy.

Figure 3. Adult Registrations Added to Liver Waitlist by Diagnosis Group and Era



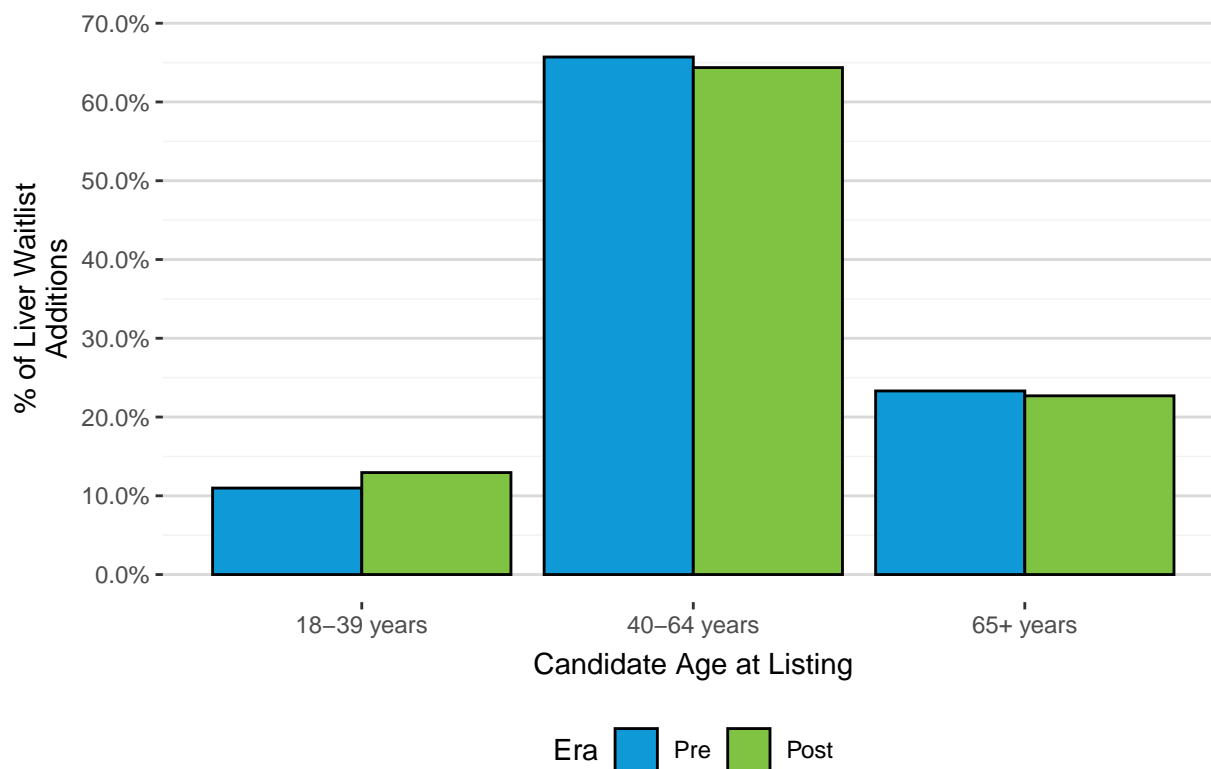
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Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 3. Number and Percent of Adult Registrations Added to Liver Waitlist by Diagnosis Group and Era

Diagnosis Group	Pre-Policy	Post-Policy
Acute Hepatic Necrosis	521 (2.8%)	496 (2.6%)
Alcohol-Related Liver Disease	6070 (32.2%)	7235 (37.5%)
Benign Neoplasms	163 (0.9%)	121 (0.6%)
Biliary Atresia	43 (0.2%)	35 (0.2%)
Cholestatic Liver Disease/Cirrhosis	518 (2.8%)	484 (2.5%)
Cirrhosis	3391 (18.0%)	2736 (14.2%)
Graft Failure	328 (1.7%)	357 (1.9%)
Malignant Neoplasms	2261 (12.0%)	2243 (11.6%)
Metabolic Disease	331 (1.8%)	257 (1.3%)
NASH	3739 (19.9%)	3733 (19.4%)
Other	147 (0.8%)	181 (0.9%)
Other Specify	563 (3.0%)	609 (3.2%)
PSC/SSC	749 (4.0%)	785 (4.1%)
Total	18824 (100.0%)	19272 (100.0%)

Post-policy, there was a higher proportion of adult candidates added to the waitlist in the 18-39 years age category (12.9% post-policy vs. 11.0% pre-policy).

Figure 4. Adult Registrations Added to Liver Waitlist by Candidate Age at Listing and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

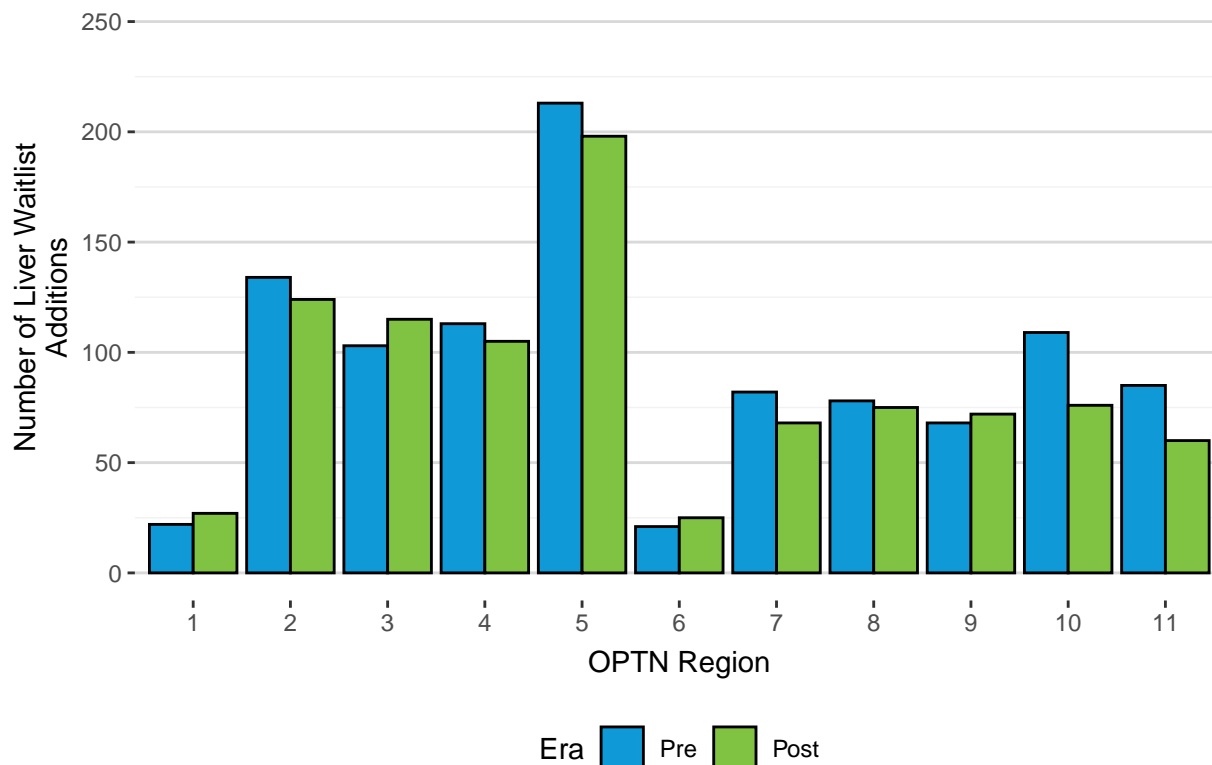
Table 4. Number and Percent of Adult Registrations Added to Liver Waitlist by Candidate Age at Listing and Era

Candidate Age at Listing	Pre-Policy	Post-Policy
18-39 years	2067 (11.0%)	2495 (12.9%)
40-64 years	12369 (65.7%)	12404 (64.4%)
65+ years	4388 (23.3%)	4373 (22.7%)
Total	18824 (100.0%)	19272 (100.0%)

Pediatric Registration Additions

A registration was considered pediatric if the candidate was less than 18 years old at listing. There were fewer pediatric registrations added to the waitlist (percent change -8.1%) post-policy compared to pre-policy. Regions 1, 3, 6, and 9 experienced increases in the number of pediatric registrations added and Regions 2, 4, 5, 7, 8, 10, and 11 experienced decreases.

Figure 5. Pediatric Registrations Added to Liver Waitlist by OPTN Region of Listing Center and Era



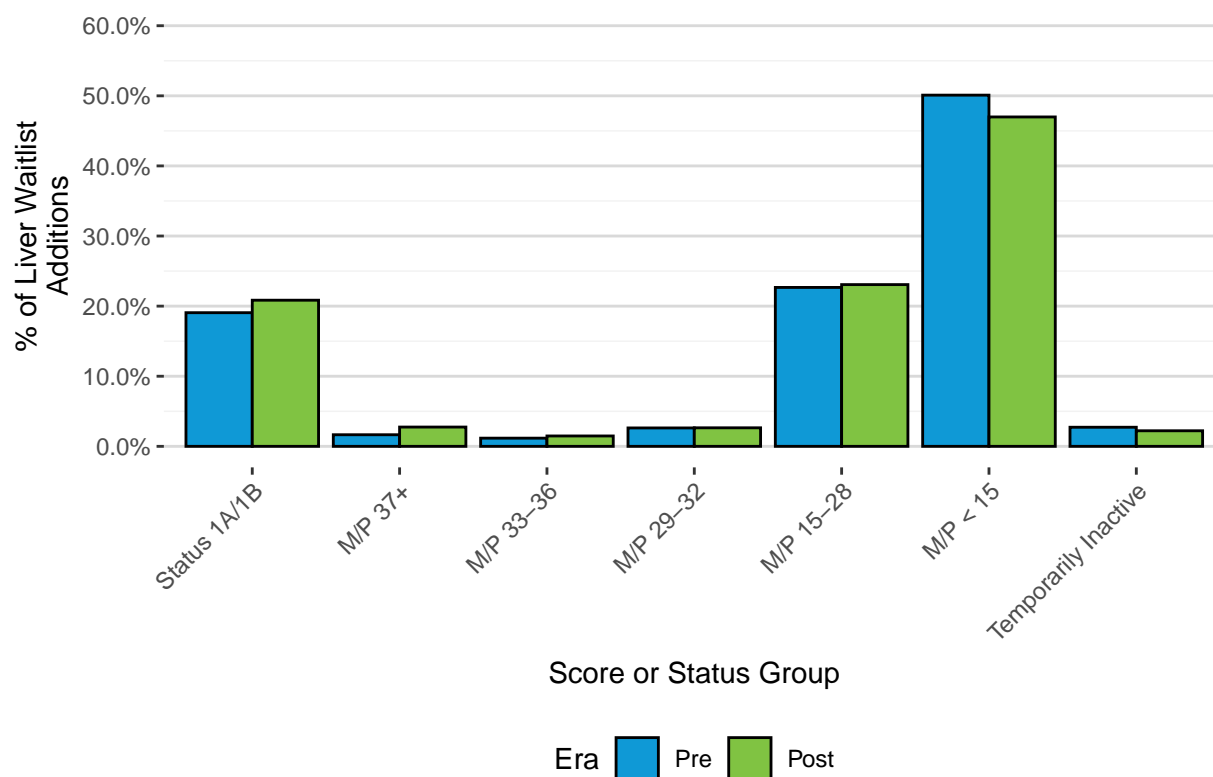
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Table 5. Number and Percent of Pediatric Registrations Added to Liver Waitlist by OPTN Region of Listing Center and Era

OPTN Region	Pre-Policy	Post-Policy
1	22 (2.1%)	27 (2.9%)
2	134 (13.0%)	124 (13.1%)
3	103 (10.0%)	115 (12.2%)
4	113 (11.0%)	105 (11.1%)
5	213 (20.7%)	198 (21.0%)
6	21 (2.0%)	25 (2.6%)
7	82 (8.0%)	68 (7.2%)
8	78 (7.6%)	75 (7.9%)
9	68 (6.6%)	72 (7.6%)
10	109 (10.6%)	76 (8.0%)
11	85 (8.3%)	60 (6.3%)
Total	1028 (100.0%)	945 (100.0%)

Proportions of pediatric waitlist additions remained fairly consistent pre- and post-policy with a slightly lower proportion of MELD or PELD <15 registrations added to the waitlist post-policy.

Figure 6. Pediatric Registrations Added to Liver Waitlist by MELD or PELD Score or Status at Listing and Era



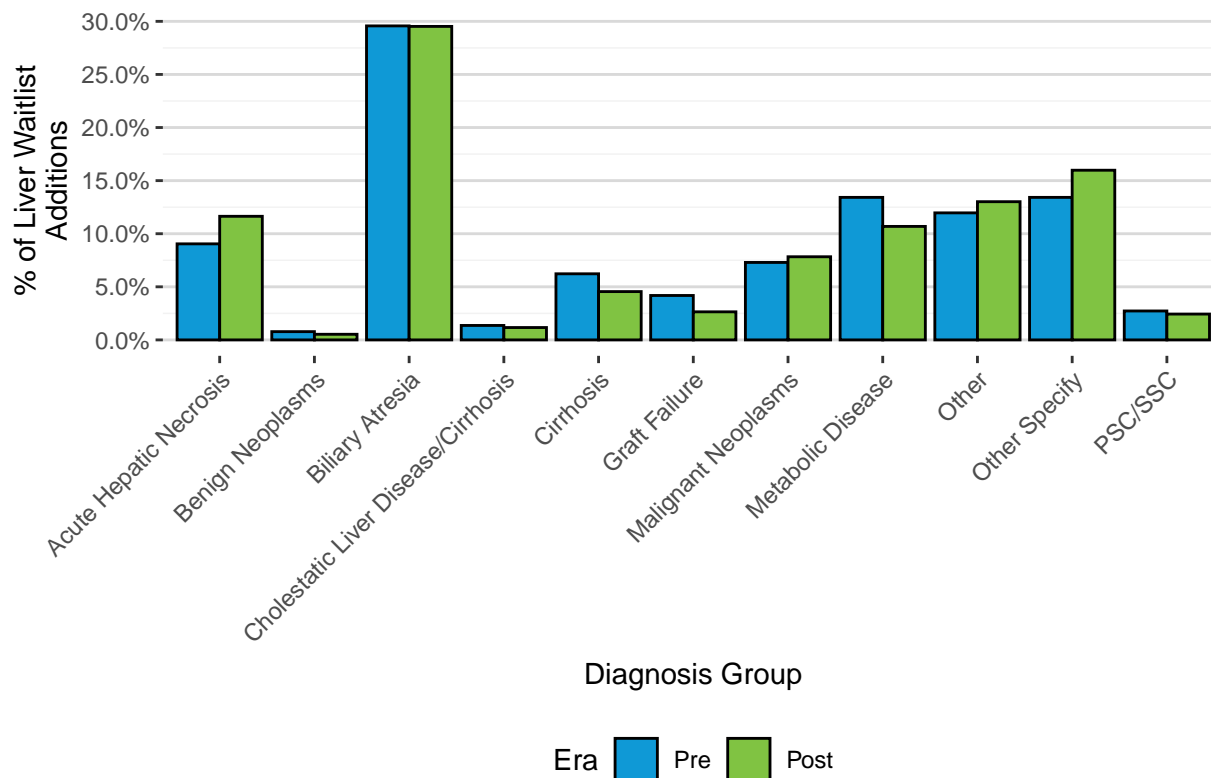
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 6. Number and Percent of Pediatric Registrations Added to Liver Waitlist by MELD or PELD Score or Status at Listing and Era

Score or Status Group	Pre-Policy	Post-Policy
Status 1A/1B	196 (19.1%)	197 (20.8%)
M/P 37+	17 (1.7%)	26 (2.8%)
M/P 33-36	12 (1.2%)	14 (1.5%)
M/P 29-32	27 (2.6%)	25 (2.6%)
M/P 15-28	233 (22.7%)	218 (23.1%)
M/P < 15	515 (50.1%)	444 (47.0%)
Temporarily Inactive	28 (2.7%)	21 (2.2%)
Total	1028 (100.0%)	945 (100.0%)

The distribution of pediatric waitlist additions by diagnosis group was similar pre- and post-policy.

Figure 7. Pediatric Registrations Added to Liver Waitlist by Diagnosis Group and Era



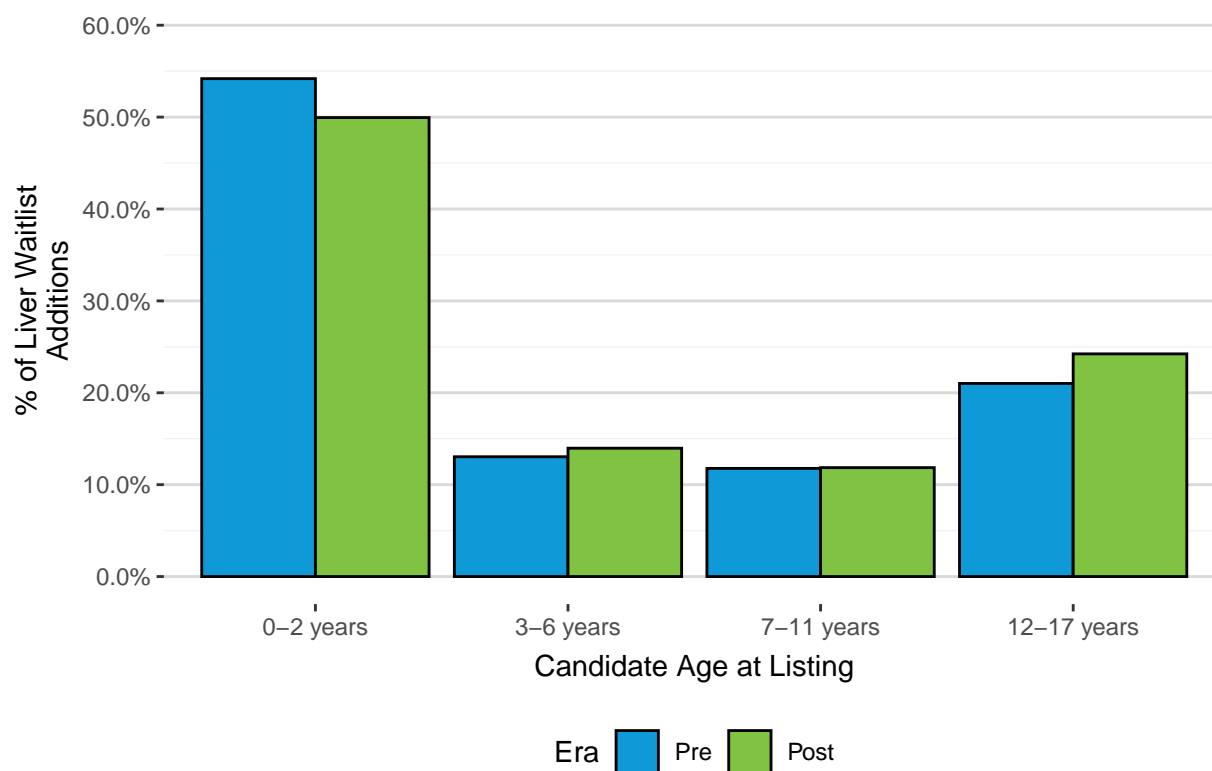
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Table 7. Number and Percent of Pediatric Registrations Added to Liver Waitlist by Diagnosis Group and Era

Diagnosis Group	Pre-Policy	Post-Policy
Acute Hepatic Necrosis	93 (9.0%)	110 (11.6%)
Benign Neoplasms	8 (0.8%)	5 (0.5%)
Biliary Atresia	304 (29.6%)	279 (29.5%)
Cholestatic Liver Disease/Cirrhosis	14 (1.4%)	11 (1.2%)
Cirrhosis	64 (6.2%)	43 (4.6%)
Graft Failure	43 (4.2%)	25 (2.6%)
Malignant Neoplasms	75 (7.3%)	74 (7.8%)
Metabolic Disease	138 (13.4%)	101 (10.7%)
Other	123 (12.0%)	123 (13.0%)
Other Specify	138 (13.4%)	151 (16.0%)
PSC/SSC	28 (2.7%)	23 (2.4%)
Total	1028 (100.0%)	945 (100.0%)

Post-policy, there were fewer candidates 0-2 years old at listing and more candidates 12-17 years old at listing added to the waitlist.

Figure 8. Pediatric Registrations Added to Liver Waitlist by Candidate Age at Listing and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 8. Number and Percent of Pediatric Registrations Added to Liver Waitlist by Candidate Age at Listing and Era

Candidate Age at Listing	Pre-Policy	Post-Policy
0-2 years	557 (54.2%)	472 (49.9%)
3-6 years	134 (13.0%)	132 (14.0%)
7-11 years	121 (11.8%)	112 (11.9%)
12-17 years	216 (21.0%)	229 (24.2%)
Total	1028 (100.0%)	945 (100.0%)

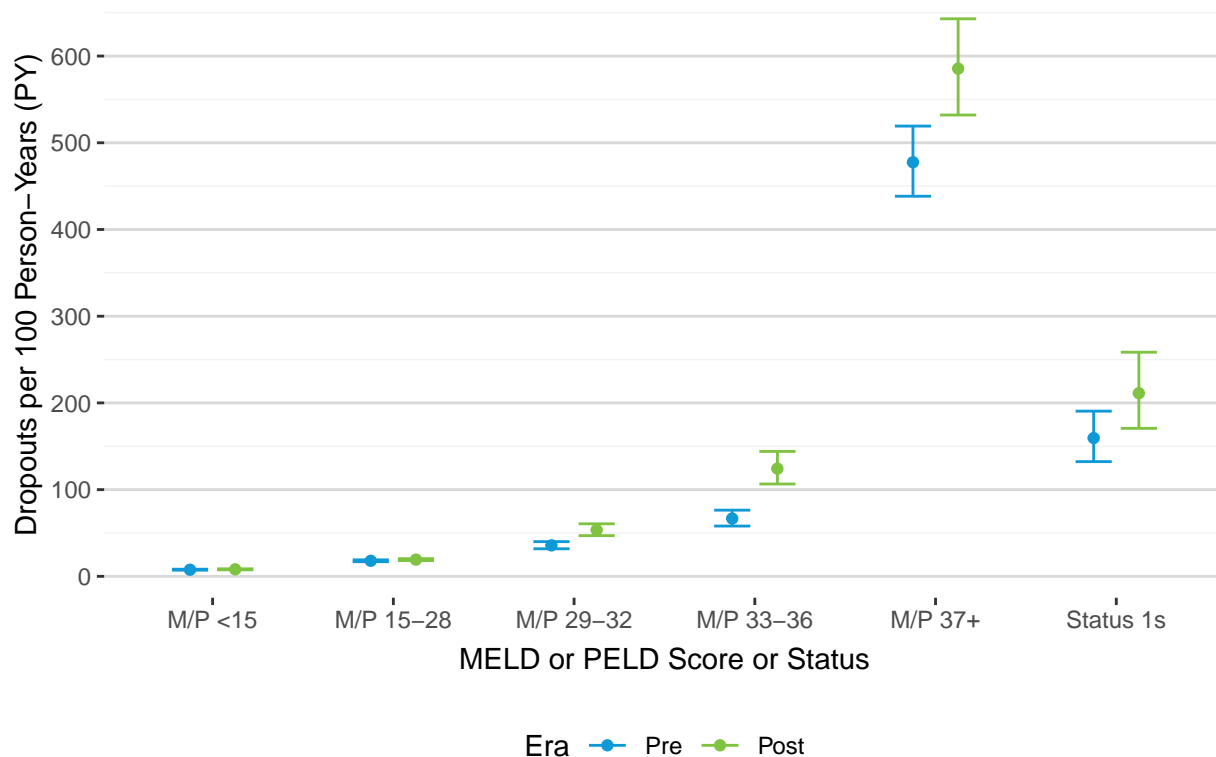
Waitlist Removal Rates

The following section looks at waitlist removal rates by MELD or PELD score or status and various stratifications. Additional waitlist removal rates by candidate ABO, candidate race/ethnicity, and candidate sex are in the **Appendix**.

Changes in the amount of waiting time and number of events for each score group determine changes in rates. In most cases of significant findings, there were similar numbers of events pre- and post-policy but fewer person-years, resulting in significantly different rates. Additional follow-up time is needed for rates to stabilize and reflect policy change. Due to smaller sample sizes for high MELD or PELD score candidates, there is still a lot of variability. Wide confidence intervals indicate small sample sizes.

Rates of removal for death or too sick to transplant significantly increased post-policy for the MELD/PELD 29-32, MELD/PELD 33-36, and MELD/PELD 37+ groups as indicated by non-overlapping confidence intervals and risk ratio confidence intervals >1 , but did not significantly change for all other status groups.

Figure 9. Liver-Alone Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 9. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status and Era

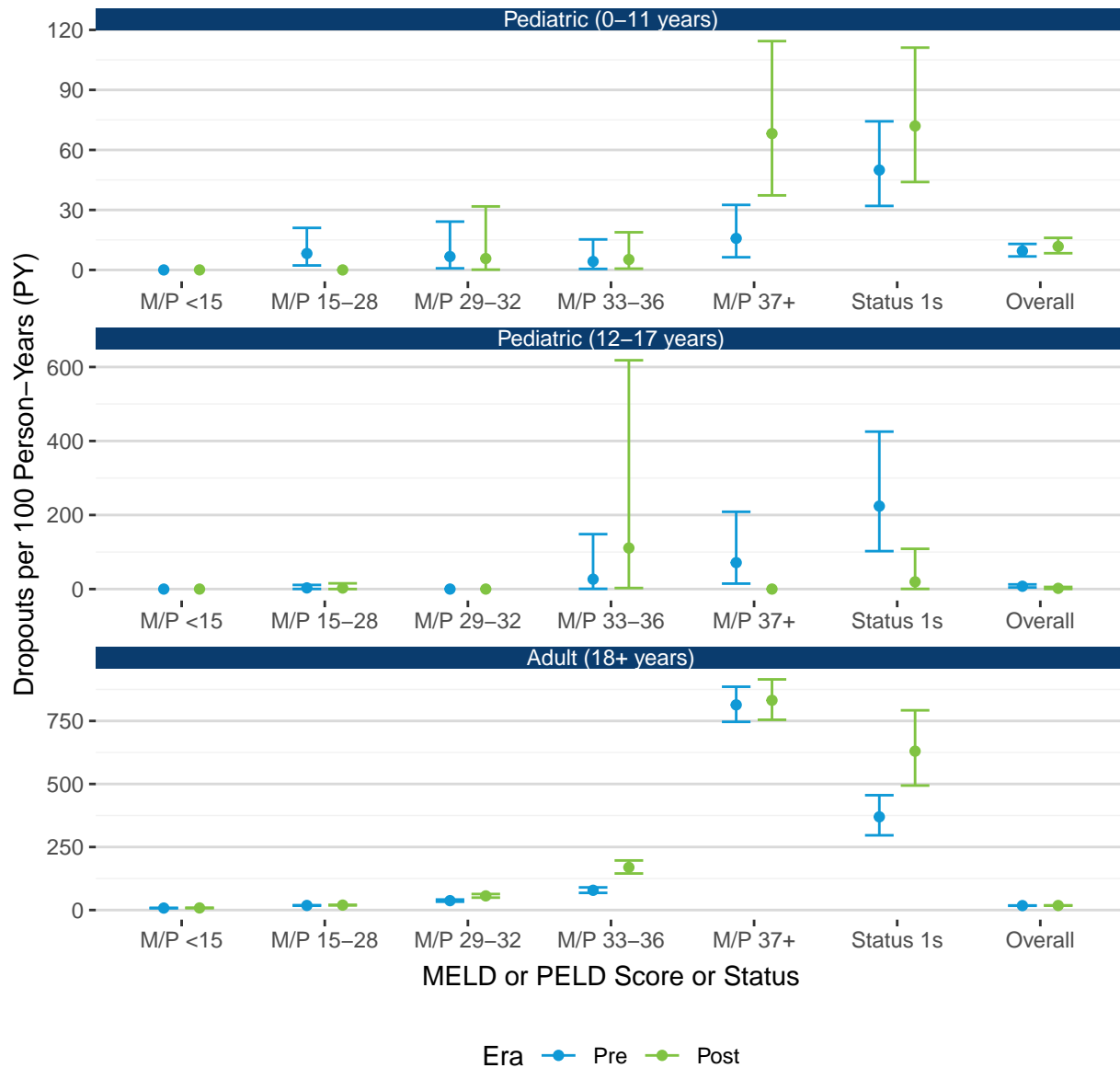
Score or Status Group	Era	Ever Waiting	Death/ Too Sick Events	Person- Years	Dropouts per 100 PY		Risk Ratio (vs. Pre-Policy)	
		N	N	PY	Estimate	95% CI	Estimate	95% CI
M/P <15	Pre	17843	772	10087.9	7.65	7.12, 8.21	Ref.	Ref.
	Post	16453	759	9398.3	8.08	7.51, 8.67	1.06	0.95, 1.17
M/P 15-28	Pre	16726	1088	6070.4	17.92	16.87, 19.02	Ref.	Ref.
	Post	16085	1162	6032.1	19.26	18.17, 20.40	1.07	0.99, 1.17
M/P 29-32	Pre	5656	299	836.8	35.73	31.79, 40.02	Ref.	Ref.
	Post	4465	245	458.4	53.45	46.96, 60.58	1.50	1.26, 1.77
M/P 33-36	Pre	2987	211	316.4	66.69	57.99, 76.32	Ref.	Ref.
	Post	2561	175	140.9	124.22	106.50, 144.05	1.86	1.52, 2.28
M/P 37+	Pre	2658	547	114.6	477.52	438.33, 519.26	Ref.	Ref.
	Post	2593	439	75.0	585.53	532.03, 642.95	1.23	1.08, 1.39
Status 1s	Pre	904	121	75.9	159.45	132.31, 190.52	Ref.	Ref.
	Post	774	94	44.5	211.22	170.68, 258.48	1.32	1.01, 1.73

For pediatric candidates ages 0-11 years at listing, waitlist rates of removal due to death or too sick to transplant increased significantly in the PELD 37 and higher group post-policy. There were no other statistically significant differences in this age group.

There were no statistically significant changes in the pediatric 12-17 year old age group, although there was a notable decrease in the number of death or too sick events post-policy (3 post-policy vs. 15 pre-policy).

In the adult age group, waitlist rates of removal due to death or too sick to transplant increased significantly in the MELD 29-32, MELD 33-36, and Status 1 groups post-policy. In all groups, the number of events for death or too sick and number of person-years decreased post-policy. There were no other statistically significant differences in this age group.

Figure 10. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Age at Listing, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 10. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Age at Listing, and Era

Age at Listing	Score or Status Group	Era	Ever Waiting	Death/ Too Sick Events	Person-Years	Dropouts per 100 PY		
			N	N	PY	Estimate	95% CI	
Pediatric (0-11 years)	M/P <15	Pre	501	0	185.5	0.00	- , -	
		Post	420	0	174.5	0.00	- , -	
	M/P 15-28	Pre	301	4	48.7	8.21	2.24, 21.02	
		Post	256	0	48.2	0.00	- , -	
	M/P 29-32	Pre	209	2	29.9	6.69	0.81, 24.16	
		Post	129	1	17.6	5.70	0.14, 31.75	
	M/P 33-36	Pre	272	2	47.4	4.22	0.51, 15.25	
		Post	244	2	38.4	5.21	0.63, 18.82	
	M/P 37+	Pre	230	7	44.4	15.78	6.34, 32.51	
		Post	121	14	20.5	68.18	37.27, 114.39	
	Status 1s	Pre	330	24	48.1	49.93	31.99, 74.30	
		Post	243	20	27.8	71.96	43.96, 111.14	
	Overall	Pre	964	39	410.3	9.50	6.76, 12.99	
		Post	839	39	332.4	11.73	8.34, 16.04	
	Pediatric (12-17 years)	M/P <15	Pre	164	0	99.2	0.00	- , -
			Post	155	0	89.9	0.00	- , -
M/P 15-28		Pre	158	2	64.8	3.09	0.37, 11.15	
		Post	128	1	36.1	2.77	0.07, 15.44	
M/P 29-32		Pre	58	0	9.0	0.00	- , -	
		Post	39	0	5.6	0.00	- , -	
M/P 33-36		Pre	34	1	3.8	26.62	0.67, 148.33	
		Post	15	1	0.9	110.94	2.81, 618.13	
M/P 37+		Pre	25	3	4.2	71.43	14.73, 208.74	
		Post	13	0	3.4	0.00	- , -	
Status 1s		Pre	55	9	4.0	224.08	102.46, 425.37	
		Post	70	1	5.1	19.51	0.49, 108.69	
Overall		Pre	304	15	196.5	7.63	4.27, 12.59	
		Post	318	3	154.0	1.95	0.40, 5.69	
Adult		M/P <15	Pre	17181	772	9803.3	7.87	7.33, 8.45
			Post	15882	759	9134.3	8.31	7.73, 8.92
	M/P 15-28	Pre	16269	1082	5957.3	18.16	17.10, 19.28	
		Post	15703	1161	5948.3	19.52	18.41, 20.67	

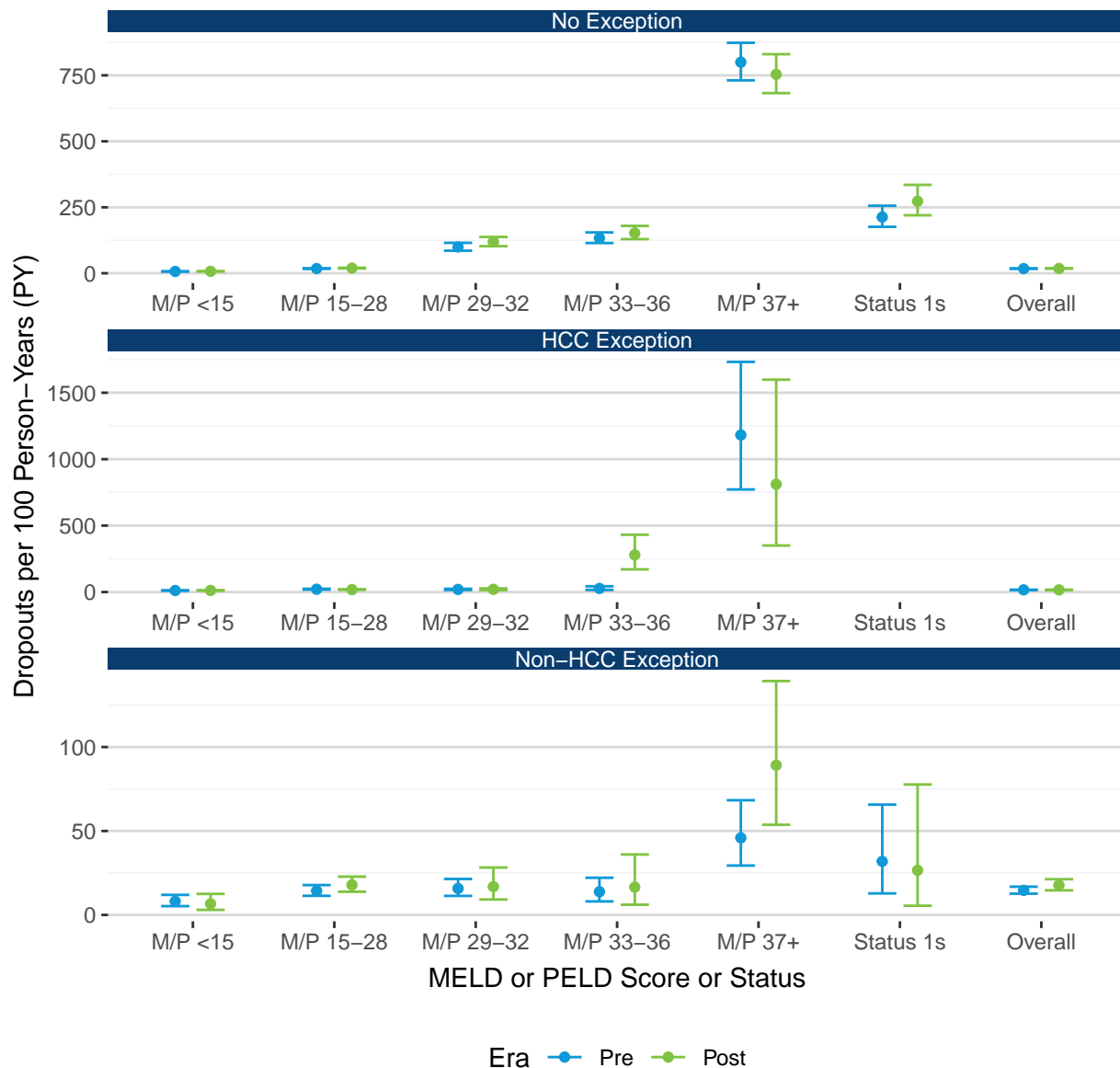
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Age at Listing	Score or Status Group	Era	N	N	PY	Estimate	95% CI
Adult (18+ years)	M/P 29-32	Pre	5389	297	798.0	37.22	33.11, 41.70
		Post	4297	244	435.2	56.06	49.25, 63.55
	M/P 33-36	Pre	2681	208	265.3	78.40	68.11, 89.81
		Post	2302	172	101.6	169.32	144.96, 196.60
	M/P 37+	Pre	2403	537	66.0	813.84	746.45, 885.68
		Post	2459	425	51.1	831.86	754.64, 914.83
	Status 1s	Pre	519	88	23.8	369.66	296.48, 455.43
		Post	461	73	11.6	630.05	493.86, 792.20
	Overall	Pre	27476	3004	17102.6	17.56	16.94, 18.20
		Post	27165	2859	15876.0	18.01	17.35, 18.68

In this section, candidates were placed in the HCC exception group if they ever had an approved liver MELD or PELD exception request for an HCC diagnosis within that policy era. Similarly, candidates were placed in the non-HCC exception group if they ever had an approved liver MELD or PELD exception request for a diagnosis other than HCC in that era. All other candidates were placed in the no exception group.

It is important to note that the National Liver Review Board (NLRB) was implemented on May 14, 2019, so there is a subset of time in the pre-policy period when NLRB was in place prior to acuity-circles (05/14/2019 to 02/03/2020). Non-exception candidates did not experience significant changes in waitlist drop out rates across policy eras. This was also true for non-HCC candidates and most HCC exception candidates. However, HCC exception candidates in the MELD/PELD 33-36 group saw a statistically significant increase in waitlist drop out rates post-policy compared to pre-policy, likely due to the much smaller number of candidates in this group post-policy.

Figure 11. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Exception Status, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 11. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Exception Status, and Era

Exception Status	Score or Status Group	Era	Ever Waiting	Death/ Too Sick Events	Person- Years	Dropouts per 100 PY		
			N	N	PY	Estimate	95% CI	
No Exception	M/P <15	Pre	12395	548	8037.5	6.82	6.26, 7.41	
		Post	11851	558	7653.7	7.29	6.70, 7.92	
	M/P 15-28	Pre	12013	826	4661.6	17.72	16.53, 18.97	
		Post	11942	845	4331.6	19.51	18.21, 20.87	
	M/P 29-32	Pre	3284	179	179.7	99.60	85.54, 115.31	
		Post	3413	186	156.2	119.12	102.61, 137.52	
	M/P 33-36	Pre	2232	177	132.5	133.56	114.61, 154.76	
		Post	2207	149	97.5	152.84	129.28, 179.44	
	M/P 37+	Pre	2284	497	62.1	799.81	731.03, 873.32	
		Post	2387	412	54.7	753.75	682.71, 830.16	
	Status 1s	Pre	774	115	54.0	213.16	175.98, 255.86	
		Post	711	91	33.4	272.84	219.67, 334.98	
	Overall	Pre	21861	2363	13326.3	17.73	17.02, 18.46	
		Post	22484	2268	12533.5	18.10	17.36, 18.86	
HCC Exception	M/P <15	Pre	4136	200	1748.8	11.44	9.91, 13.14	
		Post	3937	194	1613.0	12.03	10.39, 13.84	
	M/P 15-28	Pre	3140	180	850.5	21.16	18.19, 24.49	
		Post	3259	253	1347.8	18.77	16.53, 21.23	
	M/P 29-32	Pre	1441	78	400.0	19.50	15.41, 24.33	
		Post	751	45	219.5	20.50	14.95, 27.43	
	M/P 33-36	Pre	249	17	62.7	27.13	15.80, 43.43	
		Post	94	20	7.2	279.48	170.71, 431.63	
	M/P 37+	Pre	66	26	2.2	1181.82	772.00, 1731.64	
		Post	49	8	1.0	811.11	350.18, 1598.21	
	Overall	Pre	4881	501	3071.3	16.31	14.92, 17.81	
		Post	4751	520	3192.9	16.29	14.92, 17.75	
		M/P <15	Pre	1405	25	308.9	8.09	5.24, 11.95
			Post	723	9	136.3	6.60	3.02, 12.53
M/P 15-28		Pre	1684	82	572.1	14.33	11.40, 17.79	
		Post	968	65	363.0	17.91	13.82, 22.83	
M/P 29-32		Pre	965	41	259.7	15.79	11.33, 21.42	
		Post	307	14	83.2	16.83	9.20, 28.23	

(continued)

Exception Status	Score or Status Group	Era	N	N	PY	Estimate	95% CI
Non-HCC Exception	M/P 33-36	Pre	518	17	123.0	13.83	8.05, 22.14
		Post	266	6	36.3	16.55	6.07, 36.02
	M/P 37+	Pre	322	24	52.3	45.92	29.42, 68.33
		Post	169	19	21.3	89.20	53.70, 139.29
	Status 1s	Pre	141	7	21.9	31.89	12.82, 65.71
		Post	68	3	11.3	26.58	5.48, 77.69
	Overall	Pre	2316	196	1339.8	14.63	12.65, 16.83
		Post	1312	116	653.9	17.74	14.66, 21.28

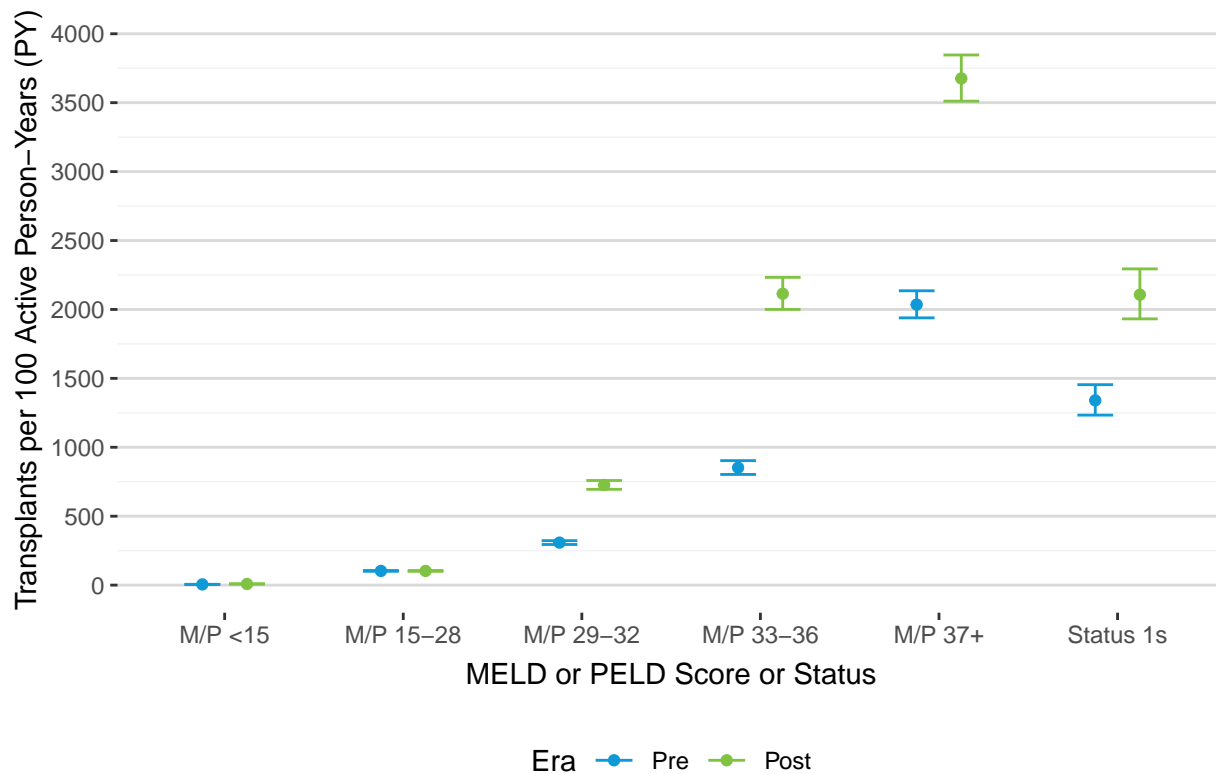
Transplant Rates

The following section looks at transplant rates by MELD or PELD score or status and various stratifications. Additional transplant rates by candidate ABO, candidate race/ethnicity, and candidate sex are in the **Appendix**.

Changes in the amount of waiting time and number of events for each score group determine changes in rates. In most cases of significant findings, there were similar numbers of events pre- and post-policy but fewer person-years, resulting in significantly different rates. Additional follow-up time is needed for rates to stabilize and reflect policy change. Due to smaller sample sizes for high MELD or PELD score candidates, there is still a lot of variability. Wide confidence intervals indicate small sample sizes.

Rates of transplant significantly increased post-policy for the MELD/PELD 29-32, MELD/PELD 33-36, and MELD/PELD 37+, and Status 1 groups, as indicated by non-overlapping confidence intervals and risk ratio confidence intervals >1 , but did not significantly change for the lower MELD/PELD score groups.

Figure 12. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 12. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status and Era

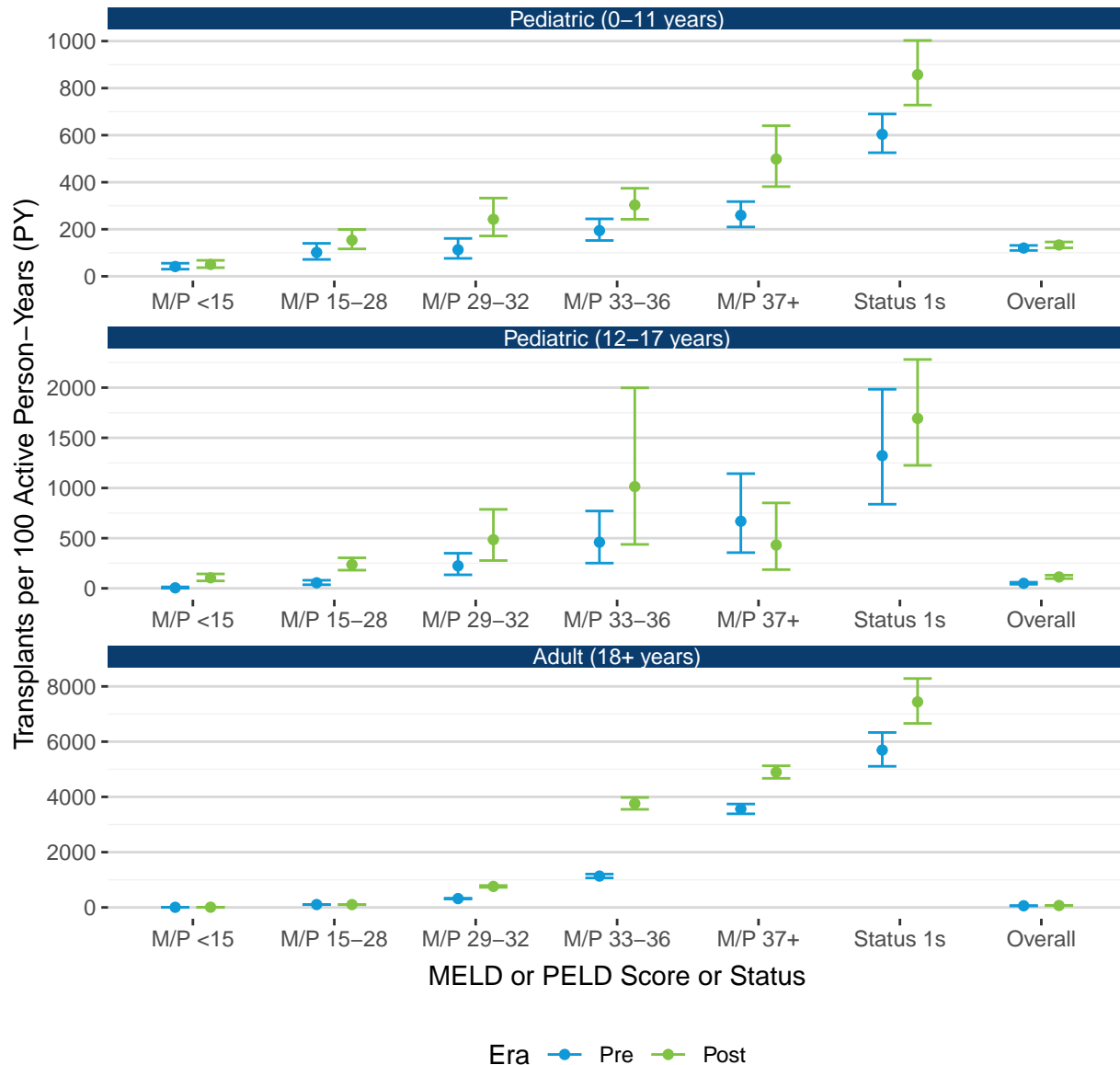
Score or Status Group	Era	Ever Waiting	Transplant Events	Person-Years	Transplants per 100 Active PY		Risk Ratio (vs. Pre-Policy)	
		N	N	PY	Estimate	95% CI	Estimate	95% CI
M/P <15	Pre	16589	431	8136.1	5.30	4.81, 5.82	Ref.	Ref.
	Post	15274	622	7410.3	8.39	7.75, 9.08	1.58	1.40, 1.79
M/P 15-28	Pre	16095	5102	4947.2	103.13	100.32, 106.00	Ref.	Ref.
	Post	15490	4981	4838.6	102.94	100.10, 105.84	1.00	0.96, 1.04
M/P 29-32	Pre	5520	1882	610.2	308.41	294.63, 322.66	Ref.	Ref.
	Post	4311	1998	275.0	726.42	694.92, 758.99	2.36	2.21, 2.51
M/P 33-36	Pre	2860	1128	132.4	852.05	803.05, 903.26	Ref.	Ref.
	Post	2471	1288	60.9	2114.13	2000.24, 2232.82	2.48	2.29, 2.69
M/P 37+	Pre	2626	1670	82.0	2035.36	1938.90, 2135.38	Ref.	Ref.
	Post	2554	1871	50.9	3675.74	3511.05, 3846.15	1.81	1.69, 1.93
Status 1s	Pre	883	579	43.2	1340.36	1233.39, 1454.12	Ref.	Ref.
	Post	755	531	25.2	2107.14	1931.71, 2294.23	1.57	1.40, 1.77

For pediatric candidates ages 0-11 years, transplant rates increased significantly post-policy for the PELD 29-32, PELD 37+, and Status 1 groups. Transplant rates also increased in the PELD 15-28 and PELD 33-36 groups, although these changes were not statistically significant.

Pediatric candidates ages 12-17 years experienced statistically significant increases in transplant rates in the MELD/PELD <15 and MELD/PELD 15-28 groups post-policy compared to pre-policy.

Adult candidates also experienced statistically significant increases in transplant rates in the MELD 29-32, MELD 33-36, MELD 37+, and Status 1 groups post-policy compared to pre-policy.

Figure 13. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Age at Listing, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 13. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Age at Listing, and Era

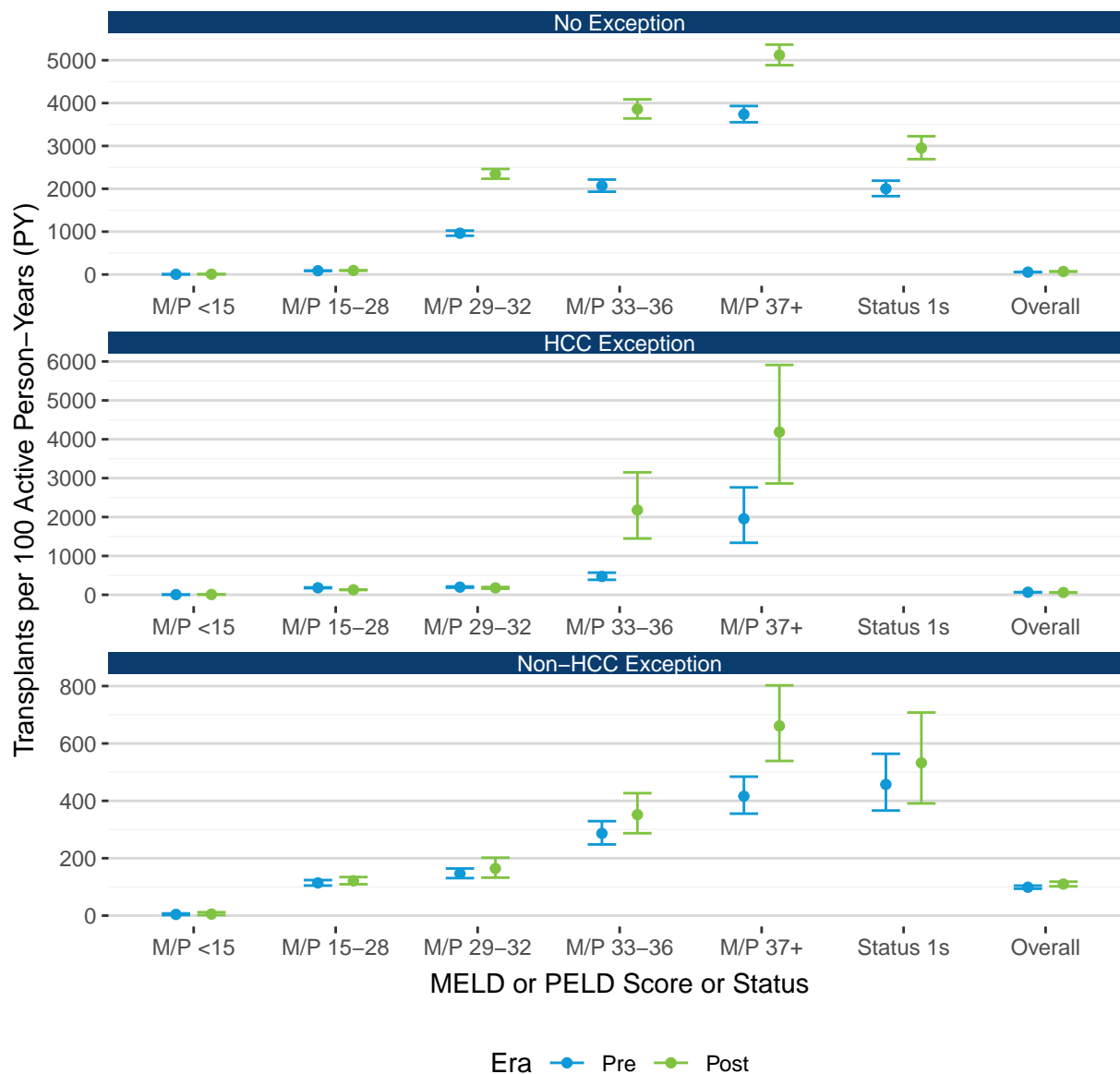
Age at Listing	Score or Status Group	Era	Ever Waiting	Transplant Events	Person-Years	Transplants per 100 Active PY	
			N	N	PY	Estimate	95% CI
Pediatric (0-11 years)	M/P <15	Pre	444	45	108.6	41.44	30.23, 55.46
		Post	381	44	87.3	50.43	36.64, 67.70
	M/P 15-28	Pre	290	37	36.4	101.69	71.60, 140.16
		Post	251	57	37.1	153.60	116.33, 199.01
	M/P 29-32	Pre	206	30	26.6	112.70	76.04, 160.89
		Post	127	38	15.7	242.23	171.42, 332.48
	M/P 33-36	Pre	267	73	37.6	194.13	152.17, 244.10
		Post	240	86	28.4	303.11	242.45, 374.34
	M/P 37+	Pre	229	94	36.2	259.47	209.68, 317.53
		Post	113	61	12.2	498.43	381.26, 640.26
	Status 1s	Pre	324	214	35.5	603.63	525.46, 690.15
		Post	237	156	18.2	857.27	728.02, 1002.85
	Overall	Pre	964	493	410.3	120.15	109.78, 131.24
		Post	839	442	332.4	132.99	120.88, 145.98
Pediatric (12-17 years)	M/P <15	Pre	142	3	61.1	4.91	1.01, 14.34
		Post	129	38	36.3	104.55	73.98, 143.50
	M/P 15-28	Pre	146	26	47.3	54.94	35.89, 80.50
		Post	121	61	25.8	236.66	181.03, 304.00
	M/P 29-32	Pre	58	19	8.5	224.00	134.86, 349.80
		Post	37	16	3.3	484.65	277.02, 787.04
	M/P 33-36	Pre	33	14	3.0	459.53	251.23, 771.02
		Post	15	8	0.8	1013.89	437.73, 1997.77
	M/P 37+	Pre	22	13	1.9	668.31	355.85, 1142.83
		Post	12	8	1.9	431.95	186.49, 851.12
	Status 1s	Pre	54	23	1.7	1322.05	838.06, 1983.72
		Post	70	43	2.5	1693.10	1225.30, 2280.59
	Overall	Pre	304	98	196.5	49.87	40.49, 60.78
		Post	318	174	154.0	112.97	96.81, 131.06
Adult	M/P <15	Pre	16005	383	7966.4	4.81	4.34, 5.31
		Post	14766	539	7286.7	7.40	6.79, 8.05
	M/P 15-28	Pre	15660	5039	4863.7	103.60	100.76, 106.50
		Post	15120	4864	4775.9	101.84	99.00, 104.75
	Pre	5256	1833	575.1	318.71	304.29, 333.64	

(continued)

Age at Listing	Score or Status Group	Era	N	N	PY	Estimate	95% CI
Adult (18+ years)	M/P 29-32	Post	4147	1944	256.1	759.20	725.83, 793.72
		Pre	2560	1041	91.7	1134.77	1066.87, 1205.85
	M/P 33-36	Post	2216	1194	31.8	3759.25	3549.02, 3978.68
		Pre	2375	1563	43.9	3562.25	3387.82, 3743.34
	M/P 37+	Post	2429	1802	36.8	4895.28	4671.84, 5126.64
		Pre	505	342	6.0	5694.80	5107.17, 6331.50
	Status 1s	Post	448	332	4.5	7438.92	6660.17, 8283.72
		Pre	27476	10201	17102.6	59.65	58.49, 60.81
	Overall	Post	27165	10675	15876.0	67.24	65.97, 68.53

Transplant rates in the non-exception group increased significantly in all MELD or PELD score or status groups but the MELD/PELD 15-28 group post-policy compared to pre-policy. In the HCC exception group, transplant rates increased significantly in the MELD/PELD <15, MELD/PELD 33-36, and MELD/PELD 37+ groups but decreased in the MELD/PELD 15-28 group. In the non-HCC exception group, transplant rates increased significantly for the MELD/PELD 37+ group and remained similar in all other groups.

Figure 14. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Exception Status, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 14. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Exception Status, and Era

Exception Status	Score or Status Group	Era	Ever Waiting	Transplant Events	Person-Years	Transplants per 100 Active PY		
			N	N	PY	Estimate	95% CI	
No Exception	M/P <15	Pre	11288	332	6414.7	5.18	4.63, 5.76	
		Post	10835	498	5983.8	8.32	7.61, 9.09	
	M/P 15-28	Pre	11472	3311	3775.3	87.70	84.74, 90.74	
		Post	11405	3218	3445.3	93.40	90.20, 96.69	
	M/P 29-32	Pre	3194	1009	104.8	963.06	904.55, 1024.37	
		Post	3318	1653	70.5	2346.00	2234.26, 2461.89	
	M/P 33-36	Pre	2146	838	40.5	2069.63	1931.85, 2214.63	
		Post	2129	1172	30.4	3858.74	3640.96, 4086.15	
	M/P 37+	Pre	2252	1514	40.5	3738.15	3552.20, 3931.30	
		Post	2351	1778	34.7	5120.08	4884.83, 5363.73	
	Status 1s	Pre	752	484	24.2	2002.49	1828.04, 2189.10	
		Post	692	480	16.3	2949.99	2691.95, 3226.09	
	Overall	Pre	21861	7488	13326.3	56.19	54.92, 57.48	
		Post	22484	8799	12533.5	70.20	68.74, 71.69	
HCC Exception	M/P <15	Pre	4026	72	1483.3	4.85	3.80, 6.11	
		Post	3779	102	1317.6	7.74	6.31, 9.40	
	M/P 15-28	Pre	3073	1250	691.8	180.68	170.80, 190.98	
		Post	3201	1428	1096.0	130.30	123.63, 137.23	
	M/P 29-32	Pre	1414	598	302.3	197.82	182.28, 214.33	
		Post	708	266	149.7	177.64	156.93, 200.32	
	M/P 33-36	Pre	225	107	22.7	471.79	386.65, 570.11	
		Post	87	28	1.3	2179.10	1448.00, 3149.41	
	M/P 37+	Pre	66	32	1.6	1956.45	1338.21, 2761.92	
		Post	48	32	0.8	4186.38	2863.48, 5909.92	
	Overall	Pre	4881	2059	3071.3	67.04	64.18, 70.00	
		Post	4751	1857	3192.9	58.16	55.55, 60.87	
	Status 2s	M/P <15	Pre	1360	10	242.5	4.12	1.98, 7.58
			Post	711	6	111.3	5.39	1.98, 11.73
M/P 15-28		Pre	1652	560	491.3	113.99	104.75, 123.84	
		Post	960	370	304.9	121.34	109.29, 134.36	
M/P 29-32		Pre	946	303	206.5	146.71	130.65, 164.19	
		Post	291	91	55.4	164.39	132.36, 201.83	
Overall		Pre	499	199	69.5	286.53	248.10, 329.22	
		Post	499	199	69.5	286.53	248.10, 329.22	

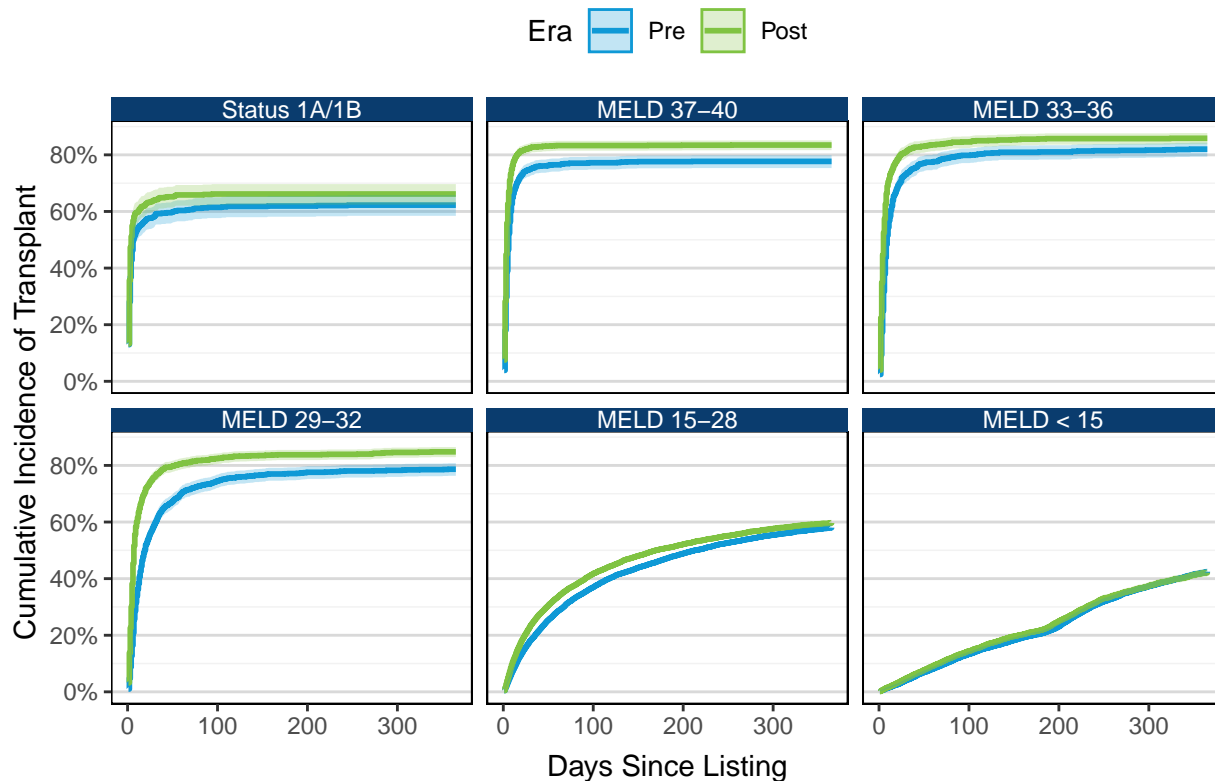
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Exception Status	Score or Status Group	Era	N	N	PY	Estimate	95% CI
Non-HCC Exception	M/P 33-36	Post	260	103	29.3	351.82	287.16, 426.68
		Pre	320	167	40.1	416.13	355.41, 484.25
	M/P 37+	Post	162	102	15.4	661.04	539.00, 802.46
		Pre	141	87	19.0	457.24	366.23, 564.00
	Status 1s	Post	67	47	8.8	532.27	391.09, 707.80
		Pre	2316	1326	1339.8	98.97	93.72, 104.45
	Overall	Post	1312	719	653.9	109.96	102.07, 118.30
		Pre					

Cumulative Incidence

The following figure shows the cumulative incidence of deceased or living donor transplant by MELD or PELD score or status and era. Post-policy, the probability of transplant within 90 days is significantly higher in the MELD 15-28, MELD 29-32, MELD 33-36 and MELD 37-40 groups compared to pre-policy. 90 day estimates are similar pre-policy and post-policy in the Status 1A/1B and MELD <15 groups.

Figure 15. Cumulative Incidence of Transplant for Liver Waitlist Additions by MELD or PELD Score or Status and Era



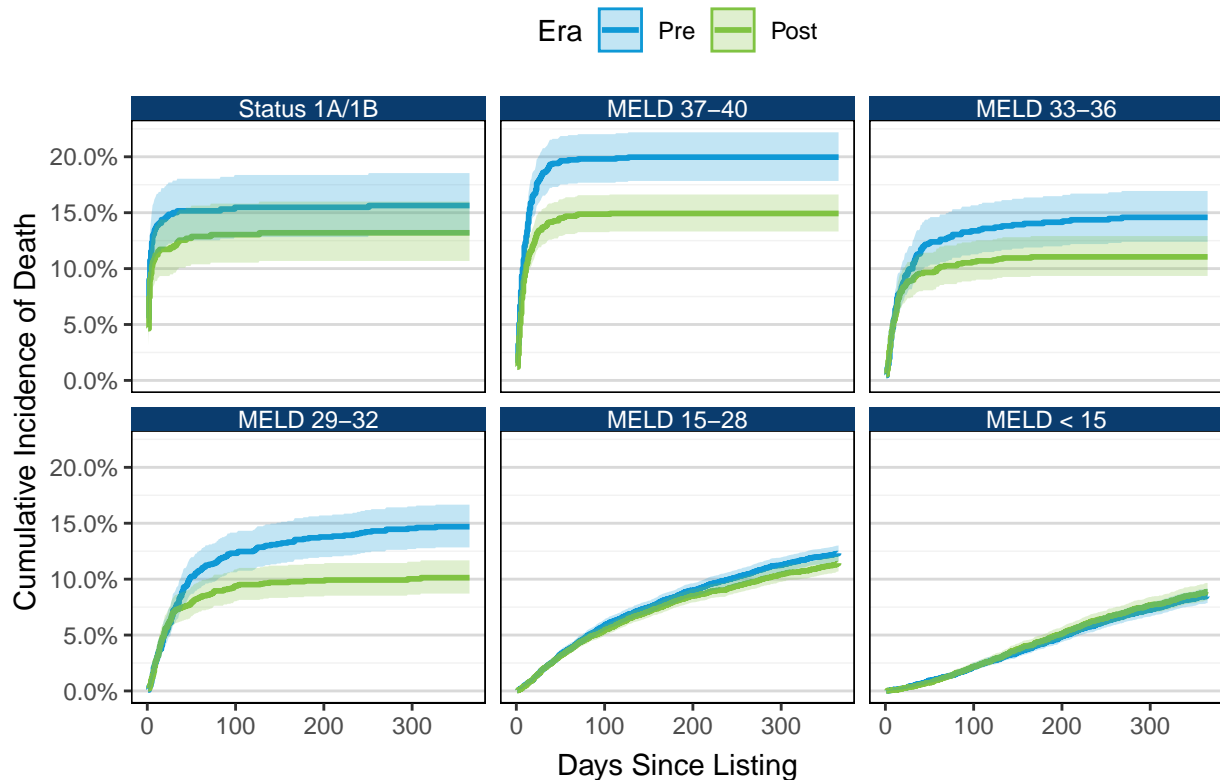
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 15. Cumulative Incidence of Transplant for Liver Waitlist Additions by MELD or PELD Score or Status and Era

Score or Status Group	Era	90 Days		180 Days		365 Days	
		Est	95% CI	Est	95% CI	Est	95% CI
Status 1A/1B	Pre	61.5%	(57.7%, 65.0%)	61.9%	(58.1%, 65.5%)	62.2%	(58.5%, 65.8%)
	Post	66.0%	(62.2%, 69.5%)	66.2%	(62.4%, 69.7%)	66.2%	(62.4%, 69.7%)
MELD 37-40	Pre	77.1%	(74.7%, 79.2%)	77.6%	(75.2%, 79.8%)	77.7%	(75.3%, 79.9%)
	Post	83.3%	(81.5%, 84.9%)	83.4%	(81.5%, 85.0%)	83.5%	(81.7%, 85.1%)
MELD 33-36	Pre	79.7%	(77.0%, 82.2%)	81.0%	(78.4%, 83.4%)	82.0%	(79.4%, 84.3%)
	Post	84.5%	(82.3%, 86.4%)	85.6%	(83.5%, 87.5%)	85.9%	(83.7%, 87.7%)
MELD 29-32	Pre	73.5%	(71.0%, 75.8%)	77.1%	(74.8%, 79.3%)	78.7%	(76.3%, 80.8%)
	Post	82.0%	(80.1%, 83.8%)	83.8%	(81.9%, 85.5%)	84.8%	(82.9%, 86.5%)
MELD 15-28	Pre	35.2%	(34.2%, 36.2%)	47.0%	(45.9%, 48.0%)	58.0%	(56.9%, 59.0%)
	Post	39.8%	(38.8%, 40.9%)	50.8%	(49.7%, 51.8%)	59.7%	(58.5%, 60.8%)
MELD < 15	Pre	12.2%	(11.5%, 13.0%)	20.6%	(19.6%, 21.5%)	42.4%	(41.3%, 43.6%)
	Post	13.3%	(12.5%, 14.2%)	21.9%	(20.8%, 22.9%)	42.1%	(40.7%, 43.4%)

This next figure looks at cumulative incidence of removal for death or too sick by MELD or PELD score or status and era. The 90 day, 180 day, and 365 day probability of removal for death or too sick is significantly lower post-policy compared to pre-policy in the MELD/PELD 37-40 group. In the MELD/PELD 29-32 group, the 180 day and 365 day probability of removal for death or too sick is significantly lower post-policy compared to pre-policy.

Figure 16. Cumulative Incidence of Removal for Death or Too Sick for Liver Waitlist Additions by MELD or PELD Score or Status and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

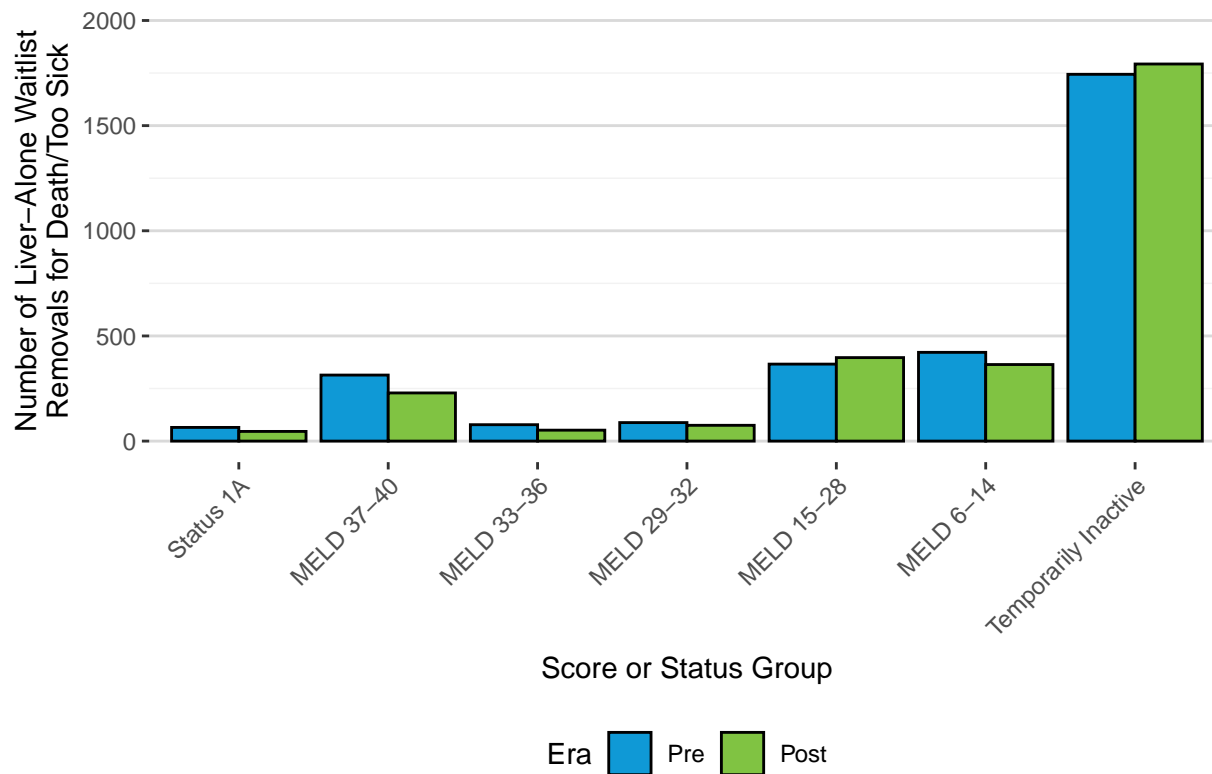
Table 16. Cumulative Incidence of Death for Liver Waitlist Additions by MELD or PELD Score or Status and Era

Score or Status Group	Era	90 Days		180 Days		365 Days	
		Est	95% CI	Est	95% CI	Est	95% CI
Status 1A/1B	Pre	15.3%	(12.7%, 18.2%)	15.5%	(12.8%, 18.4%)	15.6%	(13.0%, 18.5%)
	Post	13.0%	(10.5%, 15.8%)	13.2%	(10.7%, 16.0%)	13.2%	(10.7%, 16.0%)
MELD 37-40	Pre	19.8%	(17.7%, 22.0%)	20.0%	(17.8%, 22.2%)	20.0%	(17.8%, 22.2%)
	Post	14.9%	(13.3%, 16.6%)	14.9%	(13.3%, 16.6%)	14.9%	(13.3%, 16.6%)
MELD 33-36	Pre	13.3%	(11.2%, 15.5%)	14.1%	(12.0%, 16.5%)	14.6%	(12.4%, 16.9%)
	Post	10.5%	(8.9%, 12.3%)	11.0%	(9.3%, 12.9%)	11.0%	(9.3%, 12.9%)
MELD 29-32	Pre	12.1%	(10.4%, 13.9%)	13.6%	(11.8%, 15.5%)	14.7%	(12.8%, 16.7%)
	Post	9.1%	(7.7%, 10.5%)	9.8%	(8.5%, 11.4%)	10.1%	(8.7%, 11.7%)
MELD 15-28	Pre	5.4%	(4.9%, 5.9%)	8.4%	(7.9%, 9.0%)	12.3%	(11.6%, 13.0%)
	Post	5.0%	(4.6%, 5.5%)	8.0%	(7.5%, 8.6%)	11.4%	(10.7%, 12.2%)
MELD < 15	Pre	1.8%	(1.5%, 2.1%)	4.3%	(3.8%, 4.8%)	8.5%	(7.9%, 9.2%)
	Post	1.9%	(1.5%, 2.2%)	4.5%	(4.0%, 5.1%)	8.9%	(8.1%, 9.7%)

Waitlist Removals for Death/Too Sick

Overall, there were fewer adult liver-alone registrations removed for death or too sick to transplant post-policy (2,956) compared to pre-policy (3,077).

Figure 17. Adult Liver-Alone Registrations Removed for Death/Too Sick by MELD Score or Status Group



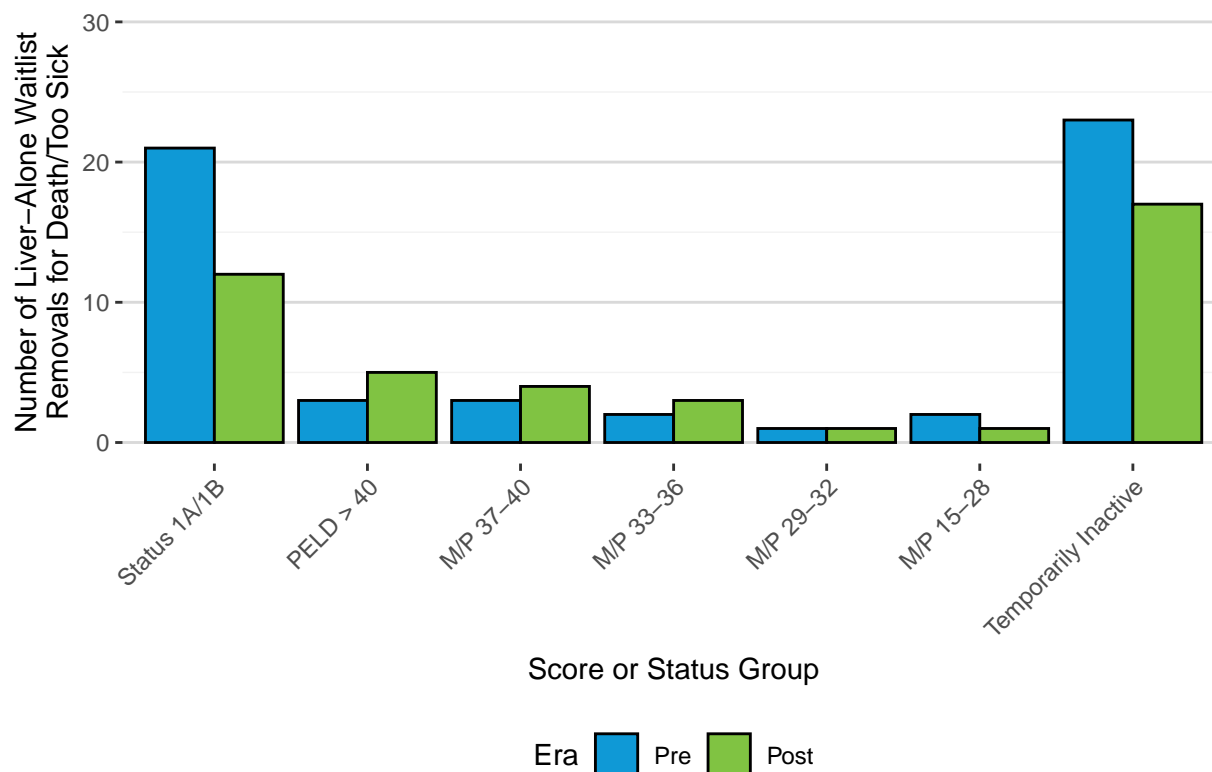
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 17. Adult Liver-Alone Registrations Removed for Death/Too Sick by MELD Score or Status Group

Score or Status Group	Pre-Policy	Post-Policy
Status 1A	65 (2.1%)	46 (1.6%)
MELD 37-40	314 (10.2%)	229 (7.7%)
MELD 33-36	78 (2.5%)	52 (1.8%)
MELD 29-32	88 (2.9%)	75 (2.5%)
MELD 15-28	366 (11.9%)	397 (13.4%)
MELD 6-14	422 (13.7%)	364 (12.3%)
Temporarily Inactive	1744 (56.7%)	1793 (60.7%)
Total	3077 (100.0%)	2956 (100.0%)

There were also fewer pediatric liver-alone registrations removed for death or too sick post-policy (43) compared to pre-policy (55), with a notable decrease in removals for death or too sick in the Status 1A/1B group.

Figure 18. Pediatric Liver-Alone Registrations Removed for Death/Too Sick by MELD or PELD Score or Status Group



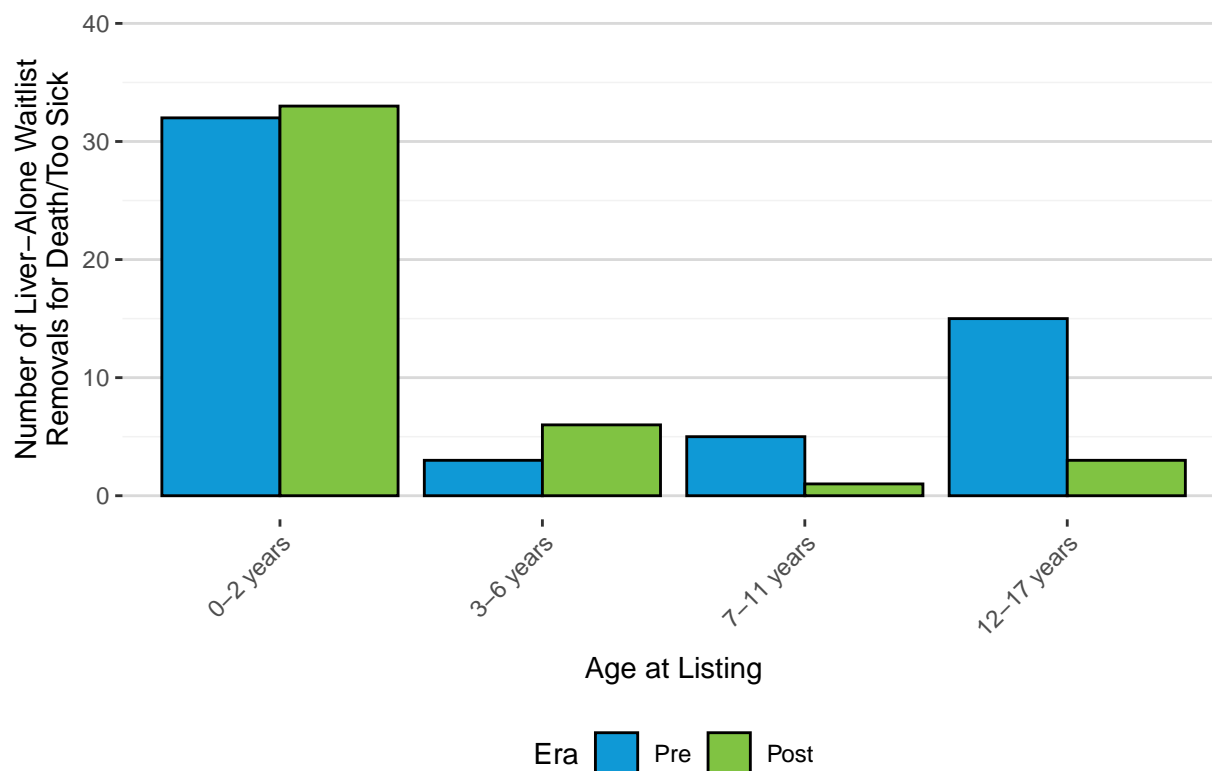
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 18. Pediatric Liver-Alone Registrations Removed for Death/Too Sick by MELD or PELD Score or Status Group

Score or Status Group	Pre-Policy	Post-Policy
Status 1A/1B	21 (38.2%)	12 (27.9%)
PELD > 40	3 (5.5%)	5 (11.6%)
M/P 37-40	3 (5.5%)	4 (9.3%)
M/P 33-36	2 (3.6%)	3 (7.0%)
M/P 29-32	1 (1.8%)	1 (2.3%)
M/P 15-28	2 (3.6%)	1 (2.3%)
Temporarily Inactive	23 (41.8%)	17 (39.5%)
Total	55 (100.0%)	43 (100.0%)

Post-policy, there were a larger number of removals for death or too sick in the younger age groups (0-2 years, 3-6 years) and a fewer number of removals for death or too sick in the older age groups (7-11 years, 12-17 years).

Figure 19. Pediatric Liver-Alone Registrations Removed for Death/Too Sick by Age at Listing



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 19. Pediatric Liver-Alone Registrations Removed for Death/Too Sick by Age at Listing

Age at Listing	Pre-Policy	Post-Policy
0-2 years	32 (58.2%)	33 (76.7%)
3-6 years	3 (5.5%)	6 (14.0%)
7-11 years	5 (9.1%)	1 (2.3%)
12-17 years	15 (27.3%)	3 (7.0%)
Total	55 (100.0%)	43 (100.0%)

Section II. Deceased Donor Liver Transplants

Adult Liver-Alone Transplants

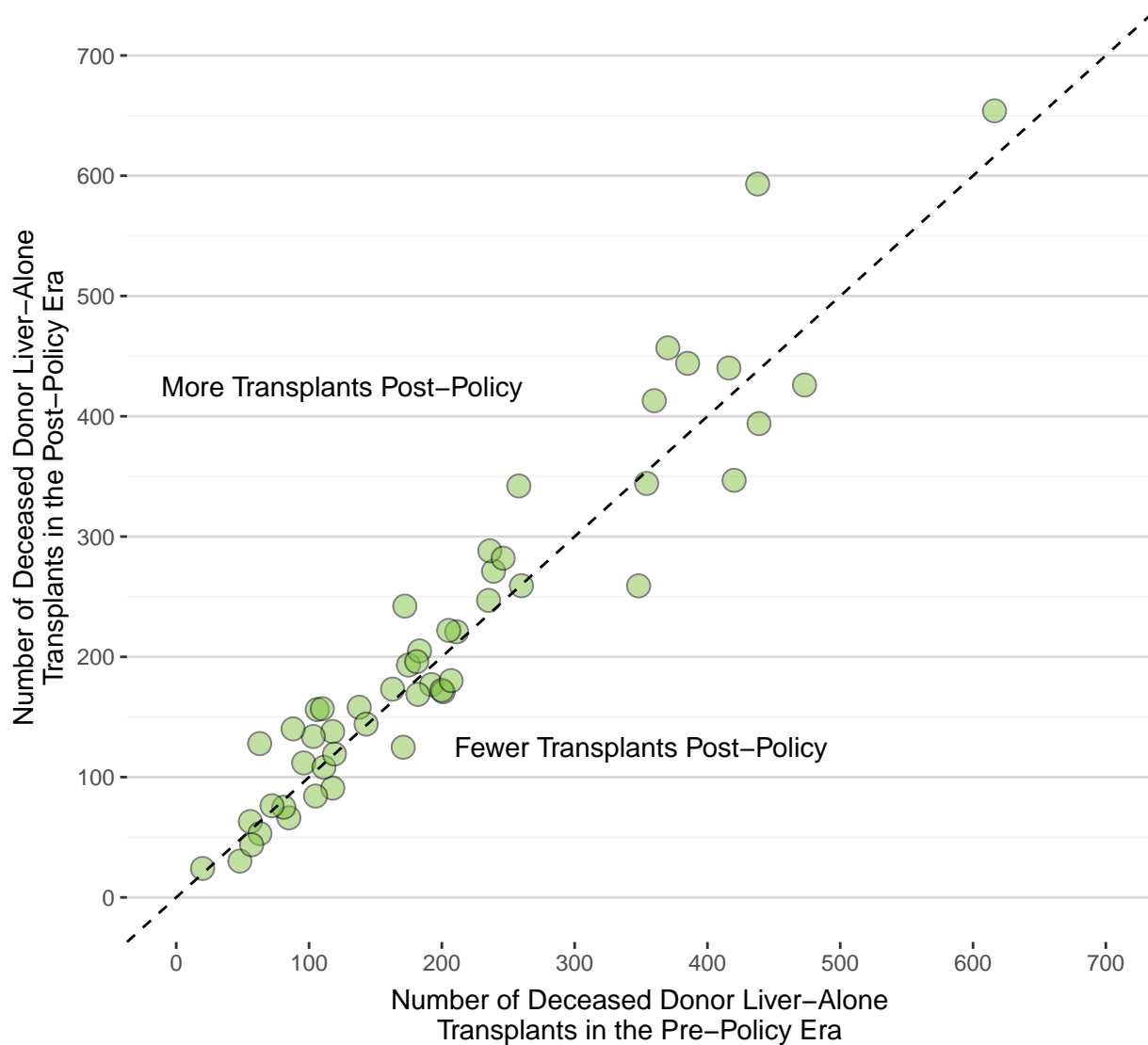
Figure 20. Adult Deceased Donor Liver-Alone Transplants by Transplant Program and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of adult deceased donor liver-alone transplants by program, pre- to post-policy. Points that fall above the diagonal represent programs that performed more deceased donor liver transplants post-policy compared to pre-policy. Points that fall below the diagonal represent programs that performed fewer deceased donor liver transplants post-policy compared to pre-policy.

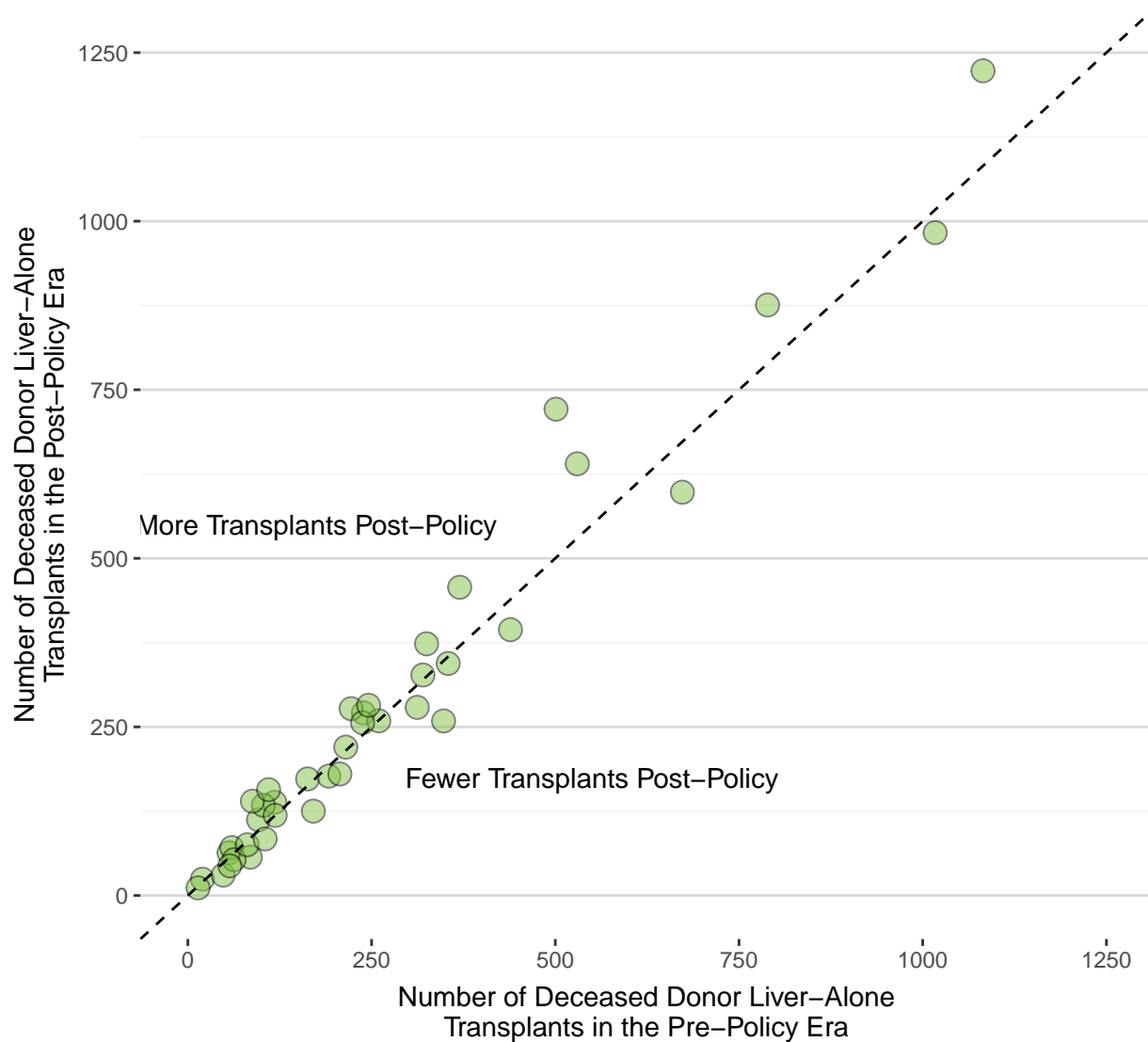
The majority of programs performed similar number of adult deceased donor liver transplants pre-policy compared to post-policy. A Spearman's rank correlation of $\rho = 0.945$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of deceased donor, liver-alone transplants performed per transplant program ($\chi^2_1 = 0.3856$, $p = 0.535$).

Figure 21. Adult Deceased Donor Liver-Alone Transplants by Transplant Program DSA and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of adult deceased donor liver-alone transplants by DSA, pre- to post-policy. Points that fall above the diagonal represent DSAs that performed more deceased donor liver transplants post-policy compared to pre-policy. Points that fall below the diagonal represent DSAs that performed fewer deceased donor liver transplants post-policy compared to pre-policy.

The majority of DSAs had a similar number of deceased donor liver transplants pre- and post-policy. A Spearman's rank correlation of $\rho = 0.958$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of deceased donor, liver-alone transplants performed within each DSA ($\chi^2_1 = 0.1306$, $p = 0.718$).

Figure 22. Adult Deceased Donor Liver-Alone Transplants by State and Era

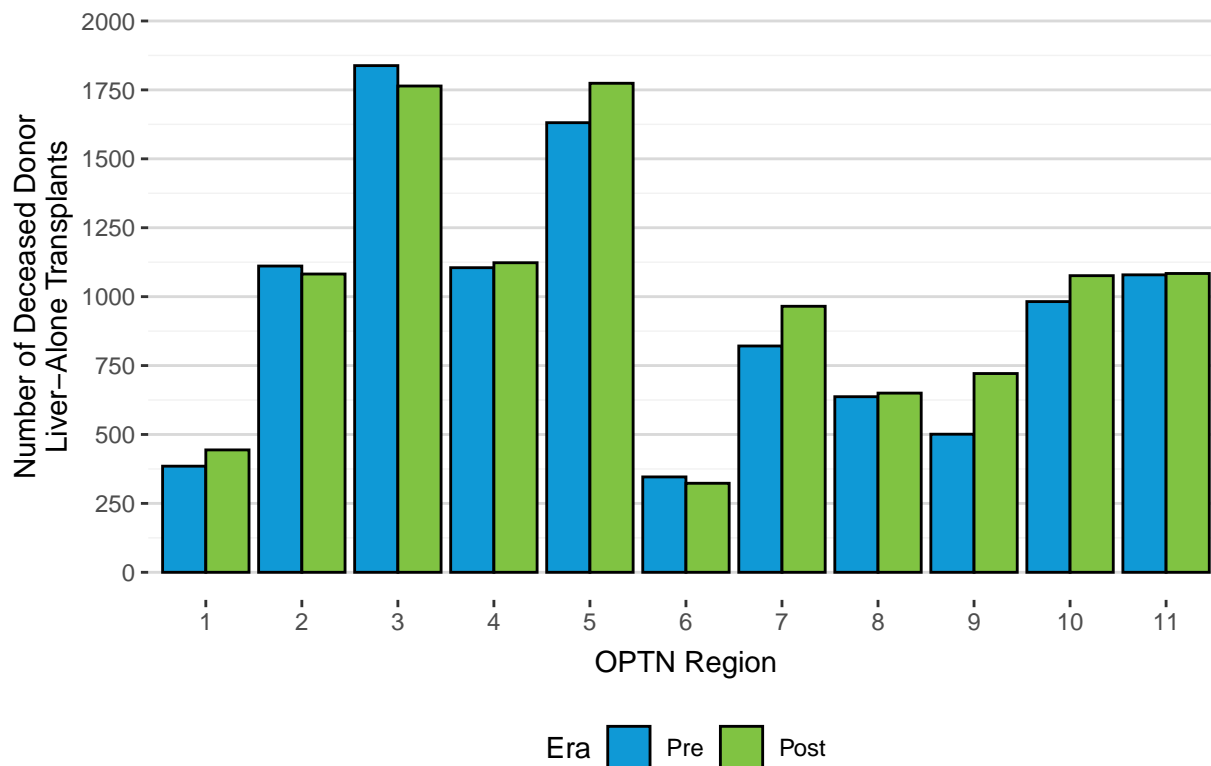
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of adult deceased donor liver-alone transplants by state, pre- to post-policy. Points that fall above the diagonal represent states that performed more deceased donor liver transplants post-policy compared to pre-policy. Points that fall below the diagonal represent states that performed fewer deceased donor liver transplants post-policy compared to pre-policy.

The majority of states had similar number of deceased donor liver transplants post-policy compared to pre-policy. A Spearman's rank correlation of $\rho = 0.978$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of deceased donor, liver-alone transplants performed in each state ($\chi^2_1 = 0.0361$, $p = 0.849$).

Adult transplant recipients are 18 years or older at transplant. There were a greater number of adult deceased donor liver-alone transplants performed post-policy compared to pre-policy (percent change 5.5%). Regions 1, 4, 5, 7, 8, 9, 10, and 11 experienced increases in the number of adult transplants. Regions 2, 3, and 6 experienced a decrease.

Figure 23. Adult Deceased Donor Liver-Alone Transplants by OPTN Region and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

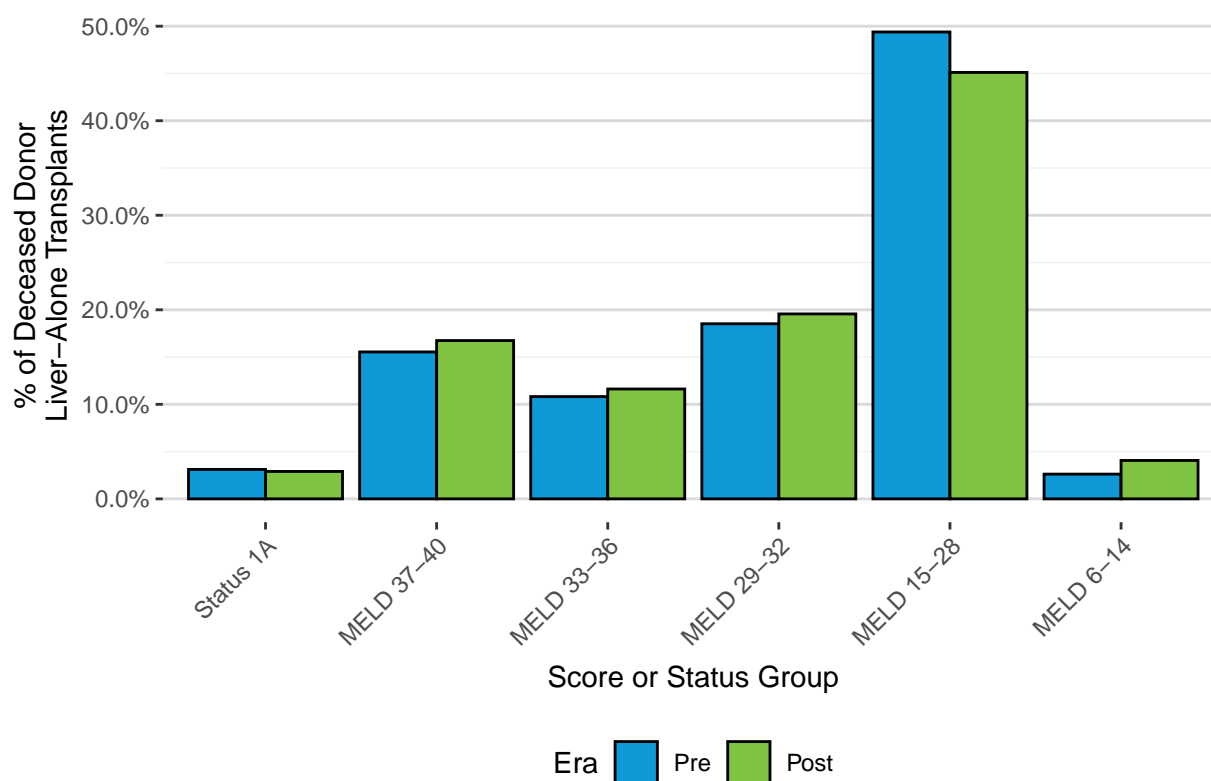
Table 20. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by OPTN Region and Era

OPTN Region	Pre-Policy	Post-Policy
1	385 (3.7%)	444 (4.0%)
2	1111 (10.6%)	1082 (9.8%)
3	1838 (17.6%)	1764 (16.0%)
4	1105 (10.6%)	1123 (10.2%)
5	1631 (15.6%)	1774 (16.1%)
6	346 (3.3%)	323 (2.9%)
7	821 (7.9%)	965 (8.8%)
8	637 (6.1%)	650 (5.9%)
9	501 (4.8%)	721 (6.6%)
10	982 (9.4%)	1076 (9.8%)
11	1079 (10.3%)	1084 (9.8%)
Total	10436 (100.0%)	11006 (100.0%)

Similar percentages of transplants occurred within each score group pre- and post policy, with a slight decrease in the proportion of transplant recipients with MELD scores of 15-28. The national median allocation MELD score at transplant was 28 pre-policy and 28 overall post-policy.

Changes in recipient score at transplant were variable across the country. This is illustrated by OPTN Region in the **Appendix**; however, these changes may be even more variable when considered at smaller units such as DSAs, states, or transplant programs due to smaller sample sizes and the differential impact of COVID-19 across the country.

Figure 24. Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status and Era



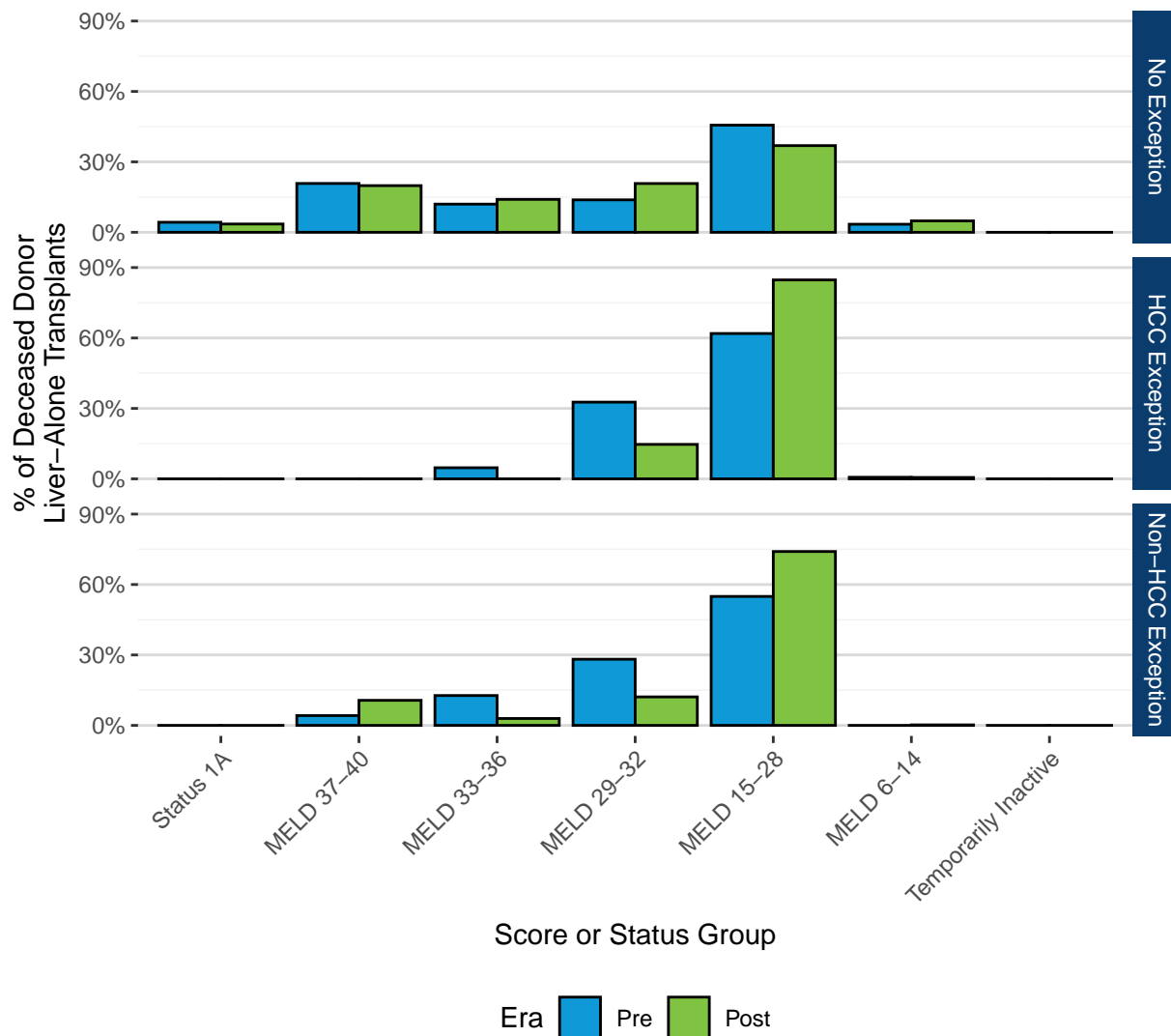
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 21. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status and Era

Score or Status Group	Pre-Policy	Post-Policy
Status 1A	325 (3.1%)	319 (2.9%)
MELD 37-40	1622 (15.5%)	1843 (16.7%)
MELD 33-36	1129 (10.8%)	1279 (11.6%)
MELD 29-32	1933 (18.5%)	2153 (19.6%)
MELD 15-28	5154 (49.4%)	4965 (45.1%)
MELD 6-14	273 (2.6%)	447 (4.1%)
Total	10436 (100.0%)	11006 (100.0%)

The distributions of allocation MELD scores or status at transplant by exception status for adult recipients show changes in distributions, particularly for HCC and non-HCC exception recipients. The large majority of both HCC and non-HCC exception transplant recipients have MELD scores of 15-28 post-policy. There has been an increase in non-HCC exception recipients with high MELD scores of 37-40, and fewer with scores of 29-36. Non-exception transplant recipients were fairly similar pre- versus post-policy.

Figure 25. Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status, Exception Status, and Era



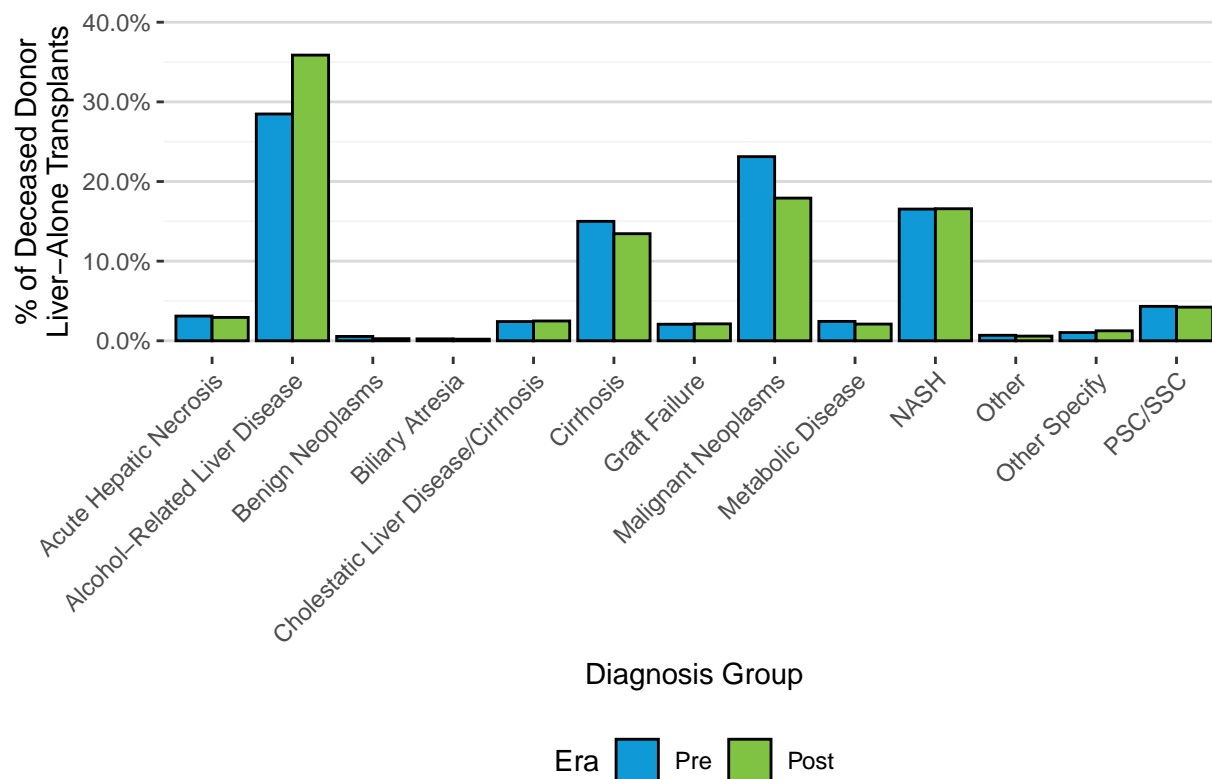
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 22. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status, Exception Status, and Era

Exception Type	Score or Status Group	Pre-Policy	Post-Policy
No Exception	Status 1A	325 (4.3%)	319 (3.5%)
	MELD 37-40	1578 (20.8%)	1792 (19.9%)
	MELD 33-36	910 (12.0%)	1265 (14.0%)
	MELD 29-32	1049 (13.8%)	1873 (20.8%)
	MELD 15-28	3463 (45.6%)	3329 (36.9%)
	MELD 6-14	261 (3.4%)	437 (4.8%)
	Temporarily Inactive	0 (0.0%)	0 (0.0%)
	Total	7586 (100.0%)	9015 (100.0%)
HCC Exception	Status 1A	0 (0.0%)	0 (0.0%)
	MELD 37-40	0 (0.0%)	0 (0.0%)
	MELD 33-36	85 (4.7%)	0 (0.0%)
	MELD 29-32	587 (32.7%)	222 (14.7%)
	MELD 15-28	1112 (61.9%)	1282 (84.7%)
	MELD 6-14	12 (0.7%)	9 (0.6%)
	Temporarily Inactive	0 (0.0%)	0 (0.0%)
	Total	1796 (100.0%)	1513 (100.0%)
Non-HCC Exception	Status 1A	0 (0.0%)	0 (0.0%)
	MELD 37-40	44 (4.2%)	51 (10.7%)
	MELD 33-36	134 (12.7%)	14 (2.9%)
	MELD 29-32	297 (28.2%)	58 (12.1%)
	MELD 15-28	579 (54.9%)	354 (74.1%)
	MELD 6-14	0 (0.0%)	1 (0.2%)
	Temporarily Inactive	0 (0.0%)	0 (0.0%)
	Total	1054 (100.0%)	478 (100.0%)

Consistent with the larger proportion of adult waitlist additions listed with an alcohol-related liver disease, there was a larger proportion of transplant recipients with an alcohol-related liver disease post-policy compared to pre-policy.

Figure 26. Adult Deceased Donor Liver-Alone Transplants by Diagnosis and Era



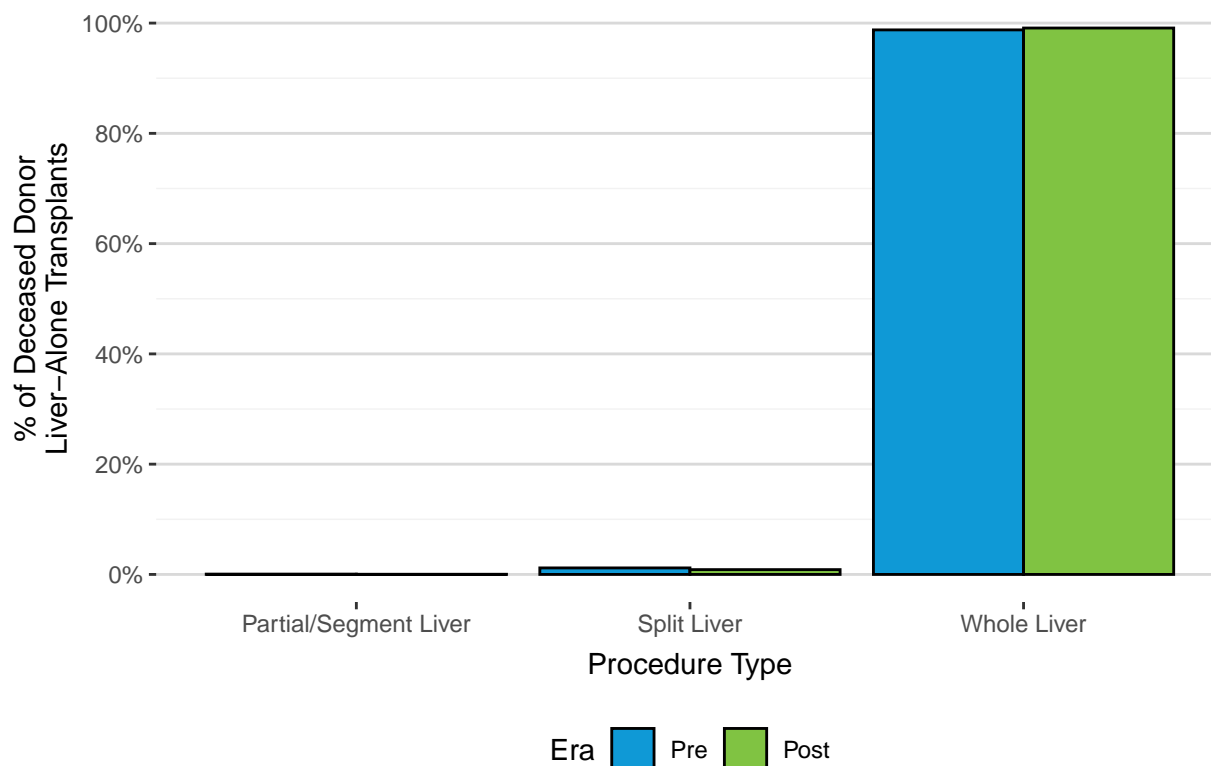
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 23. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Diagnosis and Era

Diagnosis Group	Pre-Policy	Post-Policy
Acute Hepatic Necrosis	324 (3.1%)	323 (2.9%)
Alcohol-Related Liver Disease	2972 (28.5%)	3948 (35.9%)
Benign Neoplasms	57 (0.5%)	29 (0.3%)
Biliary Atresia	25 (0.2%)	22 (0.2%)
Cholestatic Liver Disease/Cirrhosis	252 (2.4%)	274 (2.5%)
Cirrhosis	1565 (15.0%)	1480 (13.4%)
Graft Failure	217 (2.1%)	234 (2.1%)
Malignant Neoplasms	2413 (23.1%)	1972 (17.9%)
Metabolic Disease	254 (2.4%)	231 (2.1%)
NASH	1726 (16.5%)	1825 (16.6%)
Other	72 (0.7%)	65 (0.6%)
Other Specify	108 (1.0%)	138 (1.3%)
PSC/SSC	451 (4.3%)	465 (4.2%)
Total	10436 (100.0%)	11006 (100.0%)

A split liver transplant is defined as two transplants occurring from the same donor. Nearly all (99%) of transplant recipients received a whole liver transplant pre- and post-policy. There were 123 split liver transplants pre-policy and 96 post-policy.

Figure 27. Adult Deceased Donor Liver-Alone Transplants by Procedure Type and Era



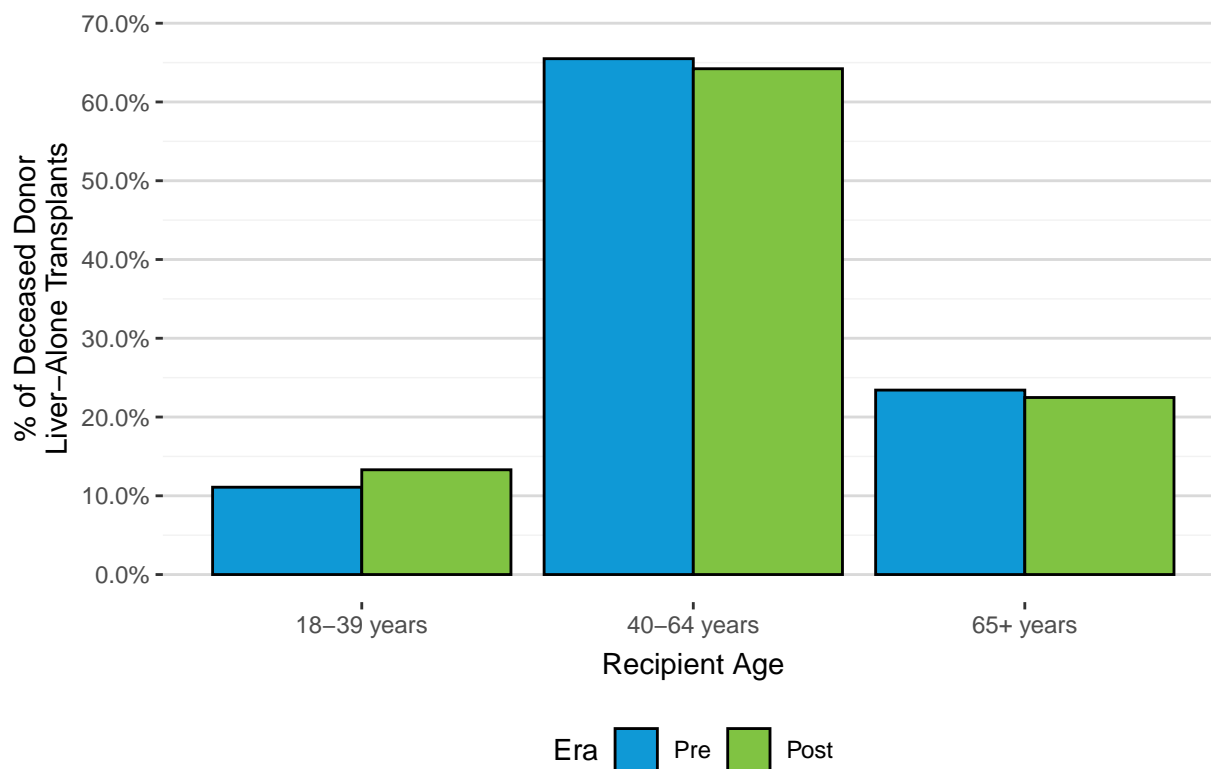
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 24. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Procedure Type and Era

Procedure Type	Pre-Policy	Post-Policy
Partial/Segment Liver	6 (0.1%)	3 (0.0%)
Split Liver	123 (1.2%)	96 (0.9%)
Whole Liver	10307 (98.8%)	10907 (99.1%)
Total	10436 (100.0%)	11006 (100.0%)

There was a slight increase in the proportion of transplant recipients in the 18-39 years age group post-policy, however age distributions remained relatively constant between policy eras.

Figure 28. Adult Deceased Donor Liver-Alone Transplants by Recipient Age and Era



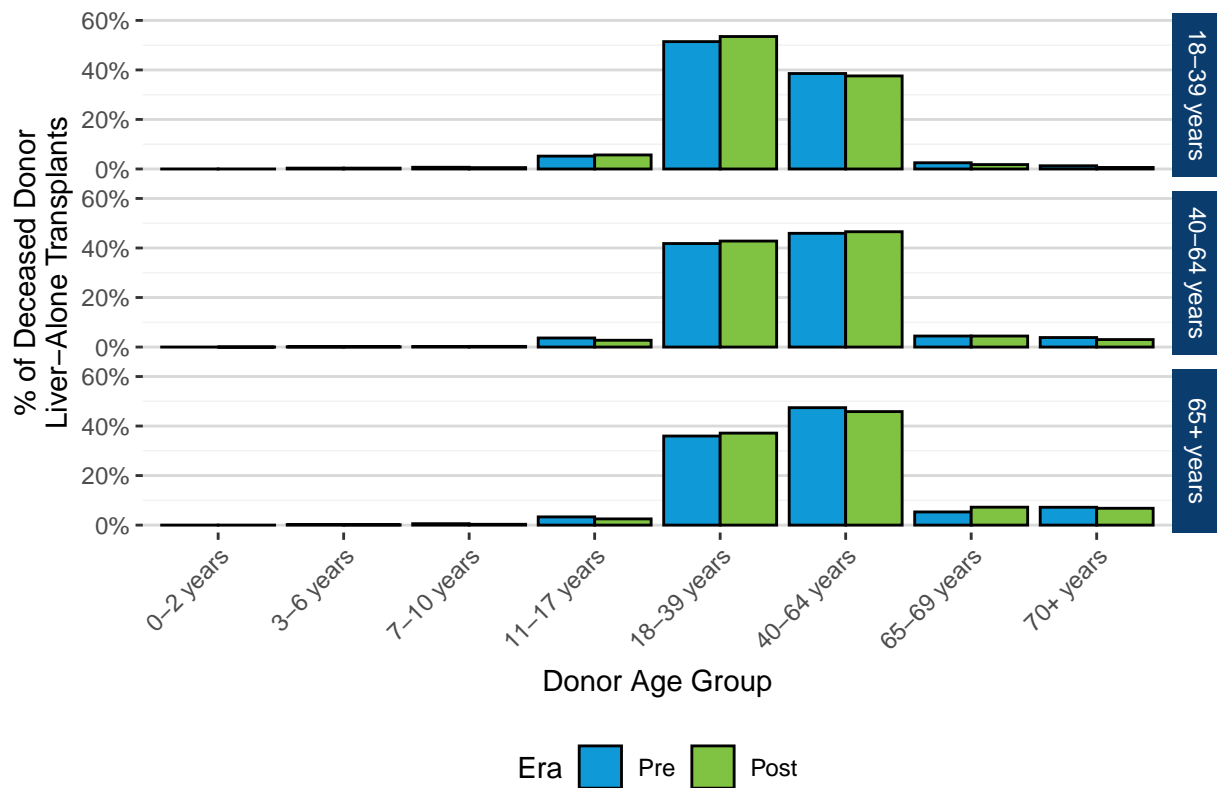
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 25. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Age and Era

Recipient Age	Pre-Policy	Post-Policy
18-39 years	1157 (11.1%)	1464 (13.3%)
40-64 years	6835 (65.5%)	7068 (64.2%)
65+ years	2444 (23.4%)	2474 (22.5%)
Total	10436 (100.0%)	11006 (100.0%)

The donor age distributions of adult deceased donor liver-alone transplants remained fairly similar pre- to post-policy. Rarely did an adult transplant recipient receive a liver from a pediatric donor.

Figure 29. Adult Deceased Donor Liver-Alone Transplants by Recipient Age, Donor Age, and Era



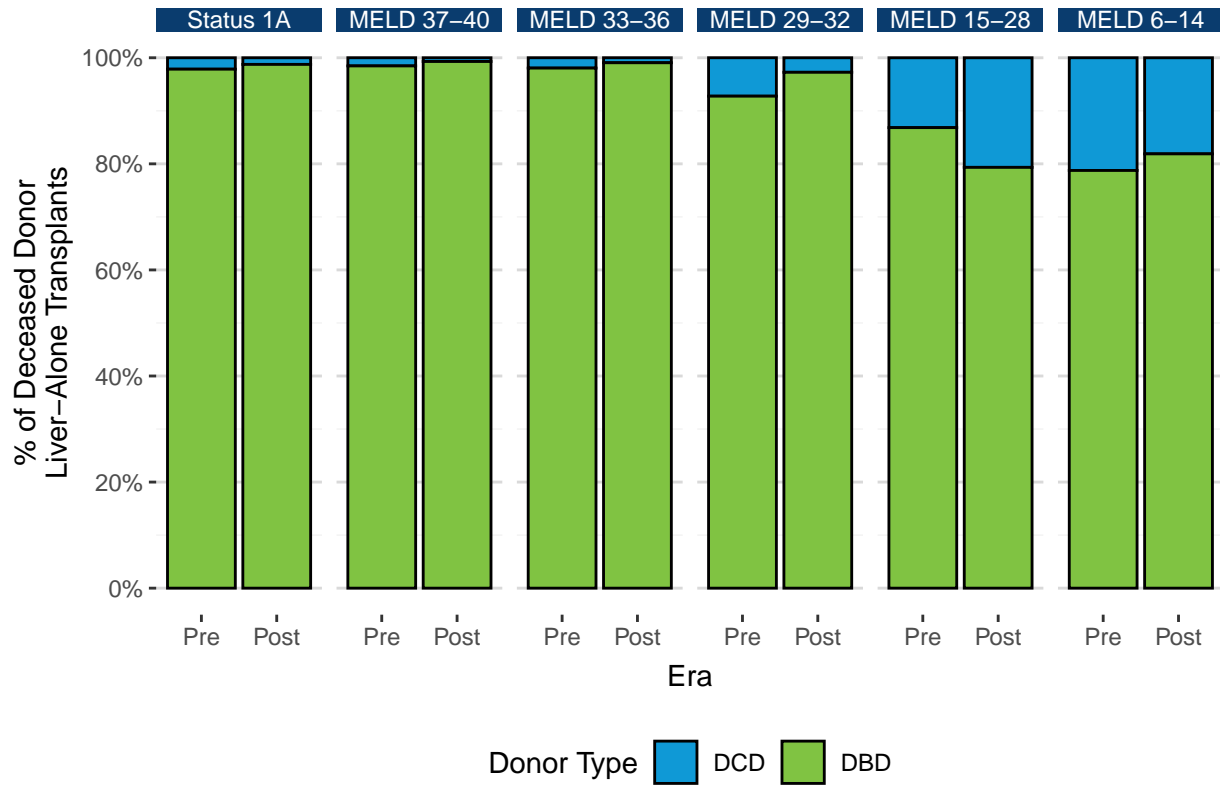
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 26. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Age, Donor Age, and Era

Recipient Age	Donor Age	Pre-Policy	Post-Policy
18-39 years	0-2 years	0 (0.0%)	0 (0.0%)
	3-6 years	4 (0.3%)	5 (0.3%)
	7-10 years	8 (0.7%)	8 (0.5%)
	11-17 years	60 (5.2%)	83 (5.7%)
	18-39 years	595 (51.4%)	783 (53.5%)
	40-64 years	446 (38.5%)	550 (37.6%)
	65-69 years	29 (2.5%)	26 (1.8%)
	70+ years	15 (1.3%)	9 (0.6%)
	Total	1157 (100.0%)	1464 (100.0%)
40-64 years	0-2 years	0 (0.0%)	1 (0.0%)
	3-6 years	7 (0.1%)	9 (0.1%)
	7-10 years	15 (0.2%)	19 (0.3%)
	11-17 years	250 (3.7%)	194 (2.7%)
	18-39 years	2857 (41.8%)	3025 (42.8%)
	40-64 years	3139 (45.9%)	3292 (46.6%)
	65-69 years	304 (4.4%)	314 (4.4%)
	70+ years	263 (3.8%)	214 (3.0%)
	Total	6835 (100.0%)	7068 (100.0%)
65+ years	0-2 years	0 (0.0%)	0 (0.0%)
	3-6 years	5 (0.2%)	4 (0.2%)
	7-10 years	14 (0.6%)	8 (0.3%)
	11-17 years	81 (3.3%)	62 (2.5%)
	18-39 years	879 (36.0%)	919 (37.1%)
	40-64 years	1159 (47.4%)	1134 (45.8%)
	65-69 years	130 (5.3%)	179 (7.2%)
	70+ years	176 (7.2%)	168 (6.8%)
	Total	2444 (100.0%)	2474 (100.0%)

There were 931 DCD transplants pre-policy and 1,195 DCD transplants post-policy. The majority of DCD transplants occurred for recipients with MELD scores of 28 or lower.

Figure 30. Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status, Donor Type, and Era



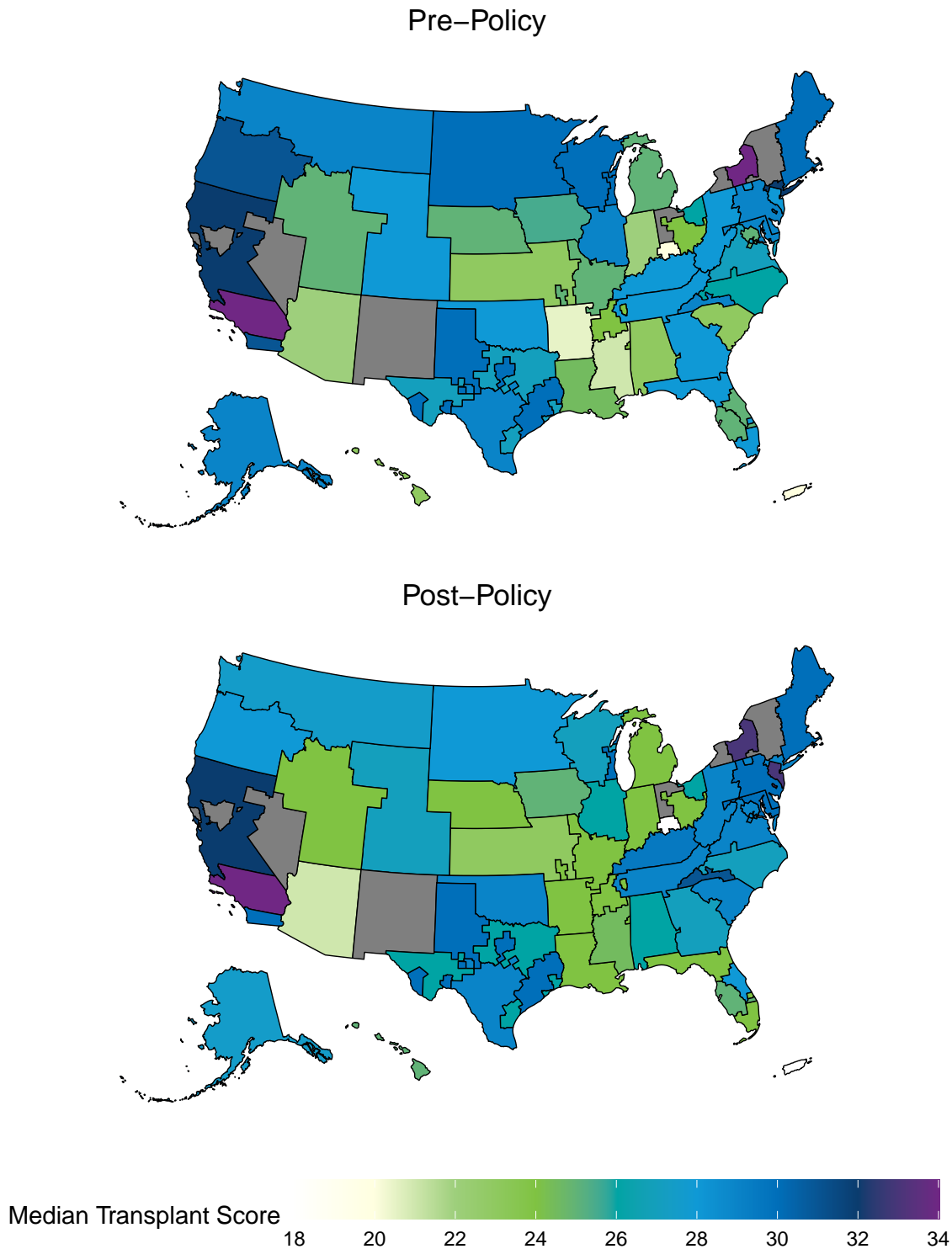
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 - 02/03/2020; Post-Policy: 02/04/2020 - 08/03/2021.

Table 27. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status, Donor Type, and Era

Score or Status Group	Donor Type	Pre-Policy	Post-Policy
Status 1A	DCD	7 (2.2%)	4 (1.3%)
	DBD	318 (97.8%)	315 (98.7%)
	Total	325 (100.0%)	319 (100.0%)
MELD 37-40	DCD	25 (1.5%)	13 (0.7%)
	DBD	1597 (98.5%)	1830 (99.3%)
	Total	1622 (100.0%)	1843 (100.0%)
MELD 33-36	DCD	22 (1.9%)	12 (0.9%)
	DBD	1107 (98.1%)	1267 (99.1%)
	Total	1129 (100.0%)	1279 (100.0%)
MELD 29-32	DCD	140 (7.2%)	59 (2.7%)
	DBD	1793 (92.8%)	2094 (97.3%)
	Total	1933 (100.0%)	2153 (100.0%)
MELD 15-28	DCD	679 (13.2%)	1026 (20.7%)
	DBD	4475 (86.8%)	3939 (79.3%)
	Total	5154 (100.0%)	4965 (100.0%)
MELD 6-14	DCD	58 (21.2%)	81 (18.1%)
	DBD	215 (78.8%)	366 (81.9%)
	Total	273 (100.0%)	447 (100.0%)

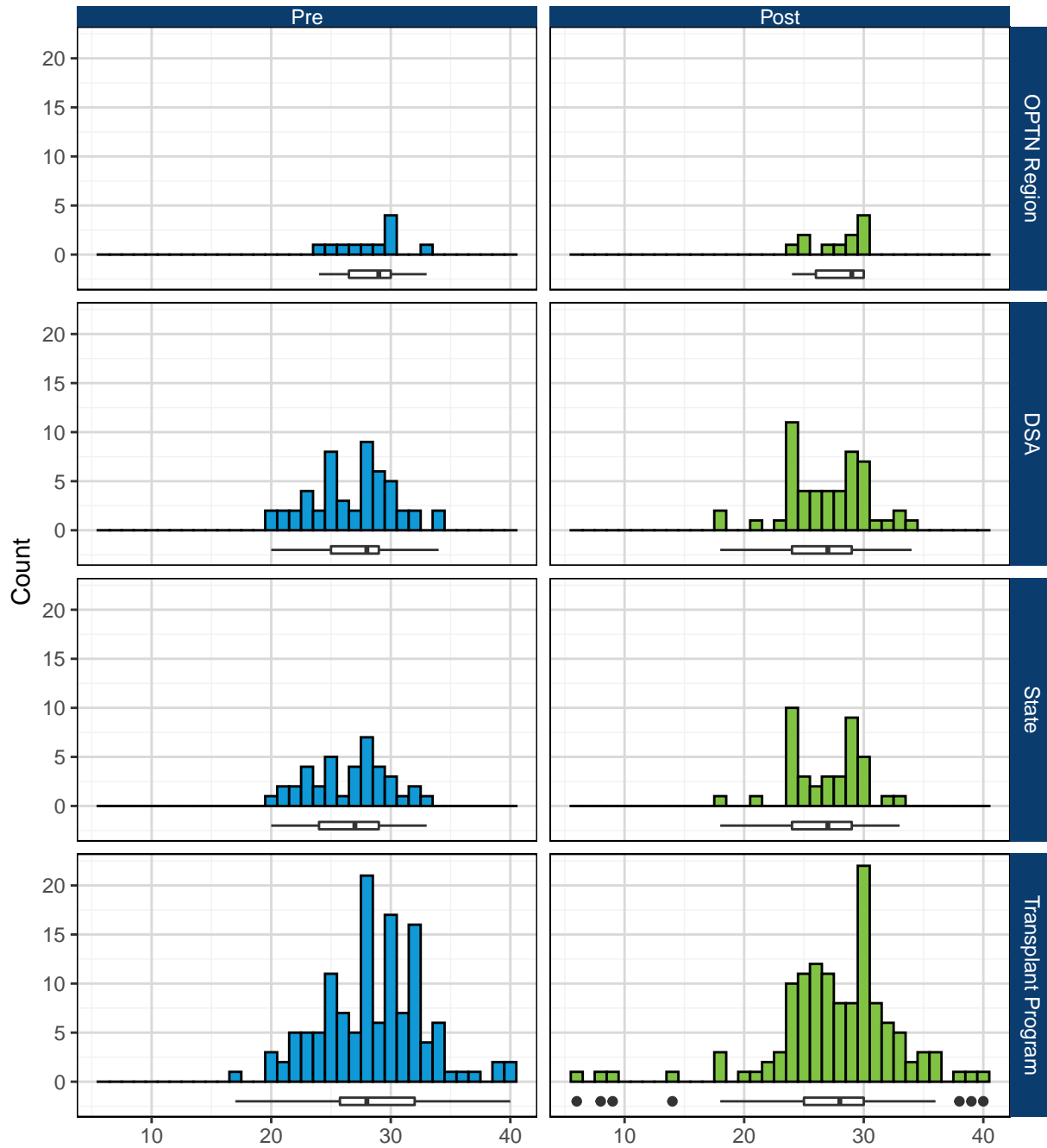
The range of median transplant scores (MTS) by DSA was 20 to 34 in the pre-policy era and 18 to 34 in the post-policy era. The national MTS was 28 pre- and 28 post-policy.

Figure 31. Median Adult Deceased Donor Liver-Alone Recipient Allocation MELD Score at Transplant by DSA of Transplant Center and Era



The following figure illustrates how the variance in MTS, or the spread around the average MTS across geographic units, has changed pre- to post-policy. There are different shapes to the distributions of MTS pre- to post-policy by geographic unit. The MTS distributions remained relatively similar by OPTN region, DSA, and state. The interquartile range (25th and 75th percentiles) remained similar by transplant program.

Figure 32. Distribution of Median Adult Deceased Donor Liver-Alone Recipient Allocation MELD Score at Transplant by Geographic Units and Era



Median MELD at Transplant

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 28. Distribution of Median Adult Deceased Donor Liver-Alone Recipient Allocation MELD Score at Transplant by Geographic Units and Era

Unit of Median Transplant Score	Era	N	Median Transplant Score (MTS)					
			Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
OPTN Region	Pre	11	24	26.500	29	28.4	30.0	33
	Post	11	24	26.000	29	27.9	30.0	30
DSA	Pre	51	20	24.750	28	26.8	29.0	34
	Post	51	18	24.000	27	26.9	29.0	34
State	Pre	39	20	24.000	27	26.5	29.0	33
	Post	39	18	24.000	27	26.8	29.0	33
Transplant Program	Pre	128	17	25.375	28	28.6	31.6	40
	Post	126	6	25.000	28	27.6	30.0	40

It was also important to quantify the variation in median allocation MELD at transplant between different units. Changes in variance decreased post-policy by OPTN region, DSA, and state. Variance between transplant programs increased.

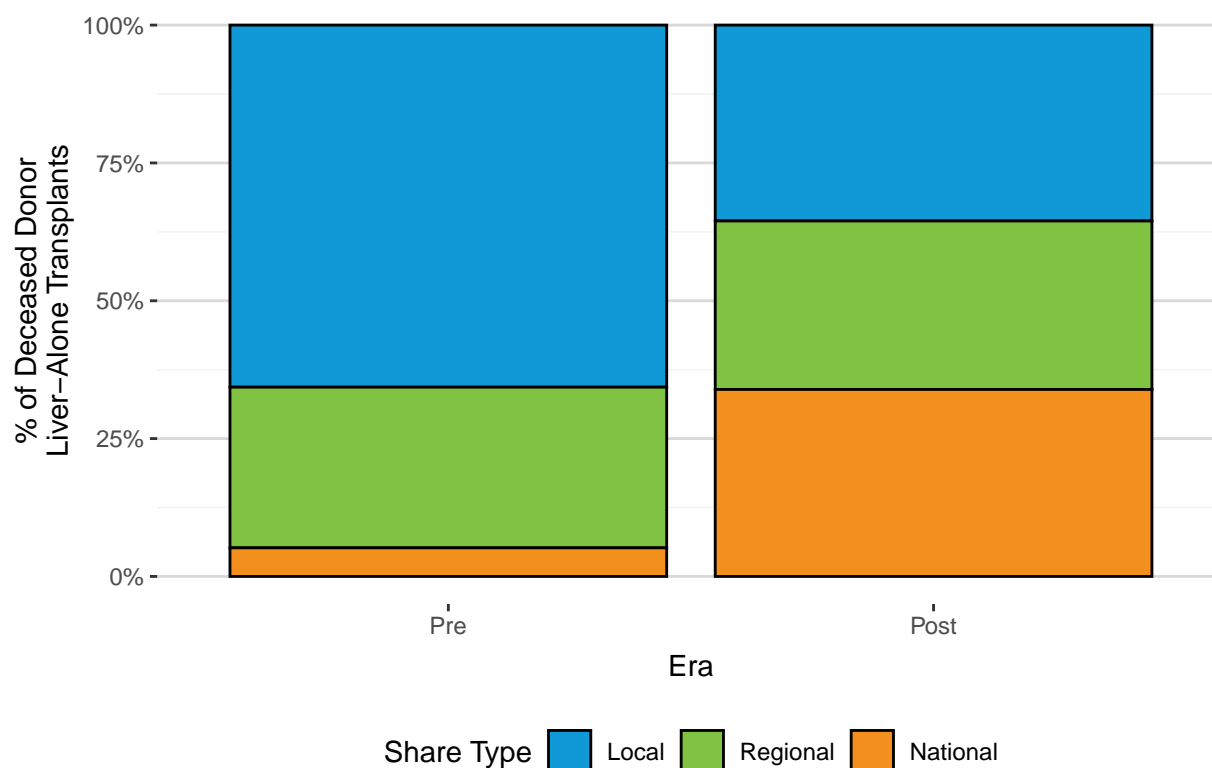
Table 29. Variance and Standard Deviation of Median Adult Deceased Donor Liver-Alone Recipient Allocation MELD Score at Transplant By Era

Unit of Median Transplant Score	Pre-Policy		Post-Policy	
	Variance	(SD)	Variance	(SD)
OPTN Region	7.05	2.66	5.29	2.30
DSA	12.05	3.47	11.84	3.44
State	11.18	3.34	9.51	3.08
Transplant Center	18.14	4.26	27.70	5.26

Overall pre- versus post-policy comparisons show that there were no statistically significant differences in variance at this time (OPTN Region $\chi^2_1=0.14$, $p=0.706$, DSA $\chi^2_1=0.08$, $p=0.772$, state $\chi^2_1=0.41$, $p=0.523$, transplant program $\chi^2_1=0.09$, $p=0.762$).

While just under two-thirds of liver transplants were local (transplant center within same DSA as donor hospital) in the pre-policy era, this dropped to approximately one-third during the post-policy era. There are fairly equal percentages of liver transplants in the local, regional, and national share types in the post-policy era.

Figure 33. Adult Deceased Donor Liver-Alone Transplants by Donor Share Type and Era



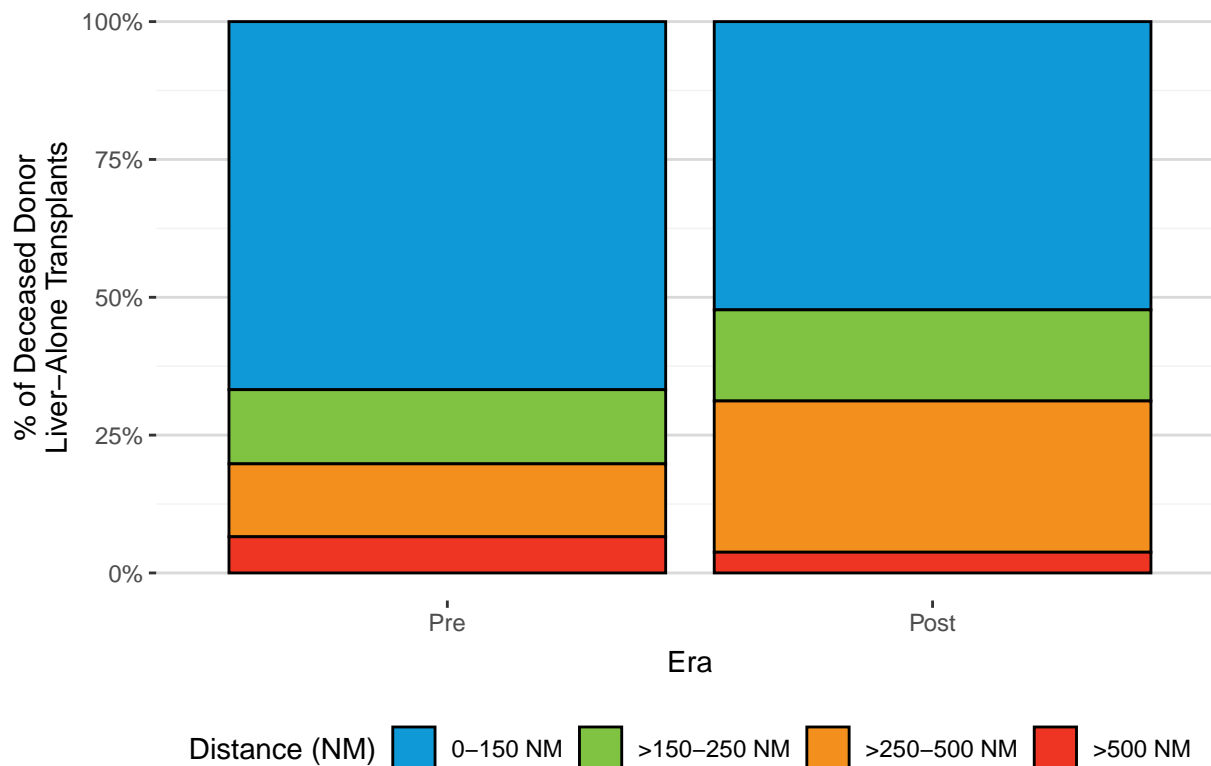
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 30. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Donor Share Type and Era

Donor Share Type	Pre-Policy	Post-Policy
Local	6853 (65.7%)	3910 (35.5%)
Regional	3042 (29.1%)	3363 (30.6%)
National	541 (5.2%)	3733 (33.9%)
Total	10436 (100.0%)	11006 (100.0%)

Since the policy removed DSA and OPTN region as units of allocation and now uses circles around the donor hospital of the potential liver donor, the distance that deceased donor livers travel has been of interest. Based on information that is reported to the OPTN, this is defined as the straight-line nautical mile (NM) distance between donor hospital and transplant center. Unlike statute (regular) miles, NM do take into account some curvature of the earth. There was a decrease in liver transplants occurring within 150 NM of the donor hospital. There was a subsequent increase in the liver transplants occurring over 150 NM but within 500 NM of the donor hospital, corresponding to the >150-250 NM and >250-500 NM classifications.

Figure 34. Adult Deceased Donor Liver-Alone Transplants by Classification Distance and Era



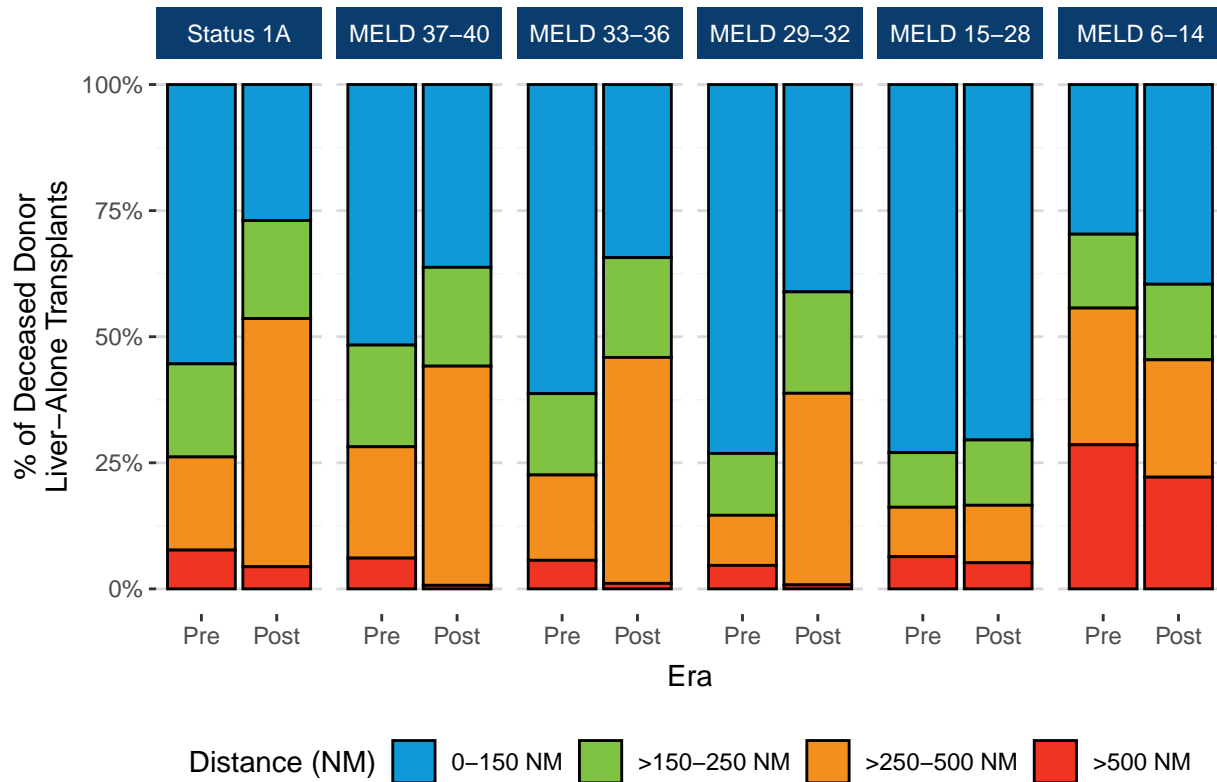
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 31. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Classification Distance and Era

Classification Distance	Pre-Policy	Post-Policy
0-150 NM	6967 (66.8%)	5754 (52.3%)
>150-250 NM	1404 (13.5%)	1819 (16.5%)
>250-500 NM	1380 (13.2%)	3019 (27.4%)
>500 NM	685 (6.6%)	414 (3.8%)
Total	10436 (100.0%)	11006 (100.0%)

There has been a substantial change in the distribution of distance between donor hospital and transplant program in all post-policy periods by score group. Notably in the post-policy eras, the higher allocation score and Status 1A groups have larger proportions of livers coming from >250-500 NM, while the distribution of distance for recipients with MELD scores of 15-28 and 6-14 remained similar to pre-policy distributions.

Figure 35. Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status, Classification Distance, and Era



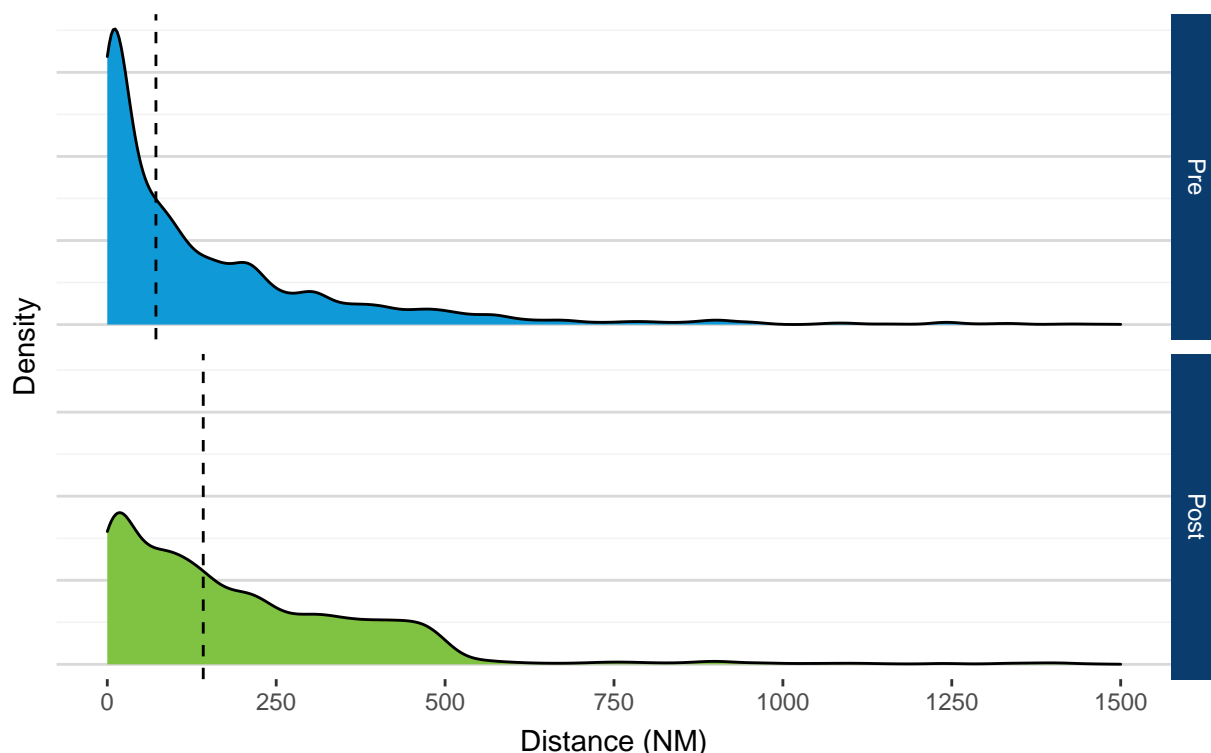
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 32. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Allocation MELD Score or Status, Classification Distance, and Era

Score or Status Group	Classification Distance	Pre-Policy	Post-Policy
Status 1A	0-150 NM	180 (55.4%)	86 (27.0%)
	>150-250 NM	60 (18.5%)	62 (19.4%)
	>250-500 NM	60 (18.5%)	157 (49.2%)
	>500 NM	25 (7.7%)	14 (4.4%)
	Total	325 (100.0%)	319 (100.0%)
MELD 37-40	0-150 NM	838 (51.7%)	668 (36.2%)
	>150-250 NM	327 (20.2%)	361 (19.6%)
	>250-500 NM	358 (22.1%)	801 (43.5%)
	>500 NM	99 (6.1%)	13 (0.7%)
	Total	1622 (100.0%)	1843 (100.0%)
MELD 33-36	0-150 NM	692 (61.3%)	439 (34.3%)
	>150-250 NM	182 (16.1%)	253 (19.8%)
	>250-500 NM	191 (16.9%)	573 (44.8%)
	>500 NM	64 (5.7%)	14 (1.1%)
	Total	1129 (100.0%)	1279 (100.0%)
MELD 29-32	0-150 NM	1414 (73.2%)	885 (41.1%)
	>150-250 NM	237 (12.3%)	433 (20.1%)
	>250-500 NM	192 (9.9%)	818 (38.0%)
	>500 NM	90 (4.7%)	17 (0.8%)
	Total	1933 (100.0%)	2153 (100.0%)
MELD 15-28	0-150 NM	3762 (73.0%)	3499 (70.5%)
	>150-250 NM	558 (10.8%)	643 (13.0%)
	>250-500 NM	505 (9.8%)	566 (11.4%)
	>500 NM	329 (6.4%)	257 (5.2%)
	Total	5154 (100.0%)	4965 (100.0%)
MELD 6-14	0-150 NM	81 (29.7%)	177 (39.6%)
	>150-250 NM	40 (14.7%)	67 (15.0%)
	>250-500 NM	74 (27.1%)	104 (23.3%)
	>500 NM	78 (28.6%)	99 (22.1%)
	Total	273 (100.0%)	447 (100.0%)

The median distance from donor hospital to transplant program increased from 72 NM to 142 NM post-policy. Overall, there was a greater proportion of livers coming from 250 to 500 NM post-policy compared to pre-policy.

Figure 36. Distribution of Distance from Donor Hospital to Transplant Program for Adult Deceased Donor Liver-Alone Transplants by Era



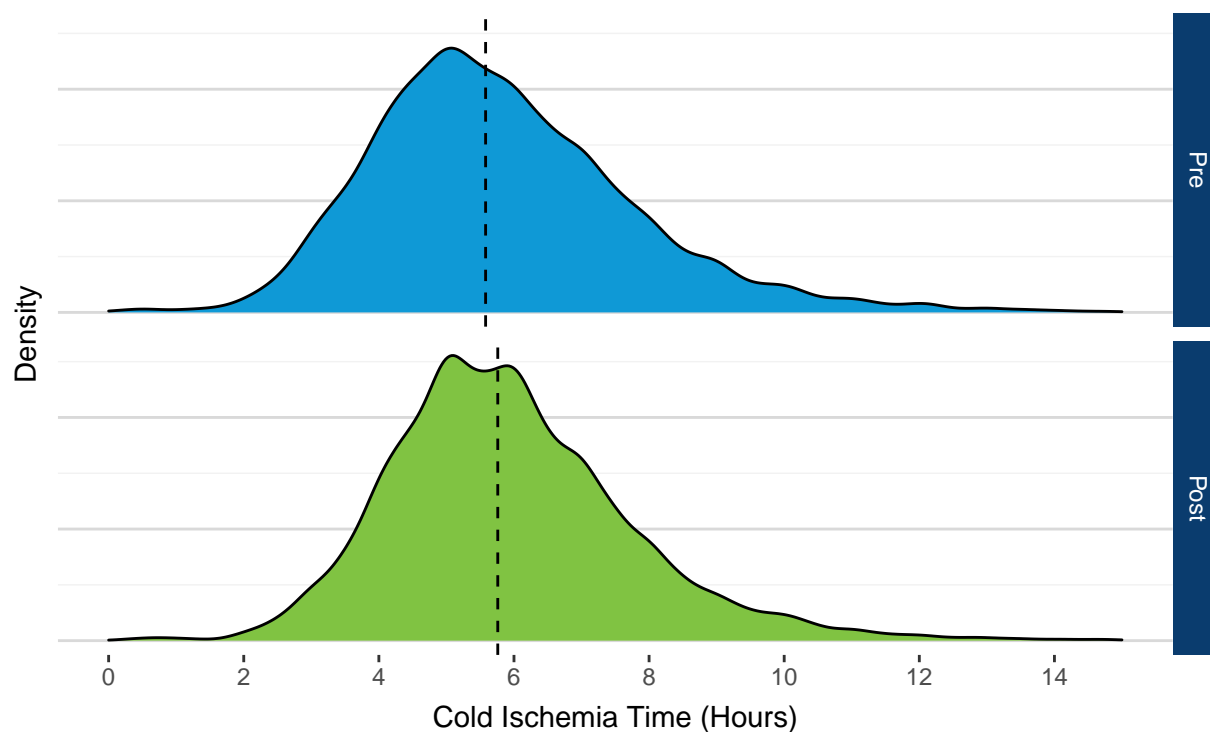
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.
 ** Dotted lines indicate median distance within each era.
 *** There were 24 pre-policy and 24 post-policy transplants with distance >1500 NM not included.

Table 33. Summary of Distance from Donor Hospital to Transplant Program for Adult Deceased Donor Liver-Alone Transplants by Era

Era	N	N Missing	Distance (NM)					
			Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Pre	10436	0	0	11	72	153.54	206	2529
Post	11006	0	0	47	142	200.35	306	2529

Despite distance increasing, the change in median cold ischemia time increased by roughly 11 minutes post-policy compared to pre-policy. Distributions in cold ischemia time remained similar pre- and post-policy.

Figure 37. Distribution of Cold Ischemia Time for Adult Deceased Donor Liver-Alone Transplants by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

** Dotted lines indicate median cold ischemia time within each era.

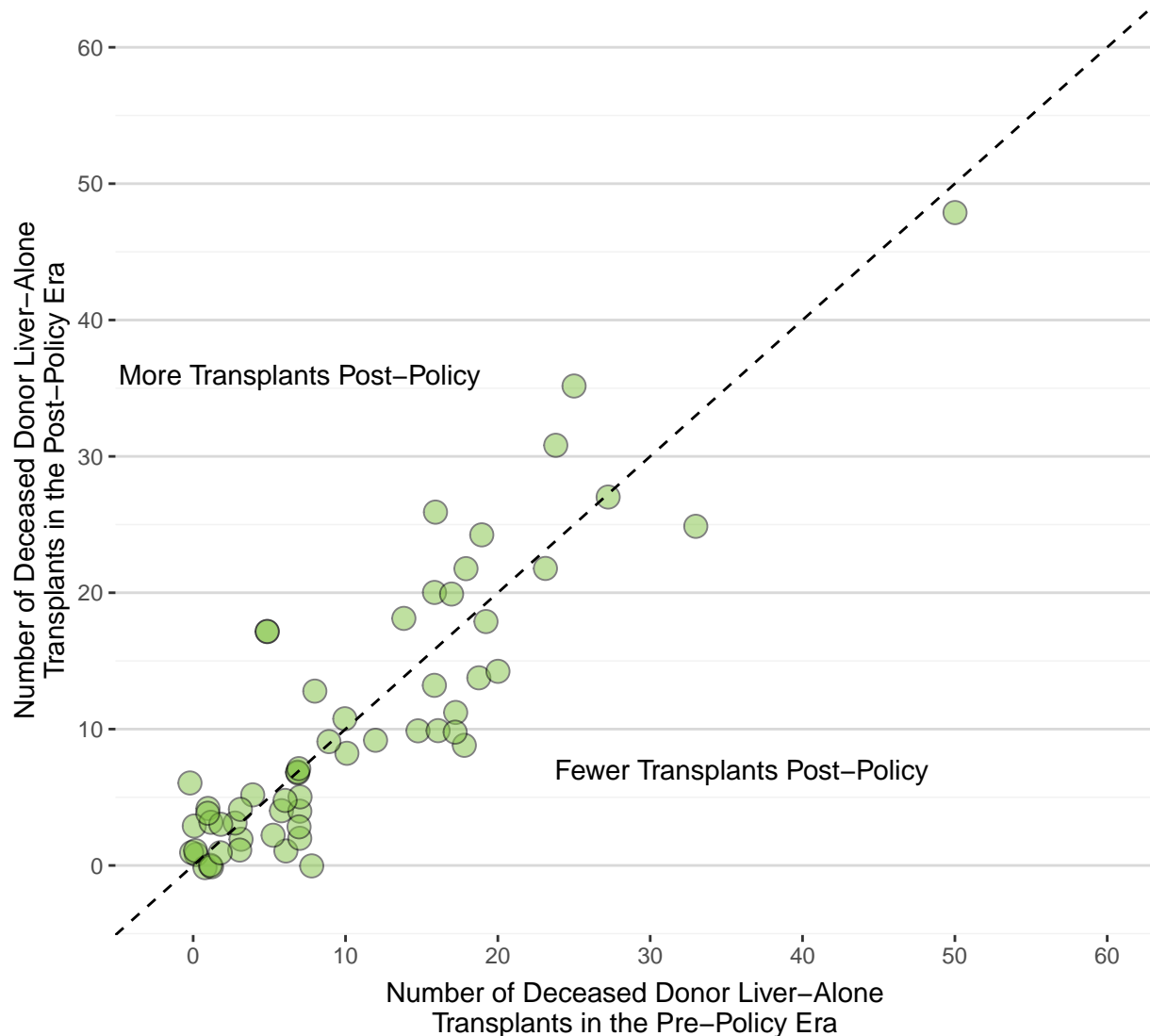
*** There were 46 pre-policy and 138 post-policy transplant recipients with missing cold ischemia time that are not included.
^ There were 22 pre-policy and 32 post-policy transplants with cold ischemia time >15 hours not included.

Table 34. Distribution of Cold Ischemia Time for Adult Deceased Donor Liver-Alone Transplants by Era

Era	N	N Missing	Time (hours)					
			Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Pre	10390	46	0.00	4.50	5.58	5.86	6.97	37.23
Post	10868	138	0.07	4.75	5.76	5.99	7.00	43.00

Pediatric Liver-Alone Transplants

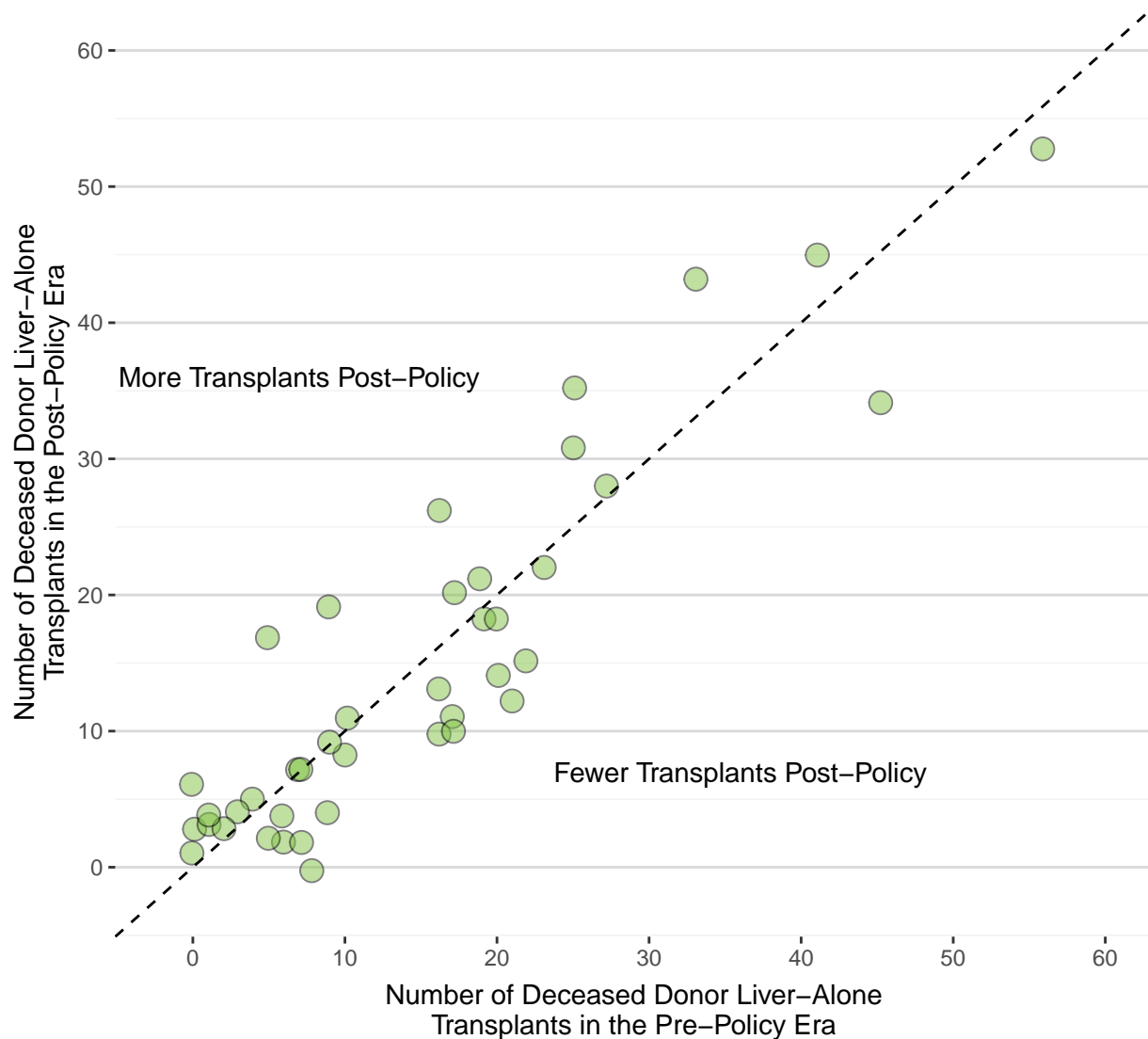
Figure 38. Pediatric Deceased Donor Liver-Alone Transplants by Transplant Program and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of pediatric deceased donor liver-alone transplants by program, pre- to post-policy. Points that fall above the diagonal represent programs that performed more deceased donor liver transplants post-policy compared to pre-policy. Points that fall below the diagonal represent programs that performed fewer deceased donor liver transplants post-policy compared to pre-policy.

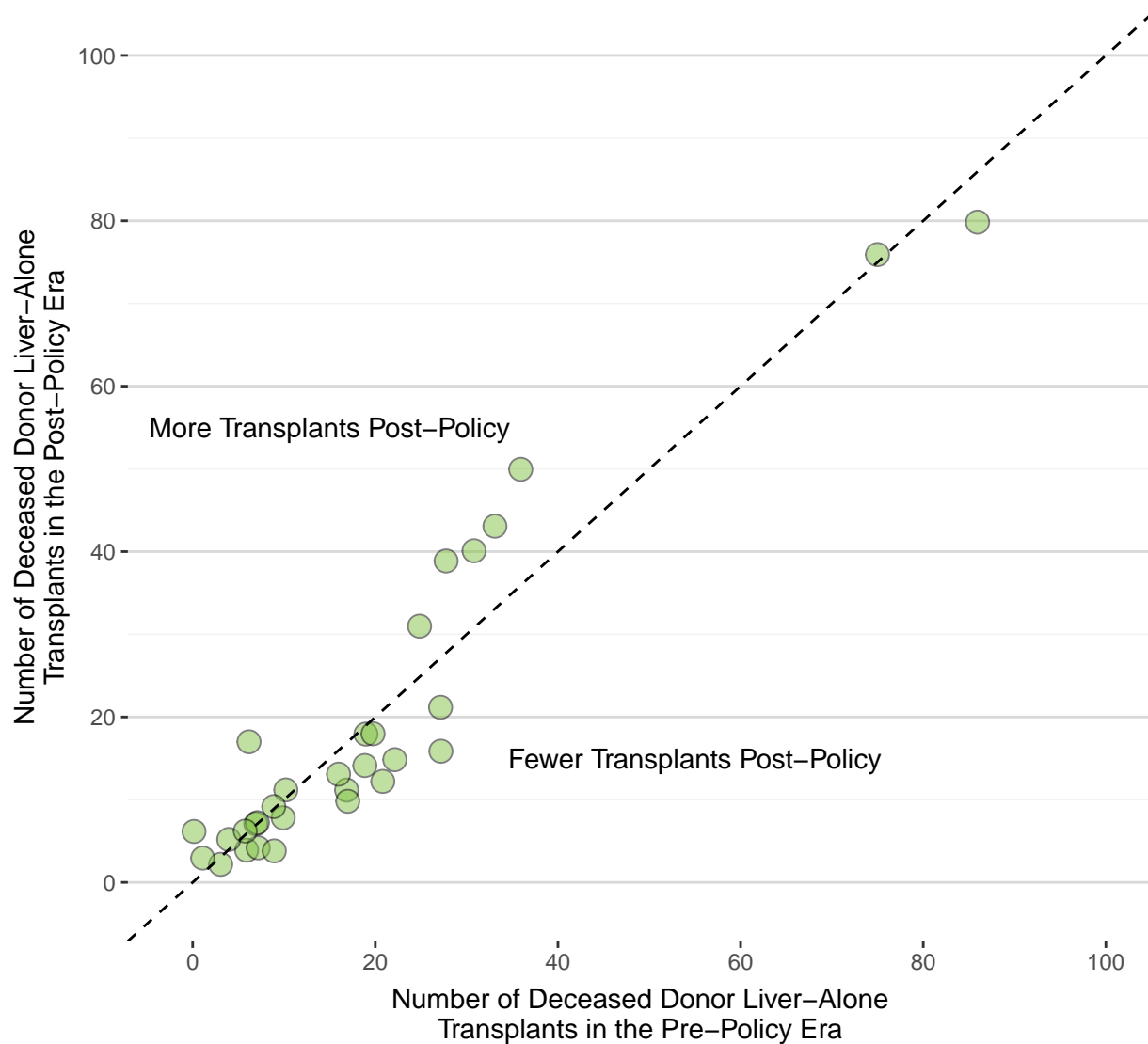
The majority of programs performed similar number of deceased donor liver transplants pre-policy and post-policy. A Spearman's rank correlation of $\rho = 0.836$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of deceased donor, liver-alone transplants performed per transplant program ($\chi^2_1 = 0.1136$, $p = 0.736$).

Figure 39. Pediatric Deceased Donor Liver-Along Transplants by Transplant Program DSA and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of pediatric deceased donor liver-alone transplants by DSA, pre- to post-policy. Points that fall above the diagonal represent DSAs that performed more deceased donor liver transplants post-policy compared to pre-policy. Points that fall below the diagonal represent DSAs that performed fewer deceased donor liver transplants post-policy compared to pre-policy.

The majority of DSAs performed similar number of deceased donor liver transplants pre- and post-policy. A Spearman's rank correlation of $\rho = 0.86$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of deceased donor, liver-alone transplants performed within each DSA ($\chi^2_1 = 0.3367$, $p = 0.562$).

Figure 40. Pediatric Deceased Donor Liver-Alone Transplants by Transplant Program State and Era

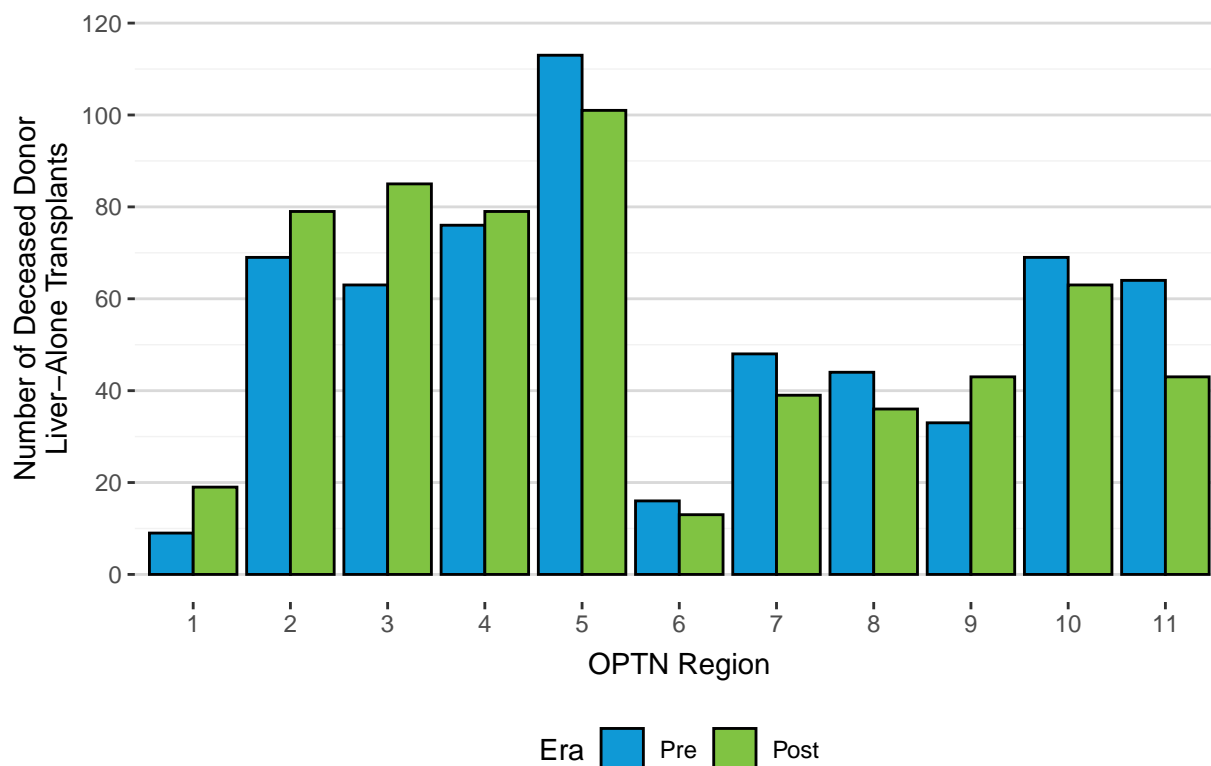
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of pediatric deceased donor liver-alone transplants by state, pre- to post-policy. Points that fall above the diagonal represent states that performed more deceased donor liver transplants post-policy compared to pre-policy. Points that fall below the diagonal represent states that performed fewer deceased donor liver transplants post-policy compared to pre-policy.

The majority of programs performed similar number of deceased donor liver transplants pre- and post-policy. A Spearman's rank correlation of $\rho = 0.905$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of deceased donor, liver-alone transplants performed within each state ($\chi^2_1 = 0.3945$, $p = 0.53$).

Overall, there were 604 pediatric deceased donor liver-alone transplants pre-policy and 600 post-policy. Regions 1, 2, 3, 4, and 9 experienced an increase in transplant volume and Regions 5, 6, 7, 8, 10, and 11 experienced a decrease.

Figure 41. Pediatric Deceased Donor Liver-Alone Transplants by OPTN Region and Era



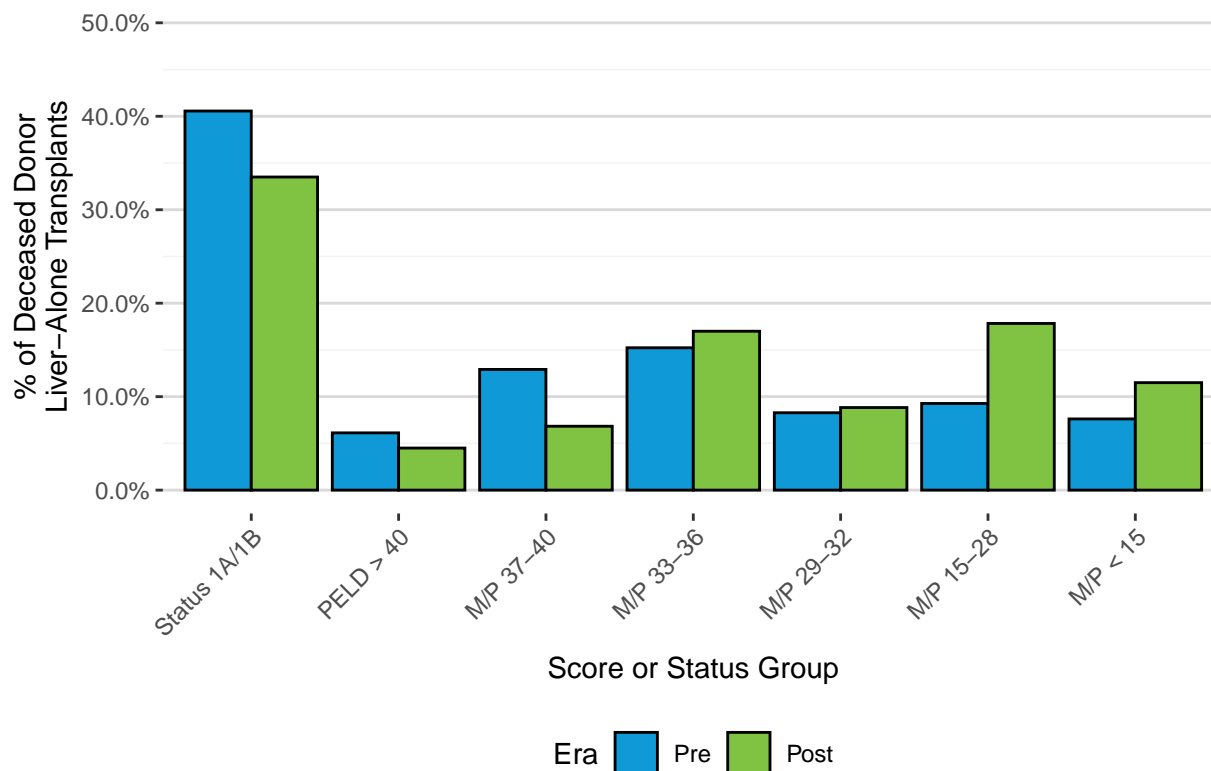
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 35. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by OPTN Region and Era

OPTN Region	Pre-Policy	Post-Policy
1	9 (1.5%)	19 (3.2%)
2	69 (11.4%)	79 (13.2%)
3	63 (10.4%)	85 (14.2%)
4	76 (12.6%)	79 (13.2%)
5	113 (18.7%)	101 (16.8%)
6	16 (2.6%)	13 (2.2%)
7	48 (7.9%)	39 (6.5%)
8	44 (7.3%)	36 (6.0%)
9	33 (5.5%)	43 (7.2%)
10	69 (11.4%)	63 (10.5%)
11	64 (10.6%)	43 (7.2%)
Total	604 (100.0%)	600 (100.0%)

There were fewer transplants in the Status 1A/1B, PELD >40, and MELD/PELD 37-40 groups and a greater number of transplants in the MELD/PELD 33-36, MELD/PELD 29-32, MELD/PELD 15-28, and MELD/PELD <15 groups post-policy compared to pre-policy. The national median allocation MELD or PELD score at transplant was 35 pre-policy and 30 overall post-policy.

Figure 42. Pediatric Deceased Donor Liver-Alone Transplants by Allocation MELD or PELD Score or Status and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

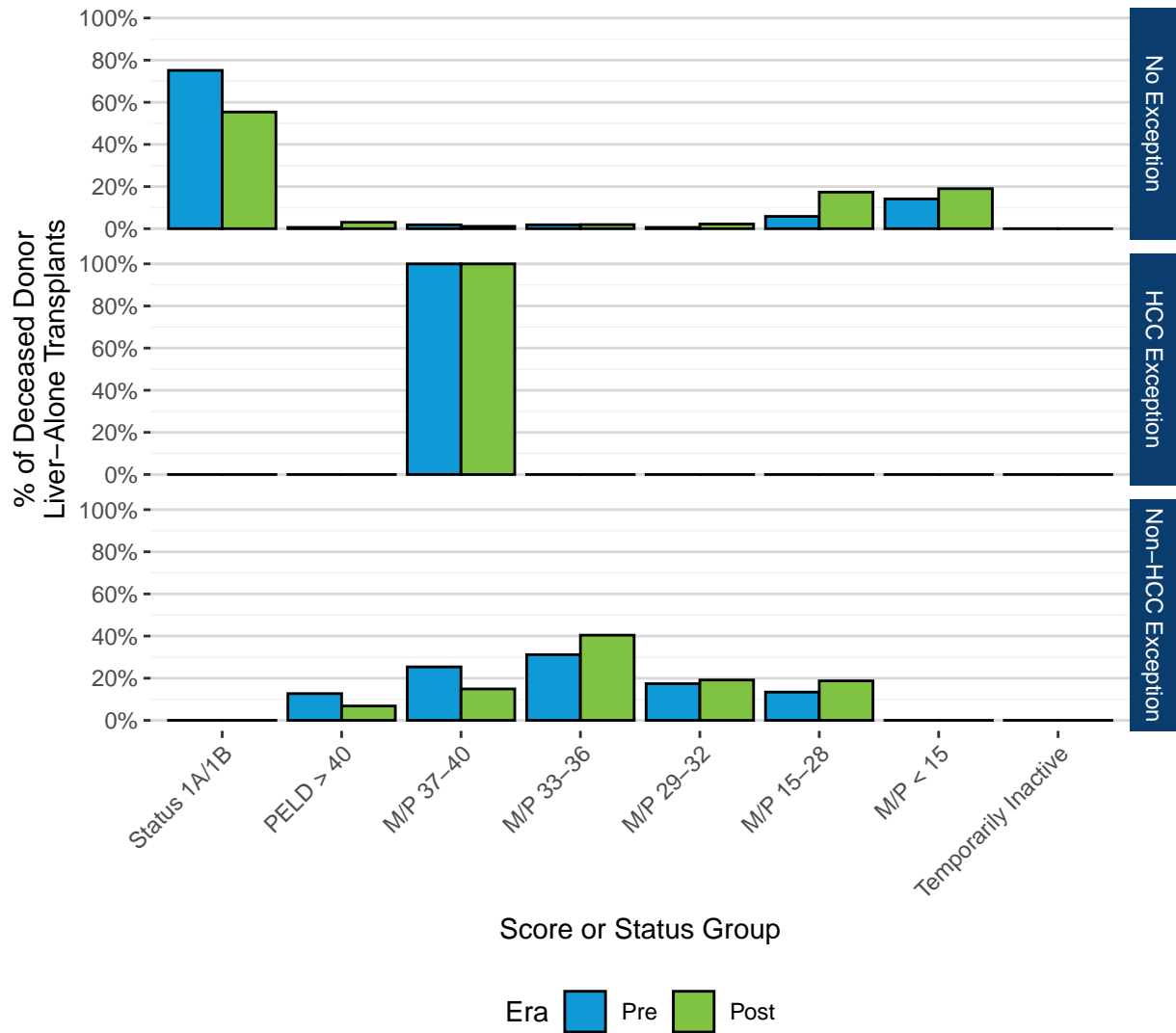
Table 36. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Allocation MELD or PELD Score or Status and Era

Score or Status Group	Pre-Policy	Post-Policy
Status 1A/1B	245 (40.6%)	201 (33.5%)
PELD > 40	37 (6.1%)	27 (4.5%)
M/P 37-40	78 (12.9%)	41 (6.8%)
M/P 33-36	92 (15.2%)	102 (17.0%)
M/P 29-32	50 (8.3%)	53 (8.8%)
M/P 15-28	56 (9.3%)	107 (17.8%)
M/P < 15	46 (7.6%)	69 (11.5%)
Total	604 (100.0%)	600 (100.0%)

The share of Status 1A/1B non-exception transplants decreased to a little over half (55%) post-policy from three quarters (75%) pre-policy. The share of MELD/PELD 15-28 non-exception transplants increased post-policy.

There were fewer PELD >40 and MELD/PELD 37-40 non-HCC exception transplants and a greater number of MELD/PELD 33-36, MELD/PELD 29-32, and MELD/PELD 15-28 non-HCC exception transplants post-policy compared to pre-policy. There were two pediatric HCC exception transplants both pre- and post-policy.

Figure 43. Pediatric Deceased Donor Liver-Alone Transplants by Allocation MELD or PELD Score or Status, Exception Status, and Era



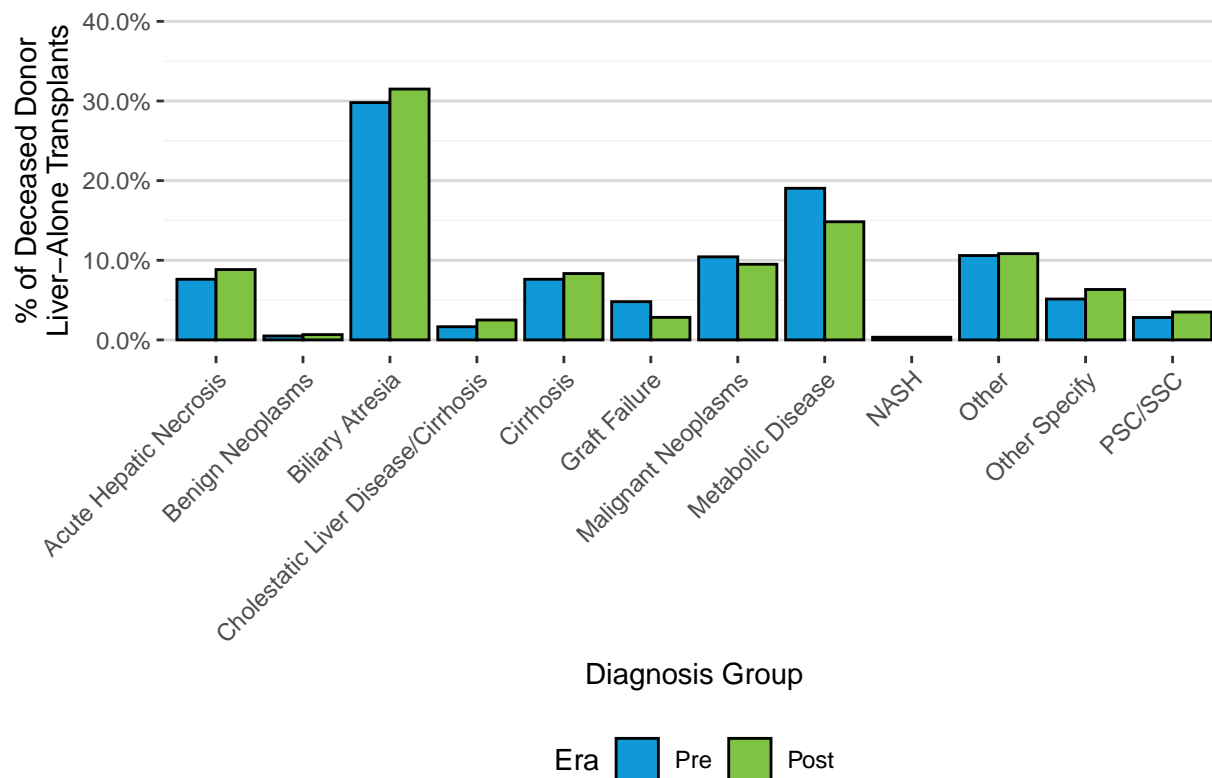
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 37. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Allocation MELD or PELD Score or Status, Exception Status, and Era

Exception Type	Score or Status Group	Pre-Policy	Post-Policy
No Exception	Status 1A/1B	245 (75.2%)	201 (55.4%)
	PELD > 40	2 (0.6%)	11 (3.0%)
	M/P 37-40	6 (1.8%)	4 (1.1%)
	M/P 33-36	6 (1.8%)	7 (1.9%)
	M/P 29-32	2 (0.6%)	8 (2.2%)
	M/P 15-28	19 (5.8%)	63 (17.4%)
	M/P < 15	46 (14.1%)	69 (19.0%)
	Temporarily Inactive	0 (0.0%)	0 (0.0%)
	Total	326 (100.0%)	363 (100.0%)
HCC Exception	Status 1A/1B	0 (0.0%)	0 (0.0%)
	PELD > 40	0 (0.0%)	0 (0.0%)
	M/P 37-40	2 (100.0%)	2 (100.0%)
	M/P 33-36	0 (0.0%)	0 (0.0%)
	M/P 29-32	0 (0.0%)	0 (0.0%)
	M/P 15-28	0 (0.0%)	0 (0.0%)
	M/P < 15	0 (0.0%)	0 (0.0%)
	Temporarily Inactive	0 (0.0%)	0 (0.0%)
	Total	2 (100.0%)	2 (100.0%)
Non-HCC Exception	Status 1A/1B	0 (0.0%)	0 (0.0%)
	PELD > 40	35 (12.7%)	16 (6.8%)
	M/P 37-40	70 (25.4%)	35 (14.9%)
	M/P 33-36	86 (31.2%)	95 (40.4%)
	M/P 29-32	48 (17.4%)	45 (19.1%)
	M/P 15-28	37 (13.4%)	44 (18.7%)
	M/P < 15	0 (0.0%)	0 (0.0%)
	Temporarily Inactive	0 (0.0%)	0 (0.0%)
	Total	276 (100.0%)	235 (100.0%)

Diagnosis distributions remained similar pre- and post-policy for pediatric deceased donor liver-alone transplants.

Figure 44. Pediatric Deceased Donor Liver-Alone Transplants by Diagnosis and Era



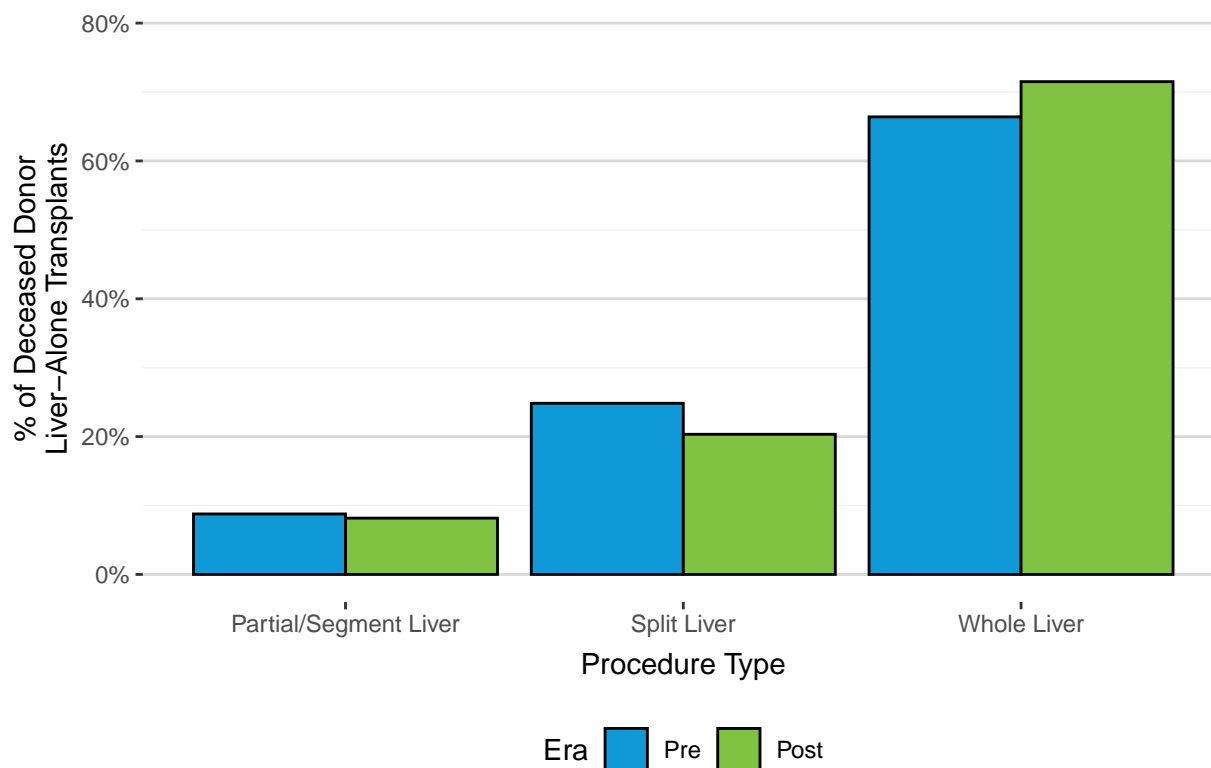
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 38. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Diagnosis and Era

Diagnosis Group	Pre-Policy	Post-Policy
Acute Hepatic Necrosis	46 (7.6%)	53 (8.8%)
Benign Neoplasms	3 (0.5%)	4 (0.7%)
Biliary Atresia	180 (29.8%)	189 (31.5%)
Cholestatic Liver Disease/Cirrhosis	10 (1.7%)	15 (2.5%)
Cirrhosis	46 (7.6%)	50 (8.3%)
Graft Failure	29 (4.8%)	17 (2.8%)
Malignant Neoplasms	63 (10.4%)	57 (9.5%)
Metabolic Disease	115 (19.0%)	89 (14.8%)
NASH	NA (-)	2 (0.3%)
Other	64 (10.6%)	65 (10.8%)
Other Specify	31 (5.1%)	38 (6.3%)
PSC/SSC	17 (2.8%)	21 (3.5%)
Total	604 (100.0%)	600 (100.0%)

A split liver transplant is defined as two transplants occurring from the same donor. A Whole liver remained the most common pediatric deceased donor procedure type. Post-policy there were 49 pediatric deceased donor split liver transplants compared to 53 pre-policy.

Figure 45. Pediatric Deceased Donor Liver-Alone Transplants by Procedure Type and Era



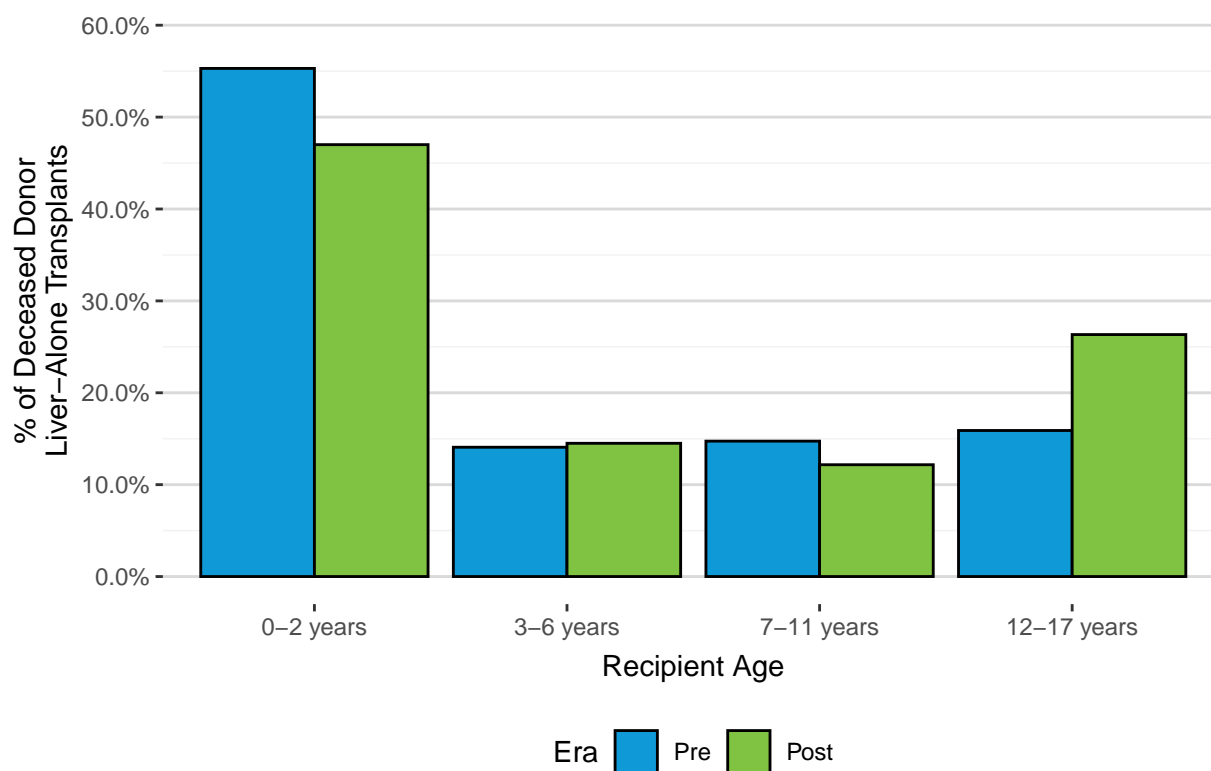
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 39. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Procedure Type and Era

Procedure Type	Pre-Policy	Post-Policy
Partial/Segment Liver	53 (8.8%)	49 (8.2%)
Split Liver	150 (24.8%)	122 (20.3%)
Whole Liver	401 (66.4%)	429 (71.5%)
Total	604 (100.0%)	600 (100.0%)

Pediatric transplant distributions differed by recipient age. Post-policy there were a greater number of 12-17 year old transplants and a smaller number of 0-2 year old and 7-11 year old transplants.

Figure 46. Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age and Era



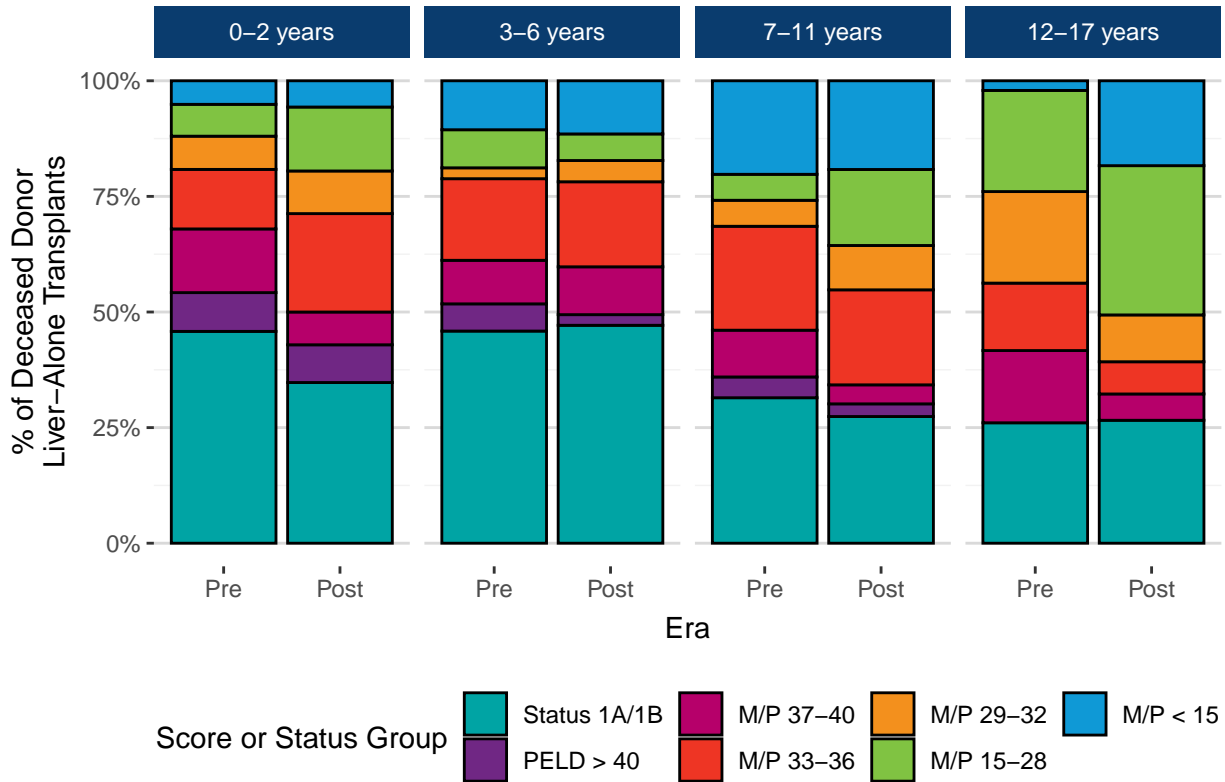
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 40. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age and Era

Recipient Age	Pre-Policy	Post-Policy
0-2 years	334 (55.3%)	282 (47.0%)
3-6 years	85 (14.1%)	87 (14.5%)
7-11 years	89 (14.7%)	73 (12.2%)
12-17 years	96 (15.9%)	158 (26.3%)
Total	604 (100.0%)	600 (100.0%)

In the 0-2 year old age group, there were fewer Status 1A/1B transplants and a greater number of PELD 15-28 and PELD 33-36 transplants post-policy. Transplant distributions remained similar in the 3-6 year old age group. There was a greater proportion of MELD/PELD 15-28 transplants in the 7-11 year old and 12-17 year old age groups post-policy.

Figure 47. Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age, Allocation MELD or PELD Score or Status, and Era



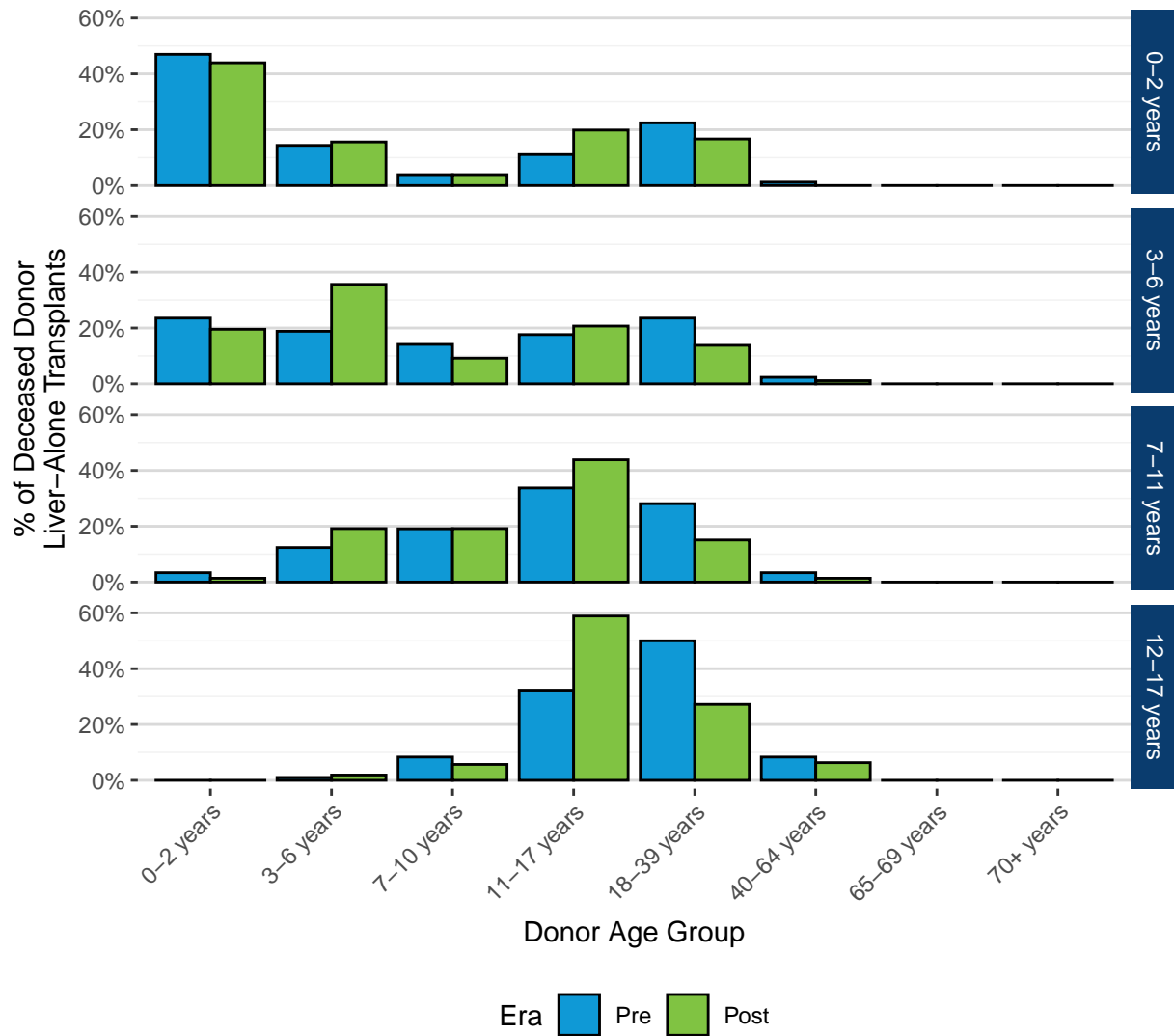
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 41. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age, Allocation MELD or PELD Score or Status, and Era

Recipient Age	Score or Status Group	Pre-Policy	Post-Policy
0-2 years	Status 1A/1B	153 (45.8%)	98 (34.8%)
	PELD > 40	28 (8.4%)	23 (8.2%)
	M/P 37-40	46 (13.8%)	20 (7.1%)
	M/P 33-36	43 (12.9%)	60 (21.3%)
	M/P 29-32	24 (7.2%)	26 (9.2%)
	M/P 15-28	23 (6.9%)	39 (13.8%)
	M/P < 15	17 (5.1%)	16 (5.7%)
	Total	334 (100.0%)	282 (100.0%)
3-6 years	Status 1A/1B	39 (45.9%)	41 (47.1%)
	PELD > 40	5 (5.9%)	2 (2.3%)
	M/P 37-40	8 (9.4%)	9 (10.3%)
	M/P 33-36	15 (17.6%)	16 (18.4%)
	M/P 29-32	2 (2.4%)	4 (4.6%)
	M/P 15-28	7 (8.2%)	5 (5.7%)
	M/P < 15	9 (10.6%)	10 (11.5%)
	Total	85 (100.0%)	87 (100.0%)
7-11 years	Status 1A/1B	28 (31.5%)	20 (27.4%)
	PELD > 40	4 (4.5%)	2 (2.7%)
	M/P 37-40	9 (10.1%)	3 (4.1%)
	M/P 33-36	20 (22.5%)	15 (20.5%)
	M/P 29-32	5 (5.6%)	7 (9.6%)
	M/P 15-28	5 (5.6%)	12 (16.4%)
	M/P < 15	18 (20.2%)	14 (19.2%)
	Total	89 (100.0%)	73 (100.0%)
12-17 years	Status 1A/1B	25 (26.0%)	42 (26.6%)
	M/P 37-40	15 (15.6%)	9 (5.7%)
	M/P 33-36	14 (14.6%)	11 (7.0%)
	M/P 29-32	19 (19.8%)	16 (10.1%)
	M/P 15-28	21 (21.9%)	51 (32.3%)
	M/P < 15	2 (2.1%)	29 (18.4%)
	Total	96 (100.0%)	158 (100.0%)

The distributions of pediatric transplants by donor age remained relatively similar pre- and post-policy for the younger children but shifted in the adolescent group (12-17 years at transplant). Adolescent transplants were more likely to receive livers from donors aged 11-17 years and less likely to receive livers from donors aged 18-39 years post-policy compared to pre-policy.

Figure 48. Pediatric Deceased Donor Liver-Along Transplants by Recipient Age, Donor Age, and Era



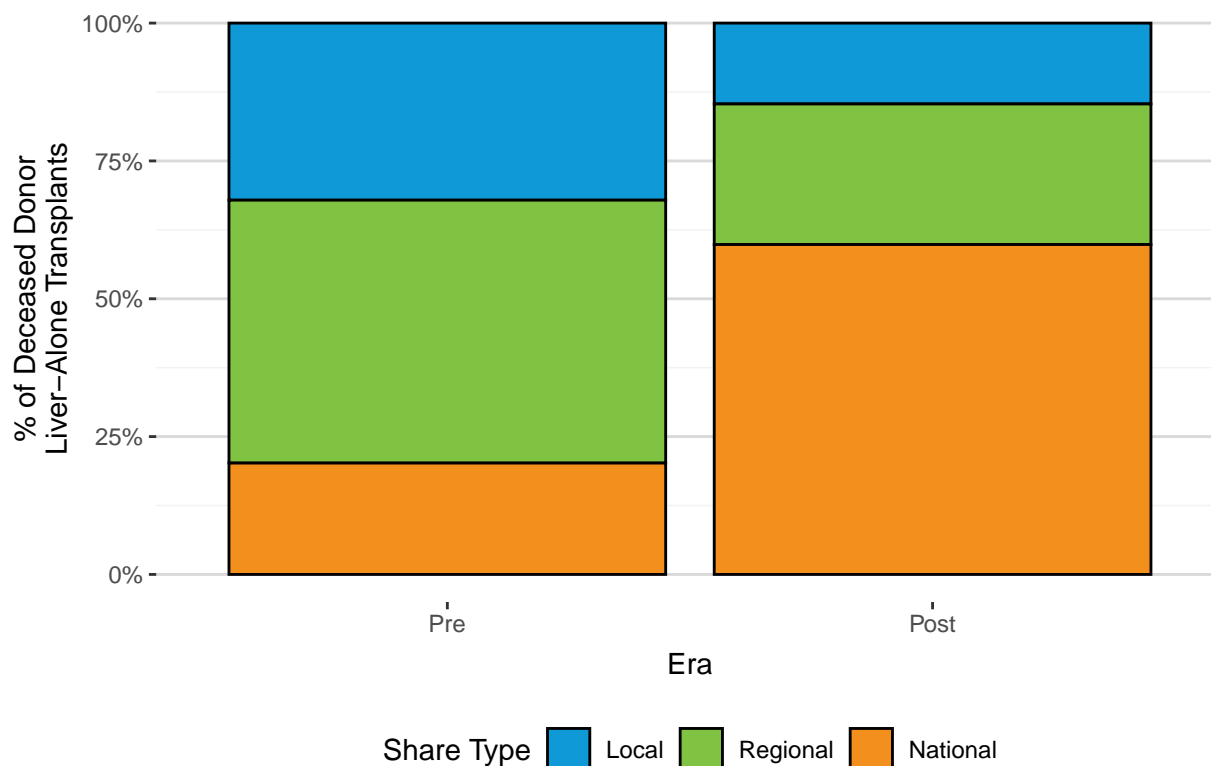
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 42. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age, Donor Age, and Era

Recipient Age	Donor Age	Pre-Policy	Post-Policy
0-2 years	0-2 years	157 (47.0%)	124 (44.0%)
	3-6 years	48 (14.4%)	44 (15.6%)
	7-10 years	13 (3.9%)	11 (3.9%)
	11-17 years	37 (11.1%)	56 (19.9%)
	18-39 years	75 (22.5%)	47 (16.7%)
	40-64 years	4 (1.2%)	0 (0.0%)
	Total	334 (100.0%)	282 (100.0%)
3-6 years	0-2 years	20 (23.5%)	17 (19.5%)
	3-6 years	16 (18.8%)	31 (35.6%)
	7-10 years	12 (14.1%)	8 (9.2%)
	11-17 years	15 (17.6%)	18 (20.7%)
	18-39 years	20 (23.5%)	12 (13.8%)
	40-64 years	2 (2.4%)	1 (1.1%)
	Total	85 (100.0%)	87 (100.0%)
7-11 years	0-2 years	3 (3.4%)	1 (1.4%)
	3-6 years	11 (12.4%)	14 (19.2%)
	7-10 years	17 (19.1%)	14 (19.2%)
	11-17 years	30 (33.7%)	32 (43.8%)
	18-39 years	25 (28.1%)	11 (15.1%)
	40-64 years	3 (3.4%)	1 (1.4%)
	Total	89 (100.0%)	73 (100.0%)
12-17 years	0-2 years	0 (0.0%)	0 (0.0%)
	3-6 years	1 (1.0%)	3 (1.9%)
	7-10 years	8 (8.3%)	9 (5.7%)
	11-17 years	31 (32.3%)	93 (58.9%)
	18-39 years	48 (50.0%)	43 (27.2%)
	40-64 years	8 (8.3%)	10 (6.3%)
	Total	96 (100.0%)	158 (100.0%)

Just under one-third of pediatric liver transplants were local (transplant center within same DSA as donor hospital) in the pre-policy era compared to about 15% in the post-policy era. Similarly, the regional share dropped from 48% pre-policy to 26% post-policy and the national share increased from 20% pre-policy to 60% post-policy.

Figure 50. Pediatric Deceased Donor Liver-Along Transplants by Donor Share Type and Era



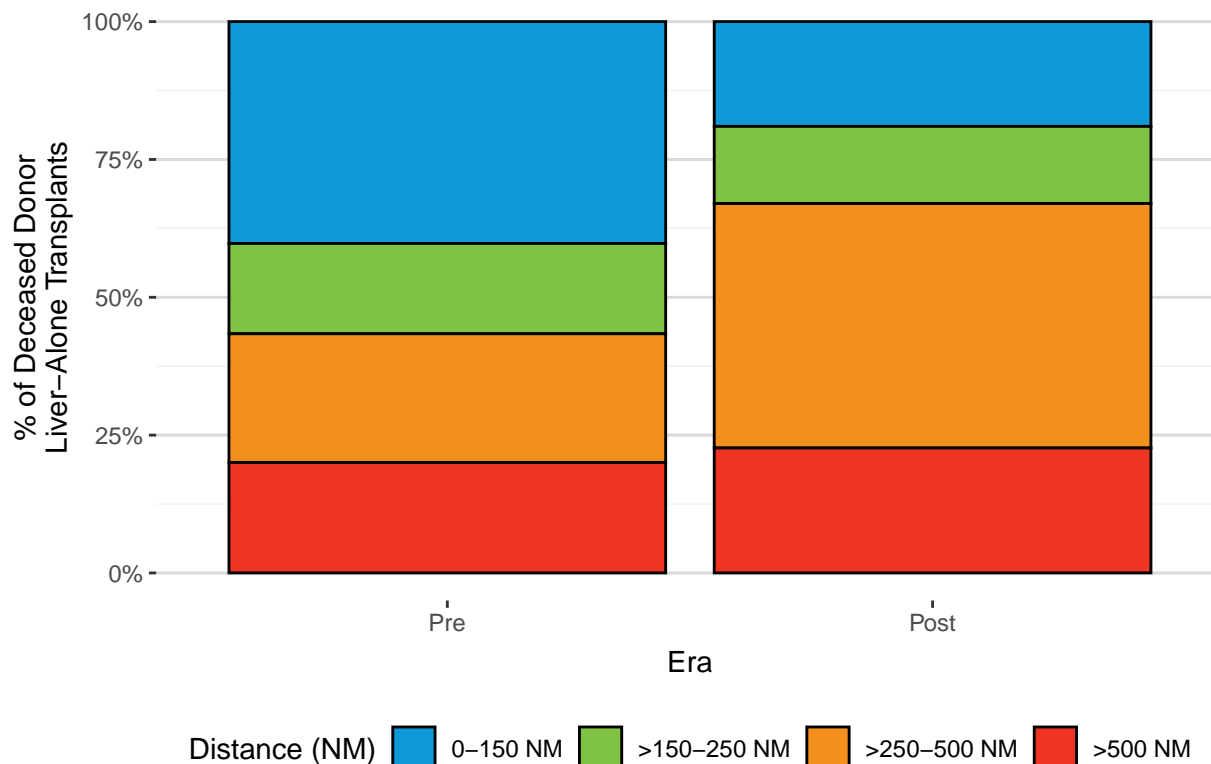
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 44. Number and Percent of Pediatric Deceased Donor Liver-Along Transplants by Donor Share Type and Era

Donor Share Type	Pre-Policy	Post-Policy
Local	194 (32.1%)	88 (14.7%)
Regional	288 (47.7%)	153 (25.5%)
National	122 (20.2%)	359 (59.8%)
Total	604 (100.0%)	600 (100.0%)

Since the policy removed DSA and OPTN region as units of allocation and now uses circles around the donor hospital of the potential liver donor, the distance that deceased donor livers travel has been of interest. Based on information that is reported to the OPTN, this is defined as the straight-line nautical mile (NM) distance between donor hospital and transplant center. Unlike statute (regular) miles, NM do take into account some curvature of the earth. There was a decrease in liver transplants occurring within 150 NM of the donor hospital. There has been a subsequent increase in the liver transplants occurring over 250 NM but within 500 NM of the donor hospital. Liver transplants occurring over 500 NM remained relatively consistent pre- and post-policy.

Figure 51. Pediatric Deceased Donor Liver-Alone Transplants by Classification Distance and Era



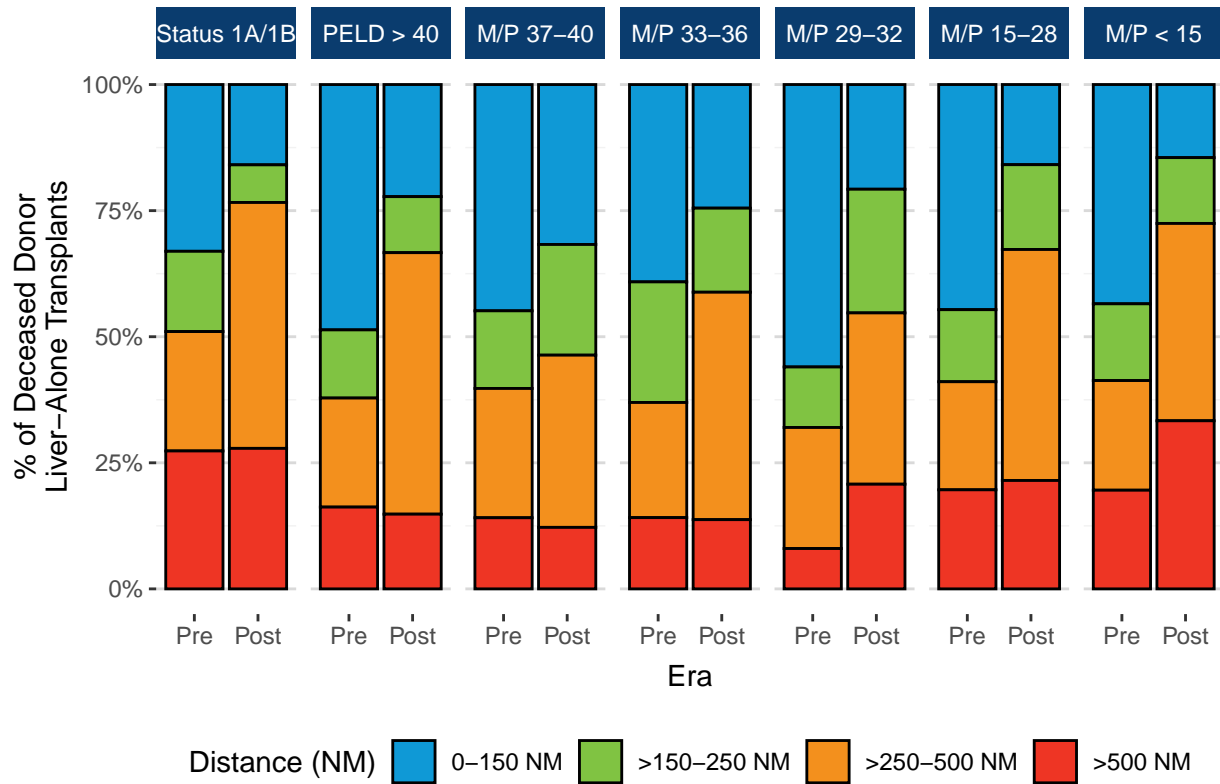
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 45. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Classification Distance and Era

Classification Distance	Pre-Policy	Post-Policy
0-150 NM	243 (40.2%)	114 (19.0%)
>150-250 NM	99 (16.4%)	84 (14.0%)
>250-500 NM	141 (23.3%)	266 (44.3%)
>500 NM	121 (20.0%)	136 (22.7%)
Total	604 (100.0%)	600 (100.0%)

There has been a substantial change in the distribution of distance between donor hospital and transplant program in all post-policy periods by score group. Notably in the post-policy eras, all allocation score groups have a lower proportion of transplants in the 0-150 NM group and a higher proportion of transplants in the >250-500 NM classification group.

Figure 52. Pediatric Deceased Donor Liver-Alone Transplants by Allocation MELD or PELD Score or Status, Classification Distance, and Era



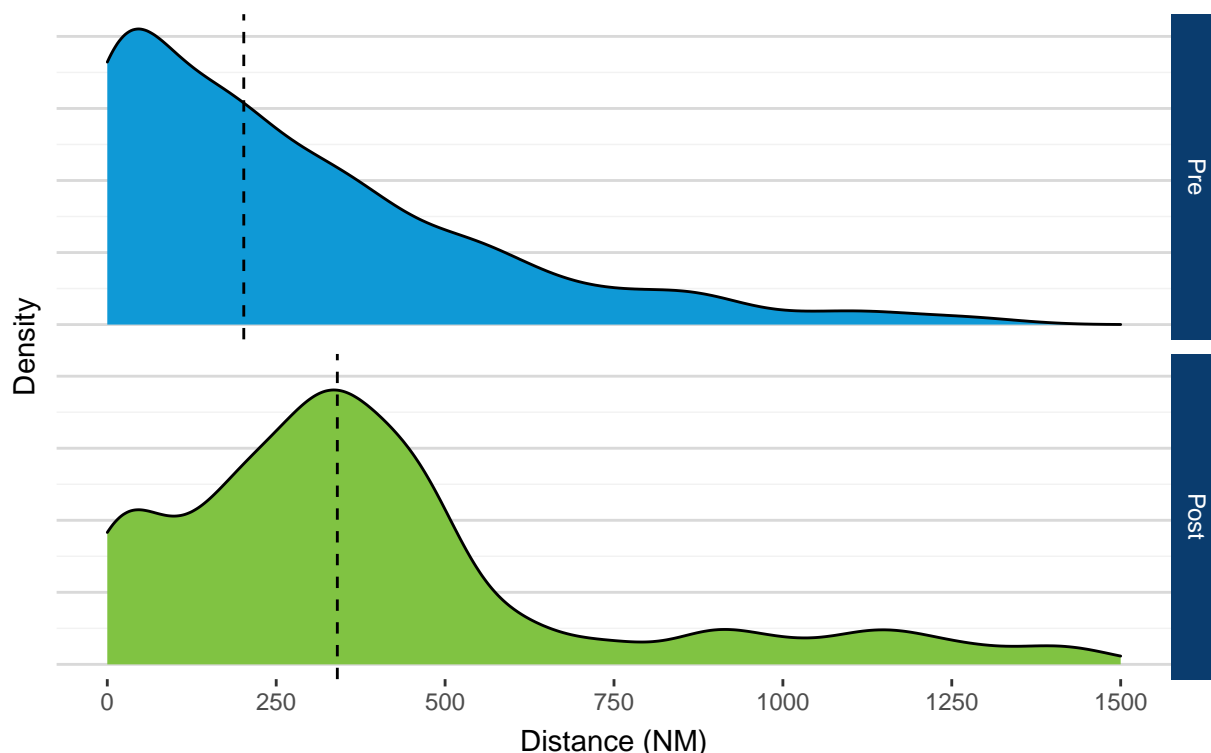
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 46. Number and Percent of Pediatric Deceased Donor Liver-Along Transplants by Allocation MELD or PELD Score or Status, Classification Distance, and Era

Score or Status Group	Classification Distance	Pre-Policy	Post-Policy
Status 1A/1B	0-150 NM	81 (33.1%)	32 (15.9%)
	>150-250 NM	39 (15.9%)	15 (7.5%)
	>250-500 NM	58 (23.7%)	98 (48.8%)
	>500 NM	67 (27.3%)	56 (27.9%)
	Total	245 (100.0%)	201 (100.0%)
PELD > 40	0-150 NM	18 (48.6%)	6 (22.2%)
	>150-250 NM	5 (13.5%)	3 (11.1%)
	>250-500 NM	8 (21.6%)	14 (51.9%)
	>500 NM	6 (16.2%)	4 (14.8%)
	Total	37 (100.0%)	27 (100.0%)
M/P 37-40	0-150 NM	35 (44.9%)	13 (31.7%)
	>150-250 NM	12 (15.4%)	9 (22.0%)
	>250-500 NM	20 (25.6%)	14 (34.1%)
	>500 NM	11 (14.1%)	5 (12.2%)
	Total	78 (100.0%)	41 (100.0%)
M/P 33-36	0-150 NM	36 (39.1%)	25 (24.5%)
	>150-250 NM	22 (23.9%)	17 (16.7%)
	>250-500 NM	21 (22.8%)	46 (45.1%)
	>500 NM	13 (14.1%)	14 (13.7%)
	Total	92 (100.0%)	102 (100.0%)
M/P 29-32	0-150 NM	28 (56.0%)	11 (20.8%)
	>150-250 NM	6 (12.0%)	13 (24.5%)
	>250-500 NM	12 (24.0%)	18 (34.0%)
	>500 NM	4 (8.0%)	11 (20.8%)
	Total	50 (100.0%)	53 (100.0%)
M/P 15-28	0-150 NM	25 (44.6%)	17 (15.9%)
	>150-250 NM	8 (14.3%)	18 (16.8%)
	>250-500 NM	12 (21.4%)	49 (45.8%)
	>500 NM	11 (19.6%)	23 (21.5%)
	Total	56 (100.0%)	107 (100.0%)
M/P < 15	0-150 NM	20 (43.5%)	10 (14.5%)
	>150-250 NM	7 (15.2%)	9 (13.0%)
	>250-500 NM	10 (21.7%)	27 (39.1%)
	>500 NM	9 (19.6%)	23 (33.3%)
	Total	46 (100.0%)	69 (100.0%)

The median distance from donor hospital to transplant program increased from 202 NM pre-policy to 340.5 NM post-policy. Post-policy, there is a larger proportion of transplants where livers traveled between 250 and 500 NM.

Figure 53. Distribution of Distance from Donor Hospital to Transplant Program for Pediatric Deceased Donor Liver-Along Transplants by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

** Dotted lines indicate median distance within each era.

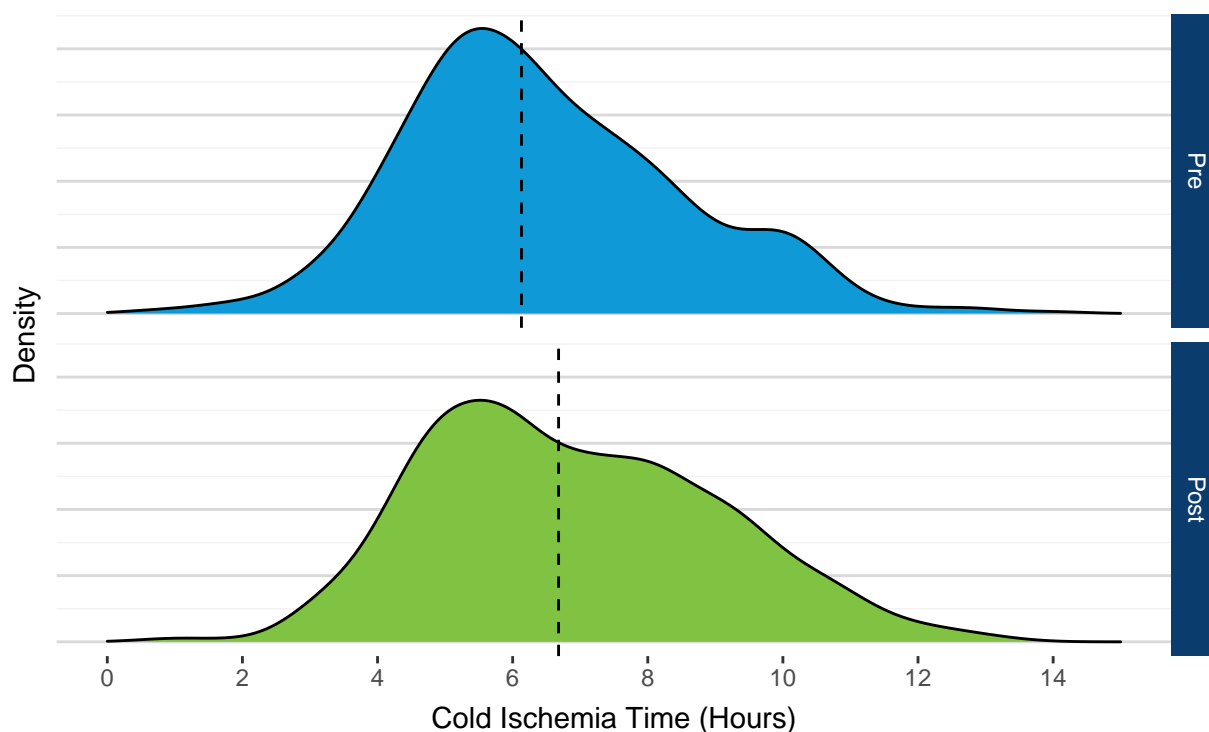
*** There were 11 pre-policy and 15 post-policy transplants with distance >1500 NM not included.

Table 47. Summary of Distance from Donor Hospital to Transplant Program for Pediatric Deceased Donor Liver-Along Transplants by Era

Era	N	N Missing	Distance (NM)					
			Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Pre	604	0	0	49	202.0	302.43	415.00	2218
Post	600	0	0	199	340.5	433.33	487.25	2205

Given the increase in distance post-policy, median cold ischemia time increased roughly 33 minutes. However, the distribution of cold ischemia time is relatively similar pre- and post-policy.

Figure 54. Distribution of Cold Ischemia Time for Pediatric Deceased Donor Liver-Alone Transplants by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

** Dotted lines indicate median cold ischemia time within each era.

*** There were 4 pre-policy and 2 post-policy transplant recipients with missing cold ischemia time that are not included.
^ There were 1 pre-policy and 1 post-policy transplants with cold ischemia time >15 hours not included.

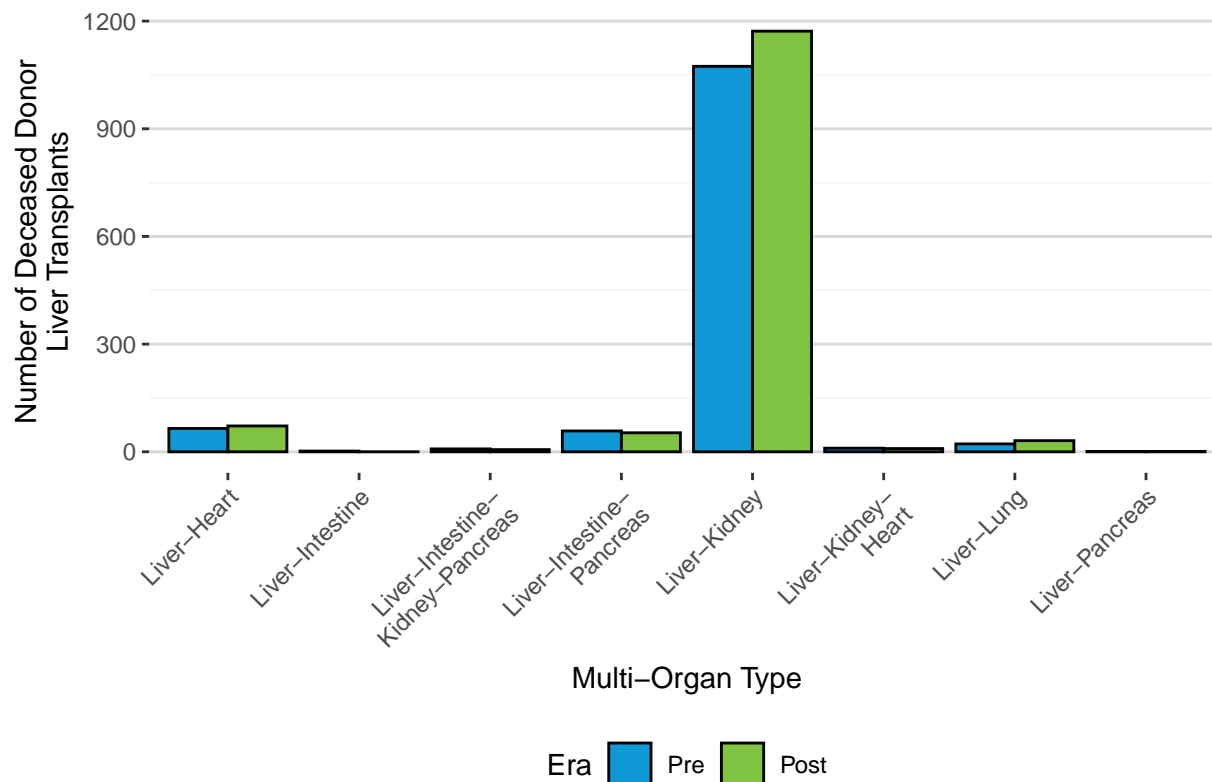
Table 48. Distribution of Cold Ischemia Time for Pediatric Deceased Donor Liver-Alone Transplants by Era

Era	N	N Missing	Time (hours)					
			Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Pre	600	4	0.57	5.03	6.13	6.46	7.74	17.28
Post	598	2	1.00	5.20	6.68	6.89	8.38	17.00

Liver Multi-Organ Transplants

There were 1,344 multi-organ liver transplants post-policy compared to 1,240 pre-policy. Distributions of multi-organ type remained similar pre- and post-policy, and liver-alone transplants made up roughly 90% of all liver transplants during both policy eras.

Figure 55. Deceased Donor Liver Transplants by Multi-Organ Type and Era



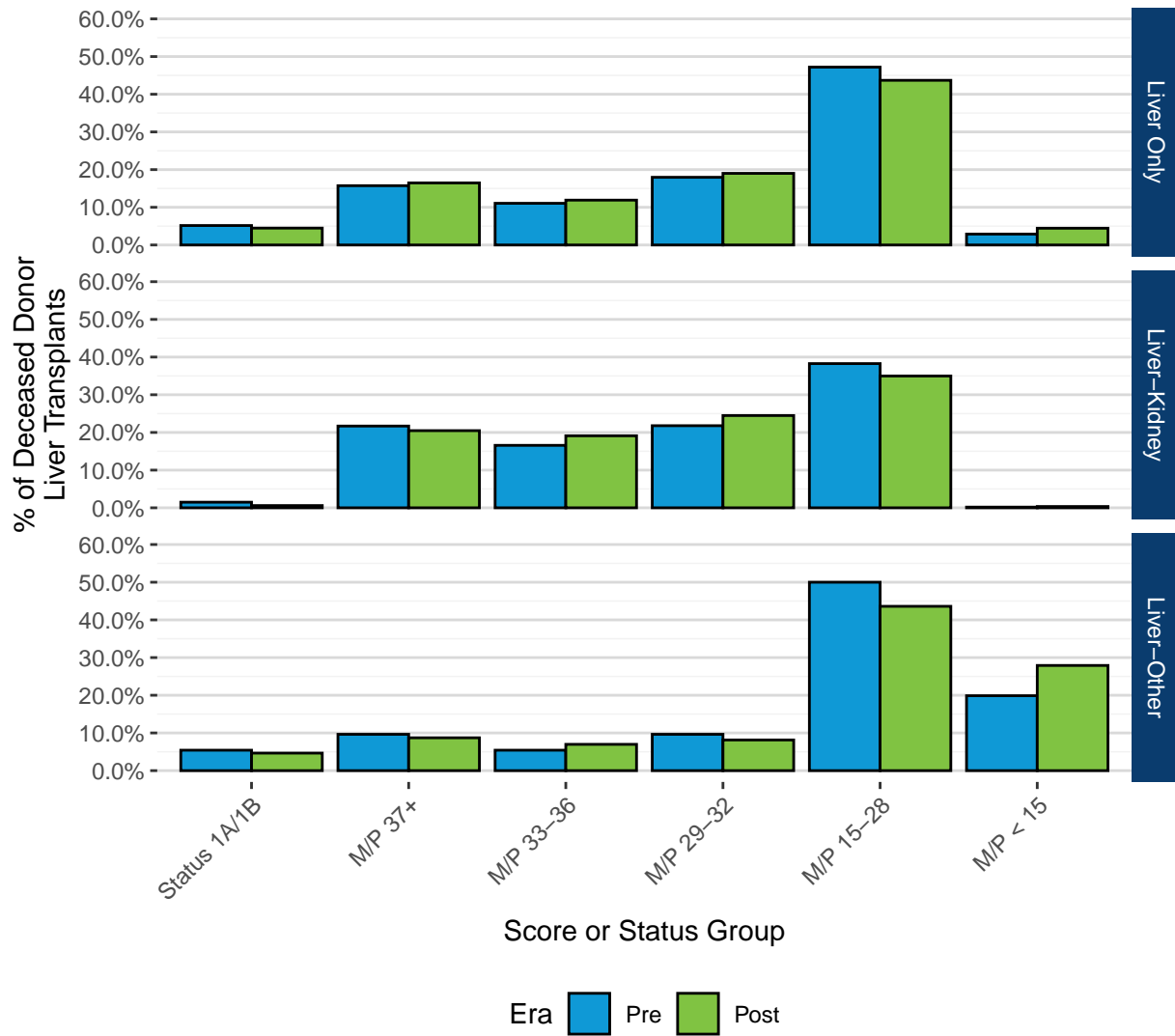
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 49. Number and Percent of Deceased Donor Liver Transplants by Multi-Organ Type and Era

Multi-Organ Type	Pre-Policy	Post-Policy
Liver Only	11040 (89.9%)	11606 (89.6%)
Liver-Heart	65 (0.5%)	72 (0.6%)
Liver-Intestine	2 (0.0%)	0 (0.0%)
Liver-Intestine-Kidney-Pancreas	8 (0.1%)	6 (0.0%)
Liver-Intestine-Pancreas	58 (0.5%)	53 (0.4%)
Liver-Kidney	1074 (8.7%)	1172 (9.1%)
Liver-Kidney-Heart	10 (0.1%)	9 (0.1%)
Liver-Lung	22 (0.2%)	31 (0.2%)
Liver-Pancreas	1 (0.0%)	1 (0.0%)
Total	12280 (100.0%)	12950 (100.0%)

Distributions of MELD or PELD Score or Status groups were similar for liver only and liver-kidney transplants. Recipients of liver-other transplants had a larger proportion of MELD/PELD scores <15.

Figure 56. Deceased Donor Liver Transplants by Multi-Organ Type, Allocation MELD or PELD Score or Status, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 50. Number and Percent of Deceased Donor Liver Transplants by Multi-Organ Type, Allocation MELD or PELD Score or Status, and Era

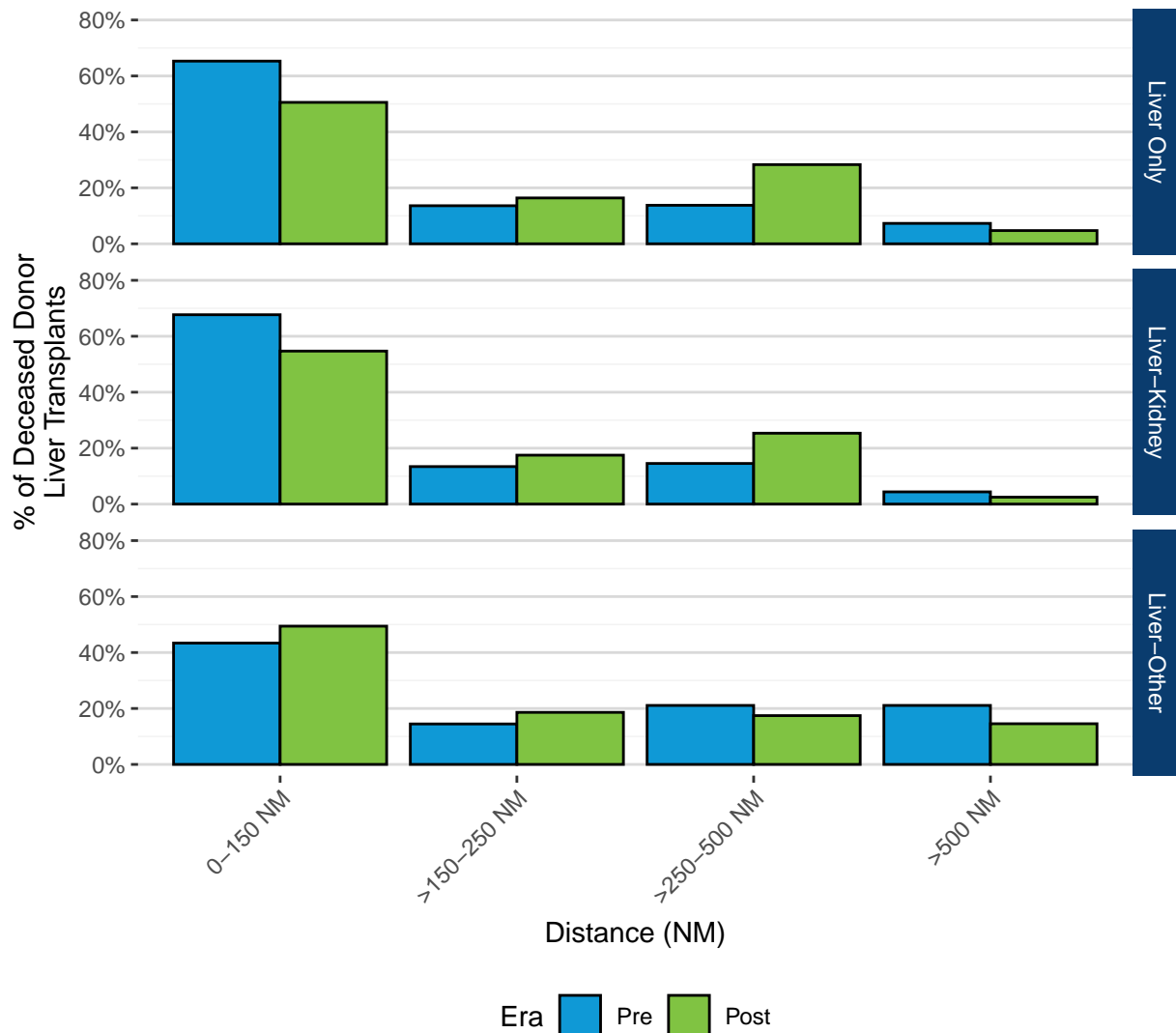
Multi-Organ Type	Score or Status Group	Pre-Policy	Post-Policy
Liver Only	Status 1A/1B	570 (5.2%)	520 (4.5%)
	M/P 37+	1737 (15.7%)	1911 (16.5%)
	M/P 33-36	1221 (11.1%)	1381 (11.9%)
	M/P 29-32	1983 (18.0%)	2206 (19.0%)
	M/P 15-28	5210 (47.2%)	5072 (43.7%)
	M/P < 15	319 (2.9%)	516 (4.4%)
	Total	11040 (100.0%)	11606 (100.0%)
Liver-Kidney	Status 1A/1B	16 (1.5%)	7 (0.6%)
	M/P 37+	233 (21.7%)	240 (20.5%)
	M/P 33-36	178 (16.6%)	224 (19.1%)
	M/P 29-32	234 (21.8%)	287 (24.5%)
	M/P 15-28	411 (38.3%)	410 (35.0%)
	M/P < 15	2 (0.2%)	4 (0.3%)
	Total	1074 (100.0%)	1172 (100.0%)
Liver-Other	Status 1A/1B	9 (5.4%)	8 (4.7%)
	M/P 37+	16 (9.6%)	15 (8.7%)
	M/P 33-36	9 (5.4%)	12 (7.0%)
	M/P 29-32	16 (9.6%)	14 (8.1%)
	M/P 15-28	83 (50.0%)	75 (43.6%)
	M/P < 15	33 (19.9%)	48 (27.9%)
	Total	166 (100.0%)	172 (100.0%)

With the implementation of the acuity circles allocation policy, changes were also made to the sharing requirements for SLK. If an OPO is offering a kidney and liver from the same deceased donor, then before allocating the kidney to kidney alone candidates, the OPO must offer the kidney with the liver to candidates who meet SLK eligibility criteria and are:

1. Within 150 NM of the donor hospital and have a MELD or PELD ≥ 15 ,
2. Within 250 NM of the donor hospital and have a MELD or PELD ≥ 29 , or
3. Within 250 NM of the donor hospital and status 1A or 1B.

Changes in distribution of distance from donor hospital to transplant program were similar for SLK transplant recipients to those for liver-alone transplant recipients and fewer livers traveled within 150 NM post-policy. Conversely for liver-other transplants, a higher proportion of livers traveled within 150 NM post-policy compared to pre-policy.

Figure 57. Deceased Donor Liver Transplants by Multi-Organ Type, Classification Distance, and Era



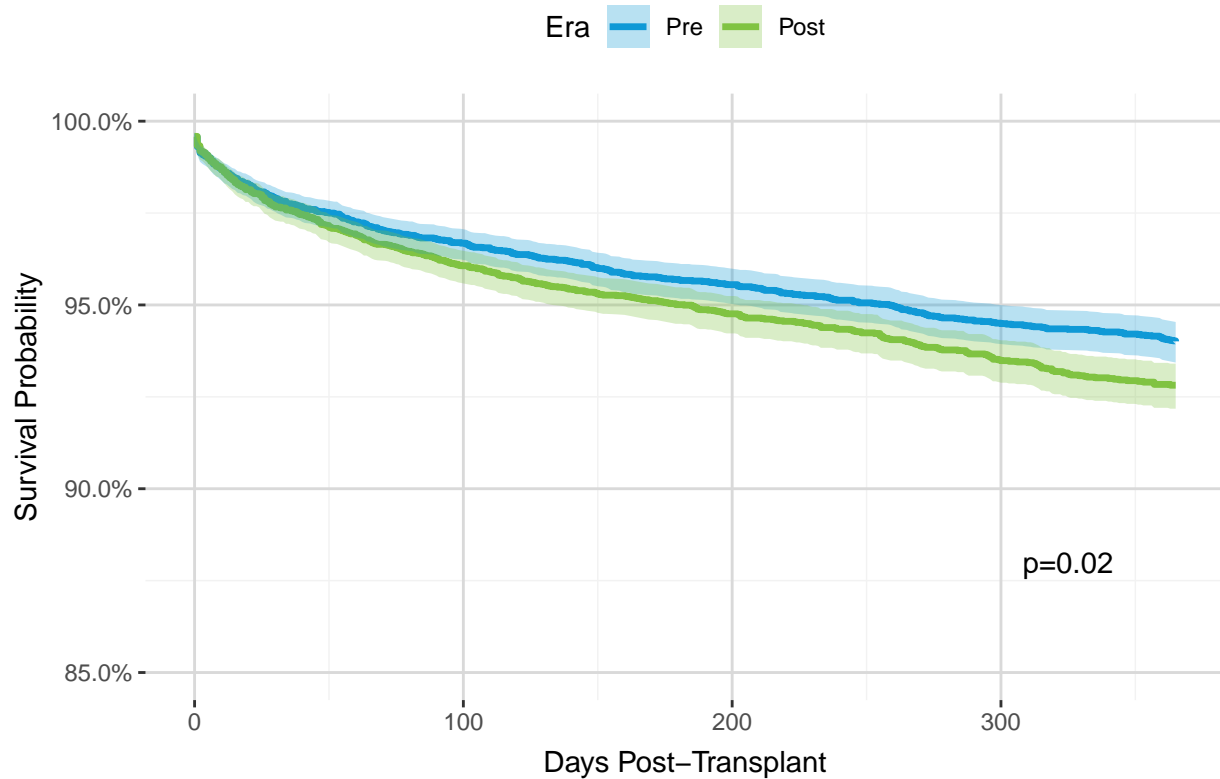
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 51. Number and Percent of Deceased Donor Liver Transplants by Multi-Organ Type, Classification Distance, and Era

Multi-Organ Type	Classification Distance	Pre-Policy	Post-Policy
Liver Only	0-150 NM	7210 (65.3%)	5868 (50.6%)
	>150-250 NM	1503 (13.6%)	1903 (16.4%)
	>250-500 NM	1521 (13.8%)	3285 (28.3%)
	>500 NM	806 (7.3%)	550 (4.7%)
	Total	11040 (100.0%)	11606 (100.0%)
Liver-Kidney	0-150 NM	727 (67.7%)	641 (54.7%)
	>150-250 NM	144 (13.4%)	205 (17.5%)
	>250-500 NM	156 (14.5%)	297 (25.3%)
	>500 NM	47 (4.4%)	29 (2.5%)
	Total	1074 (100.0%)	1172 (100.0%)
Liver-Other	0-150 NM	72 (43.4%)	85 (49.4%)
	>150-250 NM	24 (14.5%)	32 (18.6%)
	>250-500 NM	35 (21.1%)	30 (17.4%)
	>500 NM	35 (21.1%)	25 (14.5%)
	Total	166 (100.0%)	172 (100.0%)

Liver-Alone Post-Transplant Outcomes

Figure 58. One Year Post-Transplant Assumed-Alive Patient Survival Curves for Deceased Donor Liver-Alone Recipients by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 07/31/2019; Post-Policy: 02/04/2020 – 01/31/2021.

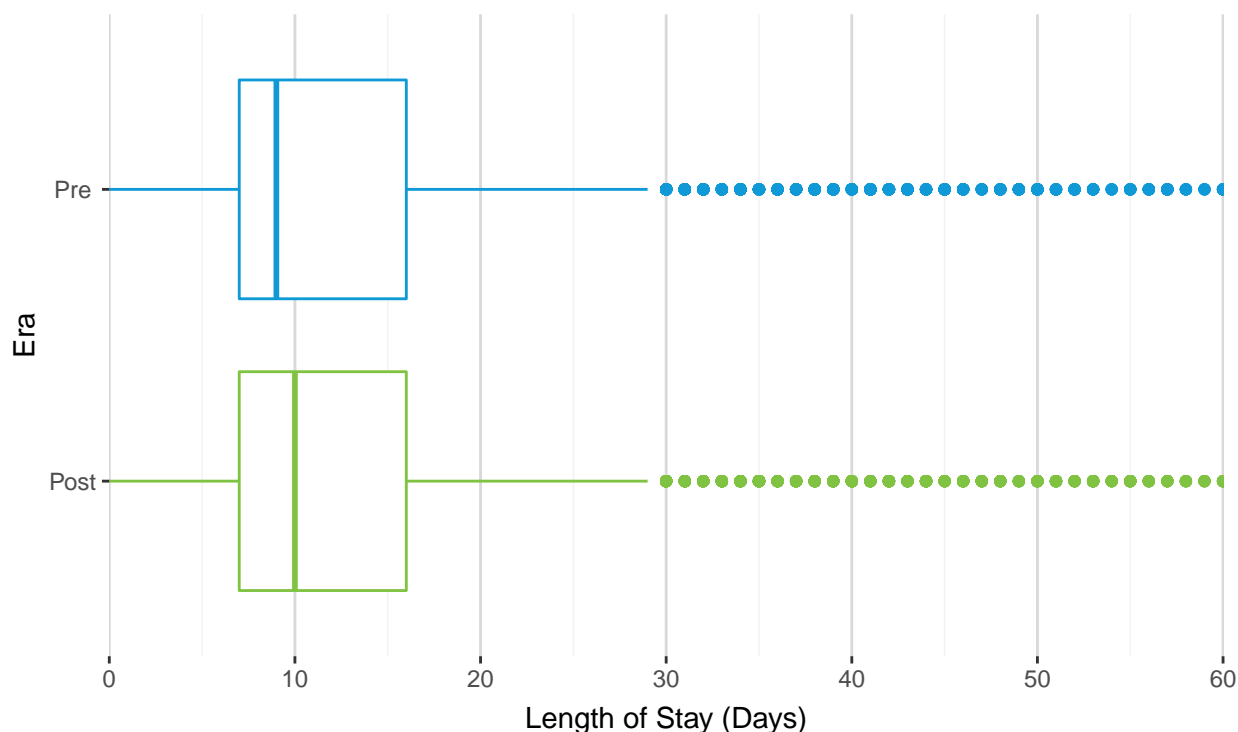
Table 52. One Year Post-Transplant Assumed-Alive Patient Survival Estimates for Deceased Donor Liver-Alone Recipients by Era

Era	N At Risk	Survival Probability	
		Estimate	95% CI
Pre	6638	94.0%	(93.4%, 94.5%)
Post	4073	92.8%	(92.2%, 93.4%)

One year patient survival for deceased donor, liver alone liver recipients showed a statistically significant difference between pre- and post-policy eras ($p=0.02$). The probability of survival at one year post-transplant was 94.0% and 92.8%, pre- and post-policy, respectively.

The distribution of post-transplant length of stay remained similar post-policy compared to pre-policy.

Figure 59. Distribution of Length of Post-Transplant Stay for Deceased Donor Liver-Alone Recipients by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.

Pre-Policy: 08/06/2018 – 07/31/2019; Post-Policy: 02/04/2020 – 01/31/2021

** There were 88 pre-policy and 73 post-policy transplant recipients with missing length of stay that are not included.

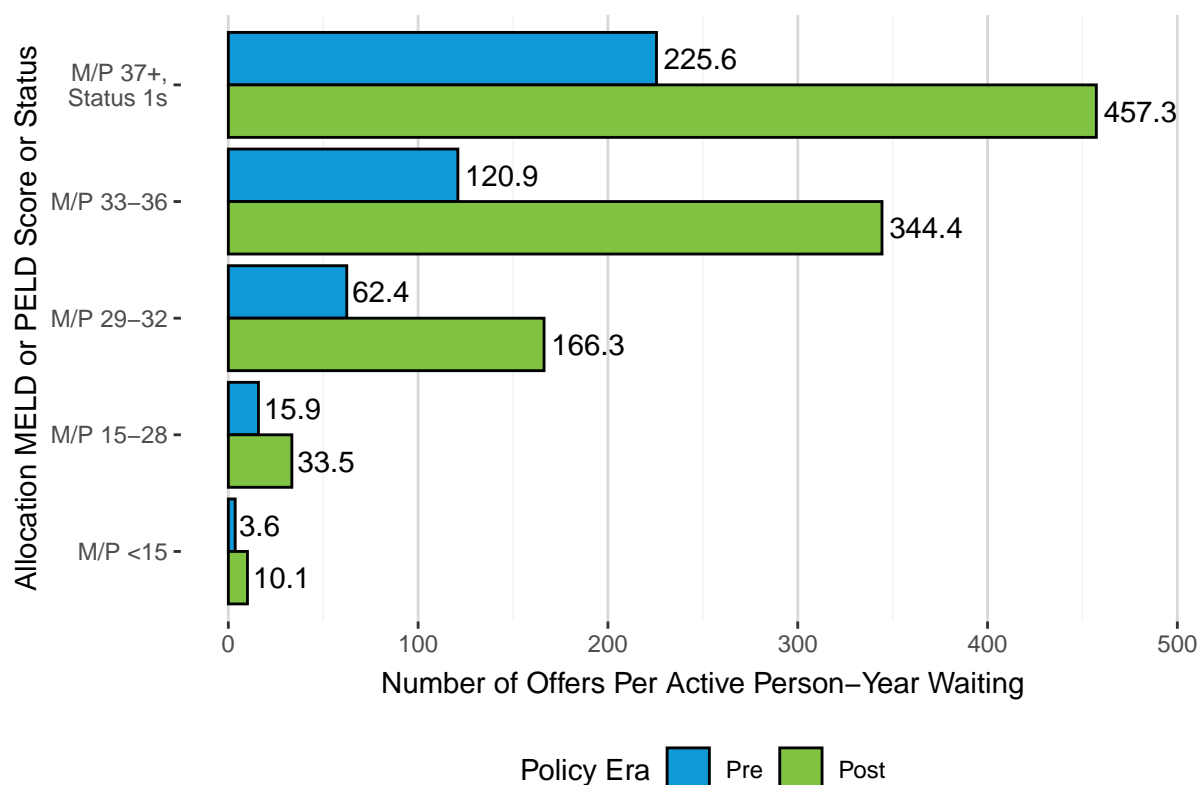
*** There were 203 pre-policy and 229 post-policy transplant recipients with length of stay > 60 days not included.

Table 53. Distribution of Length of Post-Transplant Stay for Deceased Donor Liver-Alone Recipients by Era

Era	N	N Missing	Length of Stay (days)					
			Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Pre	7110	88	0	7	10	16.1	16	618
Post	7411	73	0	7	10	15.9	17	300

Section III. Offer Rates

Figure 60. Number of Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Patient years take into account both the number of people at a given score/status as well as the amount of time each person spends at the given score/status. For example, if candidate *Z* spent 9 months at a MELD of 25 and 3 months at a MELD of 31, they would contribute 0.75 person-years to the MELD/PELD 15-28 group, and 0.25 person-years to the MELD/PELD 29-32 group. Summing this for all candidates on the waiting list contributing time during the era makes up the denominator of the offers per active patient-year waiting metric. Active patient-years are used since candidates are not able to receive offers when inactive.

The numerator sums the number of offers received by candidates within the particular score/status. So, if the same candidate *Z* received one offer at their MELD 25, and 7 offers at MELD 31, these would be added to the numerator for the respective score groups.

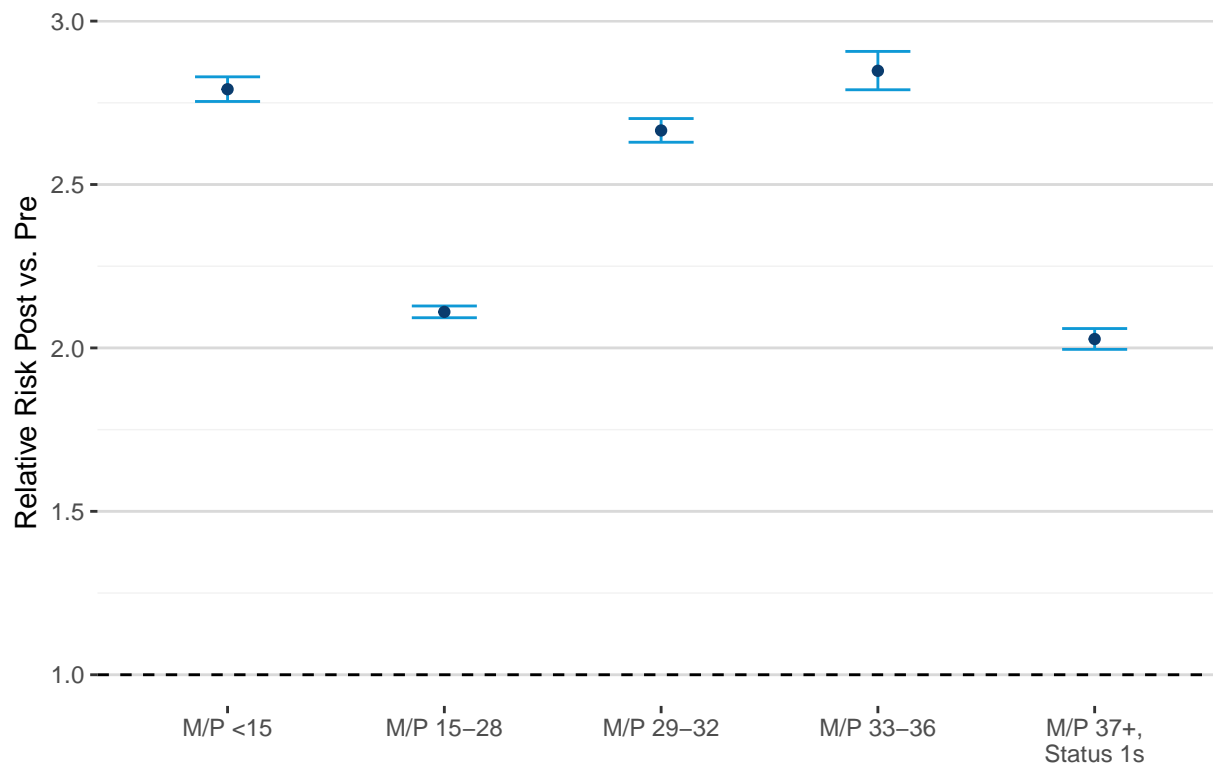
As shown in the figure above, all MELD or PELD score or status groups experienced an increase in the number of offers per active person-year waiting post-policy.

Score Group	Era	Ever Waiting	Offers	Active Person-Years	Offers per Active PY		Risk Ratio (vs. Pre-Policy)	
		N	N	PY	Estimate	95% CI	Estimate	95% CI
M/P <15	Pre	16599	29381	8143.95	3.61	(3.57, 3.65)	Ref.	Ref.
	Post	15283	74665	7414.01	10.07	(10.00, 10.14)	2.79	(2.75, 2.83)
M/P 15-28	Pre	16098	78483	4948.40	15.86	(15.75, 15.97)	Ref.	Ref.
	Post	15496	162054	4841.92	33.47	(33.31, 33.63)	2.11	(2.09, 2.13)
M/P 29-32	Pre	5519	38068	609.95	62.41	(61.79, 63.04)	Ref.	Ref.
	Post	4312	45737	274.95	166.35	(164.83, 167.88)	2.67	(2.63, 2.70)
M/P 33-36	Pre	2860	15972	132.08	120.93	(119.06, 122.82)	Ref.	Ref.
	Post	2471	20891	60.66	344.39	(339.74, 349.10)	2.85	(2.79, 2.91)
M/P 37+, Status 1s	Pre	3396	28124	124.66	225.60	(222.97, 228.25)	Ref.	Ref.
	Post	3266	34678	75.83	457.33	(452.53, 462.17)	2.03	(2.00, 2.06)

Table 54. Number of Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status and Era

For all allocation MELD/PELD scores/statuses, there was an increase in the rate of offers per active patient-year waiting in the post-policy era. This was equivalent to a 2.03-fold increase from pre- to post-policy for MELD/PELD 37+ and Status 1s and a 2.85-fold increase for MELD/PELD 33-36.

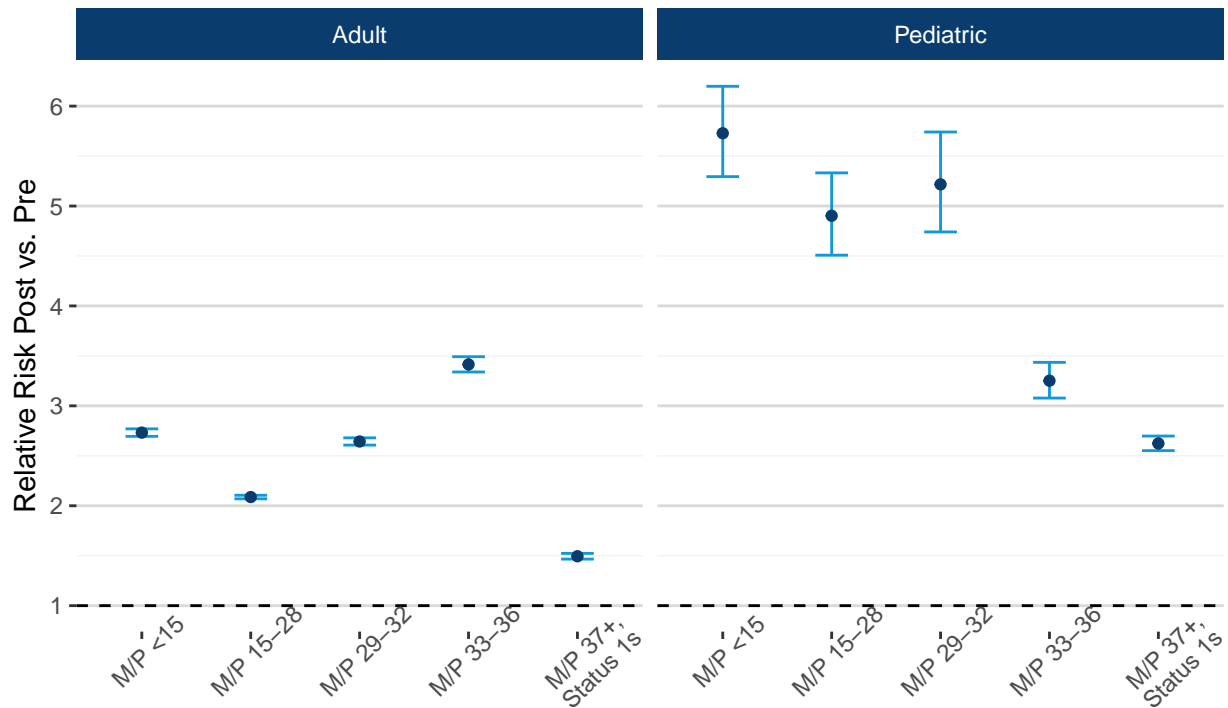
Figure 61. Relative Risk Comparing Post- to Pre-Policy Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status



Allocation MELD or PELD Score or Status
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

For all allocation MELD/PELD scores/statuses for both adult (18+ years) and pediatric (< 18 years) candidates, there was an increase in the rate of offers per active patient-year waiting in the post-policy era. These increases were more pronounced for pediatric candidates. The most marked increase was for pediatric candidates with MELD/PELD scores of <15, with an 5.73-fold increase in the risk of offers per patient-year waiting pre- to post-policy. The smaller increase in the relative risk of offers per patient-year waiting pre- to post-policy for adult candidates with MELD/PELD 37+ or Status 1s could be due to these candidates already receiving a high priority and thus larger quantity of offers under the prior allocation policy.

Figure 62. Relative Risk Comparing Post- to Pre-Policy Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status and Age at Listing



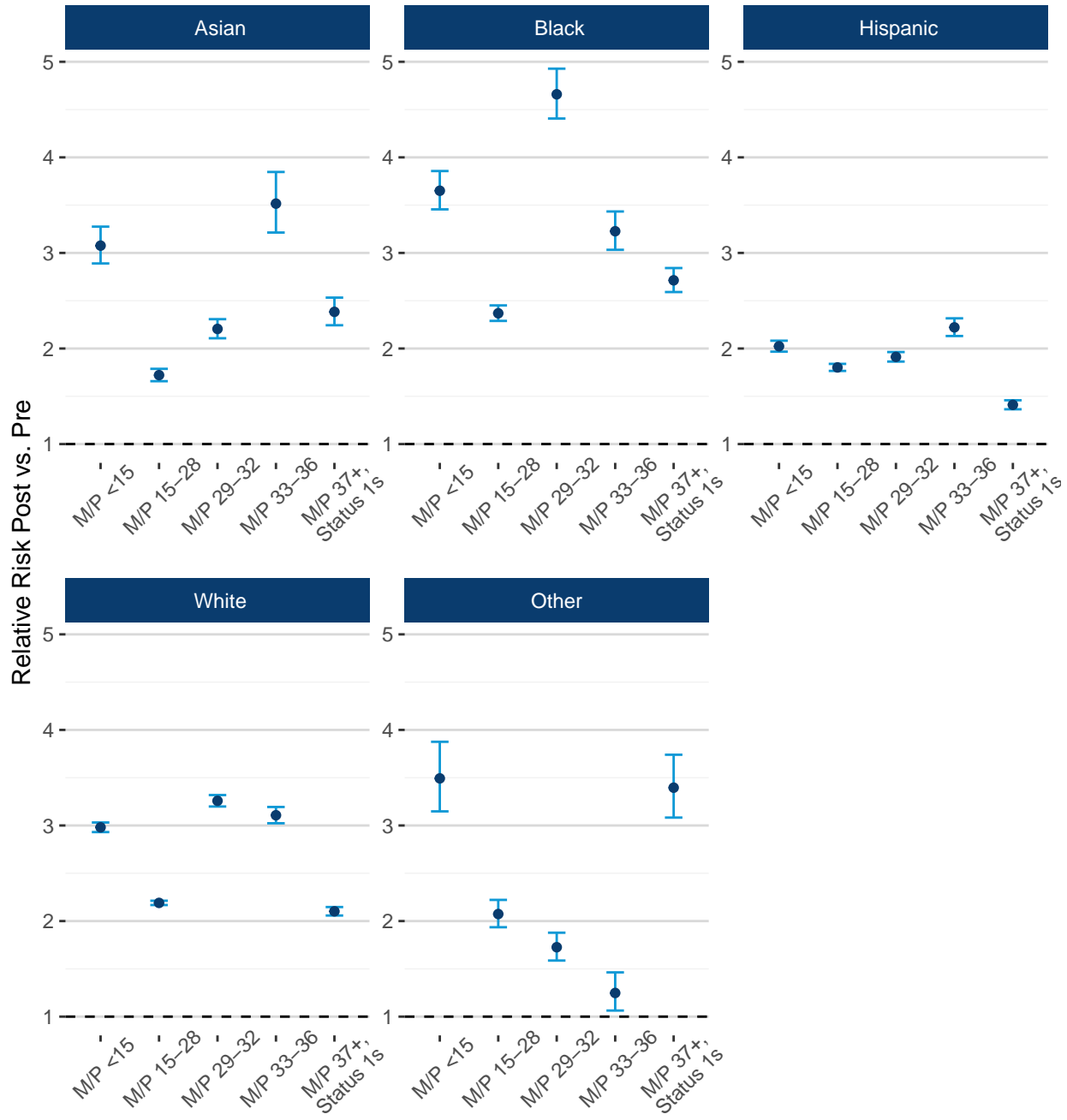
Allocation MELD or PELD Score or Status
 National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 55. Number of Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status, Age at Listing, and Era

Age at Listing	Score Group	Era	Ever Waiting	Offers	Active Person-Years	Offers per Active PY		Risk Ratio (vs. Pre-Policy)	
			N	N	PY	Estimate	95% CI	Estimate	95% CI
Pediatric	M/P <15	Pre	586	766	169.70	4.51	(4.20, 4.85)	Ref.	Ref.
		Post	510	3196	123.60	25.86	(24.97, 26.77)	5.73	(5.29, 6.2)
	M/P 15-28	Pre	436	694	83.71	8.29	(7.69, 8.93)	Ref.	Ref.
		Post	372	2556	62.88	40.65	(39.09, 42.25)	4.90	(4.51, 5.3)
	M/P 29-32	Pre	264	568	35.10	16.18	(14.88, 17.57)	Ref.	Ref.
		Post	164	1603	18.99	84.42	(80.33, 88.65)	5.22	(4.74, 5.7)
	M/P 33-36	Pre	300	1818	40.65	44.72	(42.69, 46.83)	Ref.	Ref.
		Post	255	4241	29.16	145.43	(141.09, 149.87)	3.25	(3.08, 3.4)
	M/P 37+, Status 1s	Pre	560	9042	75.36	119.98	(117.52, 122.48)	Ref.	Ref.
		Post	413	10962	34.82	314.78	(308.91, 320.73)	2.62	(2.55, 2.7)
Adult	M/P <15	Pre	16015	28615	7974.25	3.59	(3.55, 3.63)	Ref.	Ref.
		Post	14775	71469	7290.42	9.80	(9.73, 9.88)	2.73	(2.69, 2.8)
	M/P 15-28	Pre	15663	77789	4864.89	15.99	(15.88, 16.10)	Ref.	Ref.
		Post	15126	159498	4779.20	33.37	(33.21, 33.54)	2.09	(2.07, 2.1)
	M/P 29-32	Pre	5255	37500	574.85	65.23	(64.58, 65.90)	Ref.	Ref.
		Post	4148	44134	255.96	172.42	(170.82, 174.04)	2.64	(2.61, 2.7)
	M/P 33-36	Pre	2560	14154	91.43	154.81	(152.27, 157.38)	Ref.	Ref.
		Post	2216	16650	31.50	528.59	(520.60, 536.69)	3.41	(3.34, 3.5)
	M/P 37+, Status 1s	Pre	2836	19082	49.30	387.05	(381.58, 392.58)	Ref.	Ref.
		Post	2853	23716	41.00	578.40	(571.06, 585.81)	1.49	(1.47, 1.5)

Across allocation score groups, all race/ethnicity groups experienced increases in offers per patient-year waiting pre- to post-policy era. However, this increase was lowest for Hispanic, Asian, and Other race/ethnicity groups, at various MELD or PELD score or status groups.

Figure 64. Relative Risk Post- Versus Pre-Policy of Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status and Race/Ethnicity



Allocation MELD or PELD Score or Status

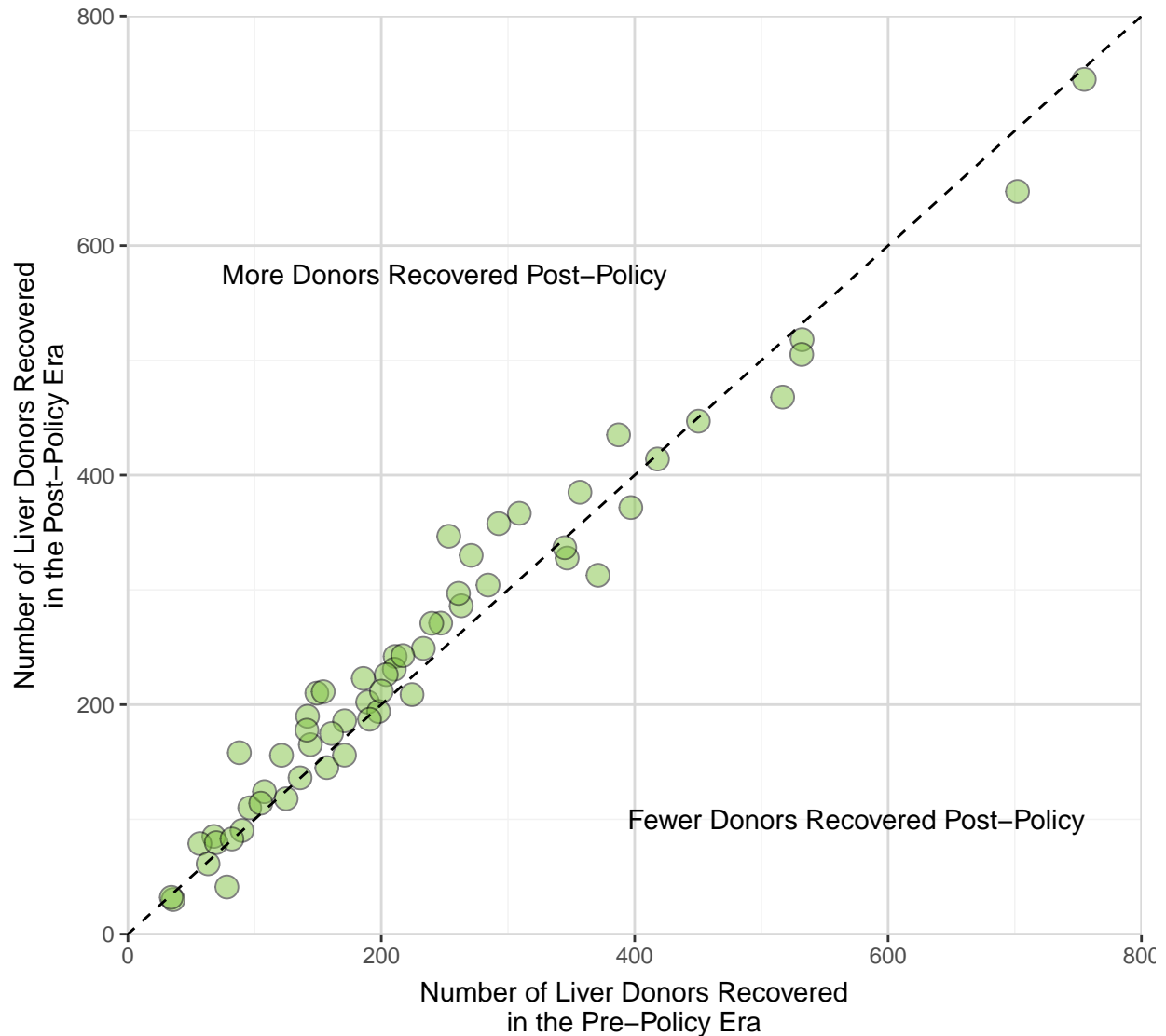
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 56. Number of Offers Per Patient-Year Waiting by Allocation MELD or PELD Score or Status, Race/Ethnicity, and Era

Race/Ethnicity	Score Group	Era	Ever Waiting	Offers	Active Person-Years	Offers per Active PY		Risk Ratio (vs. Pre-Policy)		
			N	N	PY	Estimate	95% CI	Estimate	95% CI	
Asian	M/P <15	Pre	813	1368	416.99	3.28	(3.11, 3.46)	Ref.	Ref.	
		Post	718	3471	343.92	10.09	(9.76, 10.43)	3.08	(2.89, 3.3)	
	M/P 15-28	Pre	575	3961	157.12	25.21	(24.43, 26.01)	Ref.	Ref.	
		Post	601	8782	202.37	43.40	(42.49, 44.31)	1.72	(1.66, 1.8)	
	M/P 29-32	Pre	328	3547	65.79	53.91	(52.15, 55.71)	Ref.	Ref.	
		Post	240	3971	33.41	118.86	(115.19, 122.62)	2.20	(2.11, 2.3)	
	M/P 33-36	Pre	143	800	9.55	83.81	(78.10, 89.83)	Ref.	Ref.	
		Post	118	1165	3.95	294.68	(278.00, 312.10)	3.52	(3.21, 3.8)	
	M/P 37+, Status 1s	Pre	200	1939	9.07	213.69	(204.28, 223.42)	Ref.	Ref.	
		Post	194	2269	4.45	509.34	(488.59, 530.74)	2.38	(2.24, 2.5)	
	Black	M/P <15	Pre	1104	1669	544.97	3.06	(2.92, 3.21)	Ref.	Ref.
			Post	995	5411	483.95	11.18	(10.88, 11.48)	3.65	(3.46, 3.9)
M/P 15-28		Pre	1034	4626	295.66	15.65	(15.20, 16.10)	Ref.	Ref.	
		Post	998	11302	304.98	37.06	(36.38, 37.75)	2.37	(2.29, 2.5)	
M/P 29-32		Pre	378	2096	41.62	50.35	(48.22, 52.56)	Ref.	Ref.	
		Post	269	2961	12.62	234.64	(226.27, 243.25)	4.66	(4.41, 4.9)	
M/P 33-36		Pre	224	1489	13.38	111.26	(105.68, 117.05)	Ref.	Ref.	
		Post	221	2997	8.35	359.01	(346.27, 372.10)	3.23	(3.03, 3.4)	
M/P 37+, Status 1s		Pre	335	2774	13.58	204.26	(196.73, 212.00)	Ref.	Ref.	
		Post	362	5090	9.18	554.25	(539.13, 569.69)	2.71	(2.59, 2.8)	
Hispanic		M/P <15	Pre	3027	7375	1437.01	5.13	(5.02, 5.25)	Ref.	Ref.
			Post	2880	13646	1314.02	10.38	(10.21, 10.56)	2.02	(1.97, 2.1)
	M/P 15-28	Pre	2808	14385	896.12	16.05	(15.79, 16.32)	Ref.	Ref.	
		Post	2686	25763	890.65	28.93	(28.57, 29.28)	1.80	(1.77, 1.8)	
	M/P 29-32	Pre	1163	10179	149.53	68.07	(66.76, 69.41)	Ref.	Ref.	
		Post	971	12878	98.92	130.18	(127.94, 132.45)	1.91	(1.86, 2.0)	
	M/P 33-36	Pre	605	4381	33.24	131.81	(127.93, 135.77)	Ref.	Ref.	
		Post	525	4463	15.24	292.77	(284.25, 301.49)	2.22	(2.13, 2.3)	
	M/P 37+, Status 1s	Pre	751	7084	27.90	253.87	(247.99, 259.85)	Ref.	Ref.	
		Post	651	6716	18.76	358.07	(349.56, 366.74)	1.41	(1.36, 1.5)	
	White	M/P <15	Pre	11404	18510	5634.27	3.29	(3.24, 3.33)	Ref.	Ref.
			Post	10443	50573	5164.47	9.79	(9.71, 9.88)	2.98	(2.93, 3.0)
M/P 15-28		Pre	11404	54309	3507.65	15.48	(15.35, 15.61)	Ref.	Ref.	
		Post	10945	113736	3354.20	33.91	(33.71, 34.11)	2.19	(2.17, 2.2)	
M/P 29-32		Pre	3527	20958	336.58	62.27	(61.43, 63.12)	Ref.	Ref.	
		Post	2758	24993	123.20	202.87	(200.36, 205.40)	3.26	(3.20, 3.3)	
M/P 33-36		Pre	1822	8892	72.39	122.83	(120.29, 125.41)	Ref.	Ref.	
		Post	1550	12027	31.51	381.66	(374.87, 388.54)	3.11	(3.02, 3.2)	
M/P 37+, Status 1s		Pre	2026	15769	70.55	223.53	(220.06, 227.05)	Ref.	Ref.	
		Post	1975	19042	40.53	469.84	(463.19, 476.56)	2.10	(2.06, 2.1)	
Other		M/P <15	Pre	264	459	112.29	4.09	(3.72, 4.48)	Ref.	Ref.
			Post	261	1564	109.55	14.28	(13.58, 15.00)	3.49	(3.15, 3.9)
	M/P 15-28	Pre	299	1202	94.50	12.72	(12.01, 13.46)	Ref.	Ref.	
		Post	287	2471	93.69	26.37	(25.34, 27.43)	2.07	(1.94, 2.2)	
	M/P 29-32	Pre	127	1288	16.61	77.56	(73.39, 81.92)	Ref.	Ref.	
		Post	83	934	6.98	133.90	(125.45, 142.77)	1.73	(1.59, 1.9)	
	M/P 33-36	Pre	66	410	3.52	116.55	(105.54, 128.40)	Ref.	Ref.	
		Post	59	239	1.64	145.39	(127.54, 165.04)	1.25	(1.06, 1.5)	
	M/P 37+, Status 1s	Pre	88	558	3.56	156.67	(143.94, 170.22)	Ref.	Ref.	
		Post	88	1561	2.93	531.99	(505.93, 559.05)	3.40	(3.08, 3.7)	

Section IV. Liver Utilization

Figure 65. Scatter Plot of OPO Volume by Era



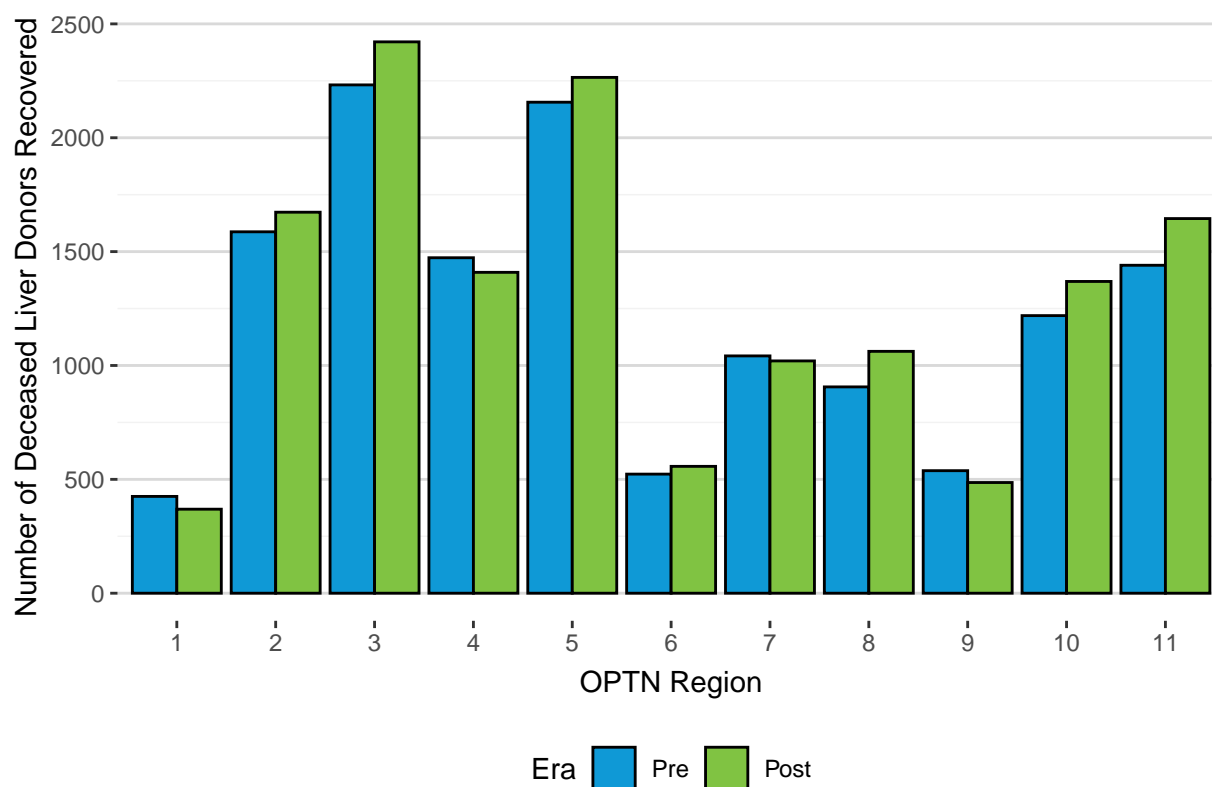
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Any points along the diagonal dashed line indicate no changes in the absolute number of deceased liver donors recovered by an OPO, pre- to post-policy. Points that fall above the diagonal represent OPOs that recovered more deceased liver donors post-policy compared to pre-policy. Points that fall below the diagonal represent OPOs that recovered fewer liver donors post-policy compared to pre-policy.

The majority of OPOs recovered a similar number of liver donors pre- and post-policy. A Spearman's rank correlation of $\rho = 0.905$ indicates a strong positive, monotonic relationship between these two measures. The Kruskal-Wallis test indicated that there was not a statistically significant change pre- to post-policy in the number of liver donors recovered within each OPO ($\chi^2_1 = 0.3945$, $p = 0.53$).

Overall, there was an increase in the number of liver donors recovered post-policy compared to pre-policy (percent change 5.4%). Below illustrates this by OPTN region. The **Appendix** highlights these trends by OPO as well.

Figure 66. Deceased Liver Donors Recovered by OPTN Region and Era



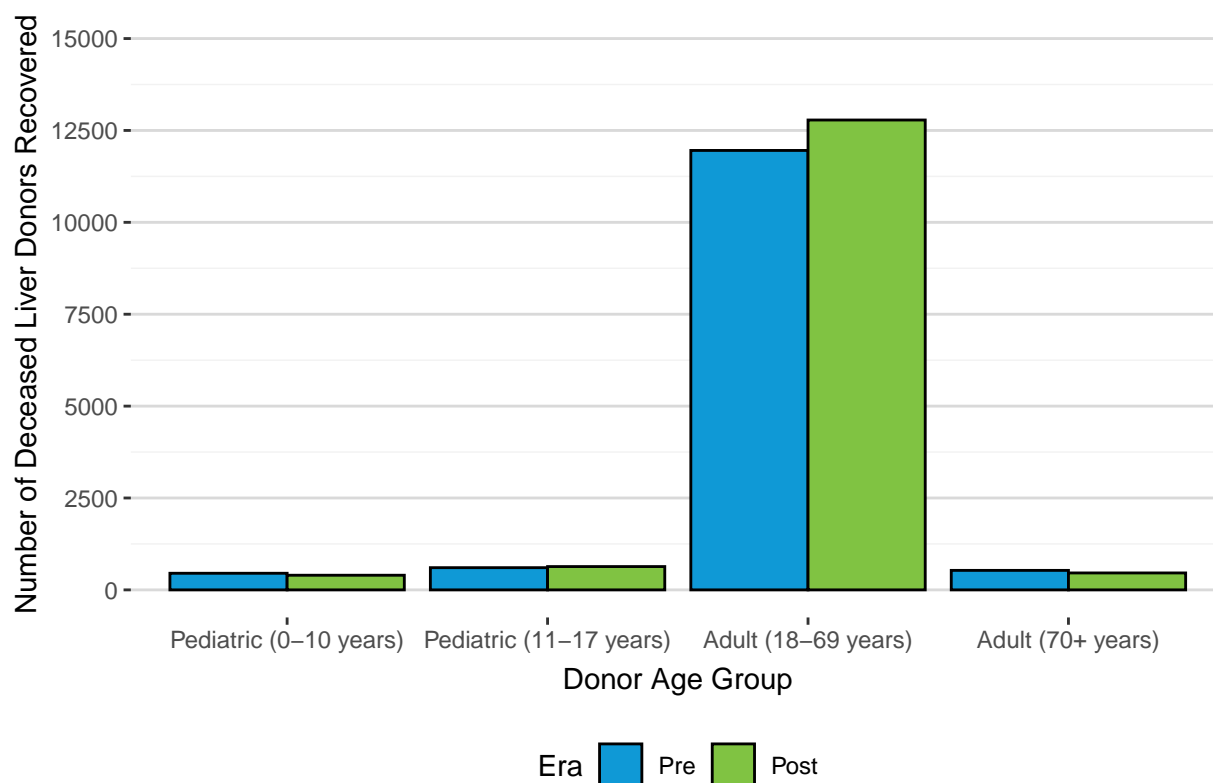
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 57. Number of Deceased Liver Donors Recovered by OPTN Region and Era

OPTN Region	Pre-Policy	Post-Policy
1	425 (3.1%)	369 (2.6%)
2	1587 (11.7%)	1673 (11.7%)
3	2232 (16.5%)	2421 (17.0%)
4	1473 (10.9%)	1409 (9.9%)
5	2156 (15.9%)	2265 (15.9%)
6	523 (3.9%)	557 (3.9%)
7	1042 (7.7%)	1020 (7.1%)
8	906 (6.7%)	1062 (7.4%)
9	538 (4.0%)	486 (3.4%)
10	1219 (9.0%)	1369 (9.6%)
11	1440 (10.6%)	1645 (11.5%)
Total	13541 (100.0%)	14276 (100.0%)

There were fewer pediatric liver donors recovered post-policy in the 0-11 year old age group. There were more donors recovered in the 18-69 year old age group.

Figure 67. Deceased Liver Donors Recovered by Donor Age and Era



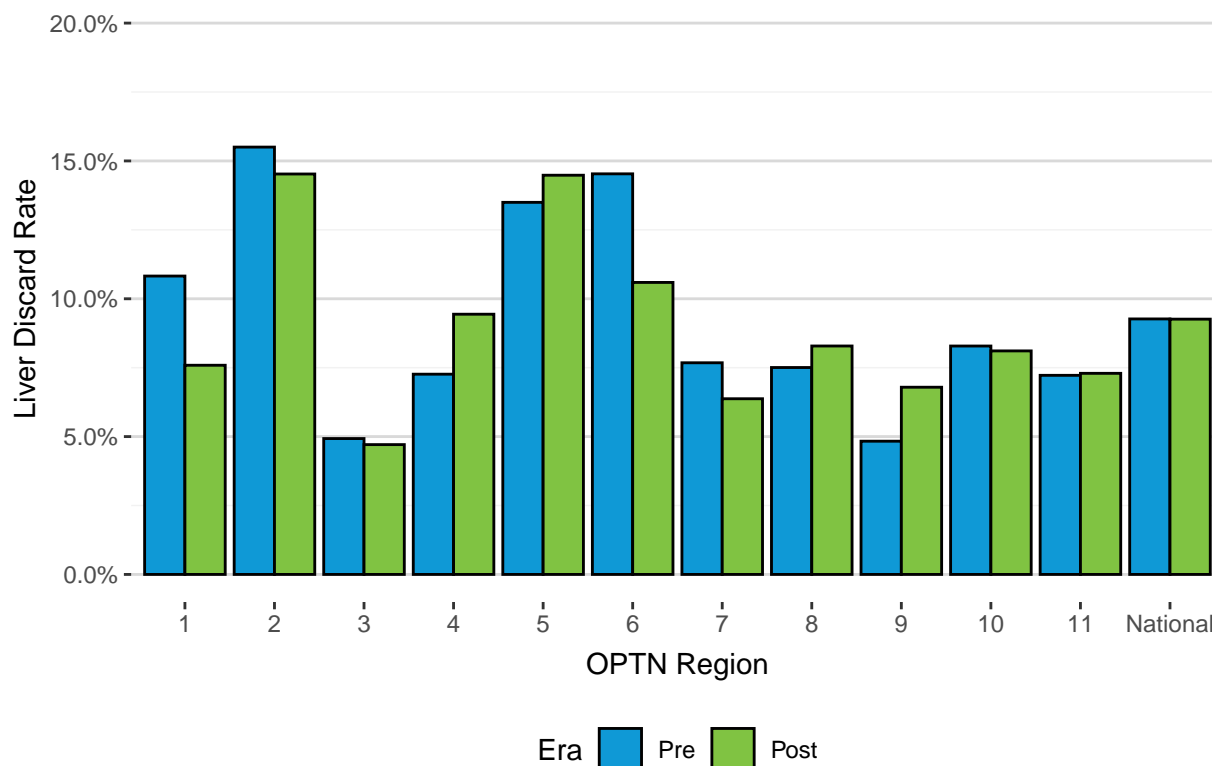
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 58. Number of Deceased Liver Donors Recovered by Donor Age and Era

Donor Age	Pre-Policy	Post-Policy
Pediatric (0-10 years)	452 (3.3%)	398 (2.8%)
Pediatric (11-17 years)	604 (4.5%)	634 (4.4%)
Adult (18-69 years)	11,955 (88.3%)	12,783 (89.5%)
Adult (70+ years)	530 (3.9%)	461 (3.2%)
Total	13,541 (100.0%)	14,276 (100.0%)

Discard rate is defined as the number of livers not transplanted over the number of deceased liver donors recovered, multiplied by 100 to get a percentage. Nationally the liver discard rate remained flat post-policy compared to pre-policy. Changes in discard rates by OPTN region continue to differ.

Figure 68. Liver Discard Rate by OPTN Region and Era



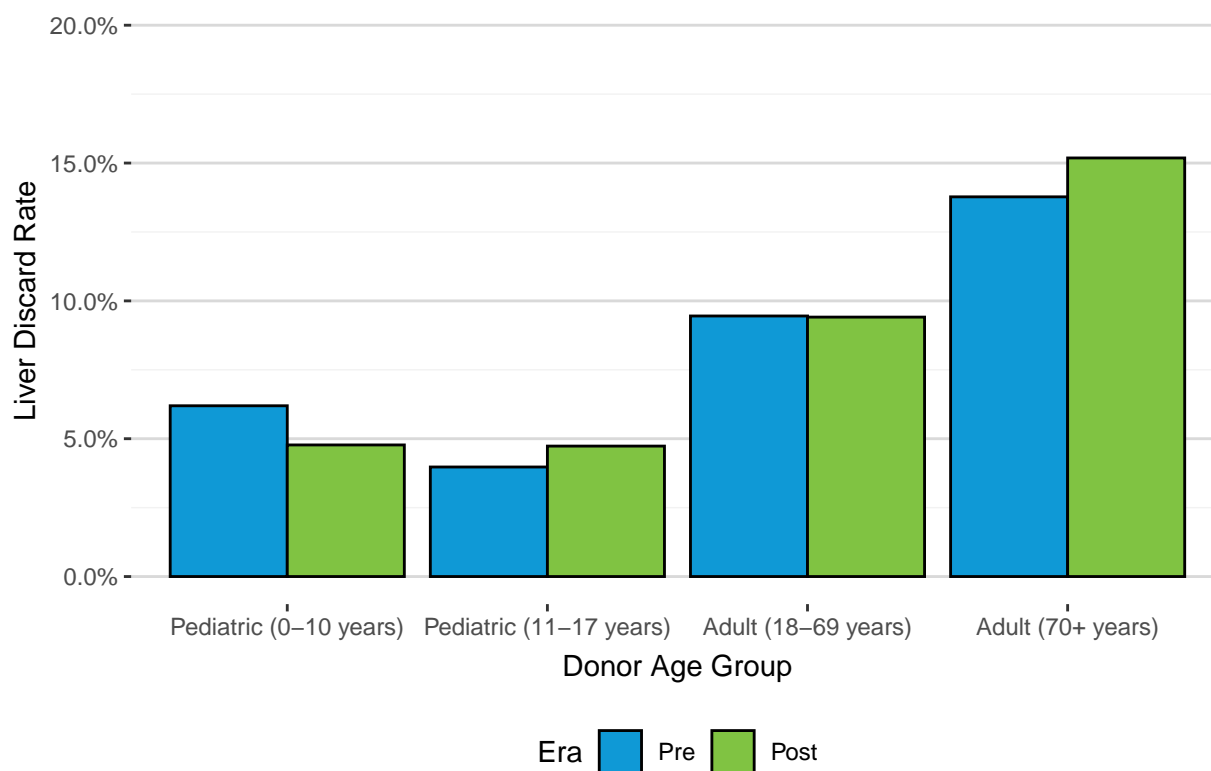
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 58. Liver Discard Rate by OPTN Region and Era

OPTN Region	Pre-Policy			Post-Policy		
	Recovered	Discarded	%	Recovered	Discarded	%
1	425	46	10.82	369	28	7.59
2	1587	246	15.50	1673	243	14.52
3	2232	110	4.93	2421	114	4.71
4	1473	107	7.26	1409	133	9.44
5	2156	291	13.50	2265	328	14.48
6	523	76	14.53	557	59	10.59
7	1042	80	7.68	1020	65	6.37
8	906	68	7.51	1062	88	8.29
9	538	26	4.83	486	33	6.79
10	1219	101	8.29	1369	111	8.11
11	1440	104	7.22	1645	120	7.29
National	13541	1255	9.27	14276	1322	9.26

Discard rates vary by donor age group. Post-policy, the discard rate increased for liver donors in the 11-17 year old and 70+ year old age groups and decreased in the 0-10 year old age group.

Figure 69. Liver Discard Rate by Donor Age and Era



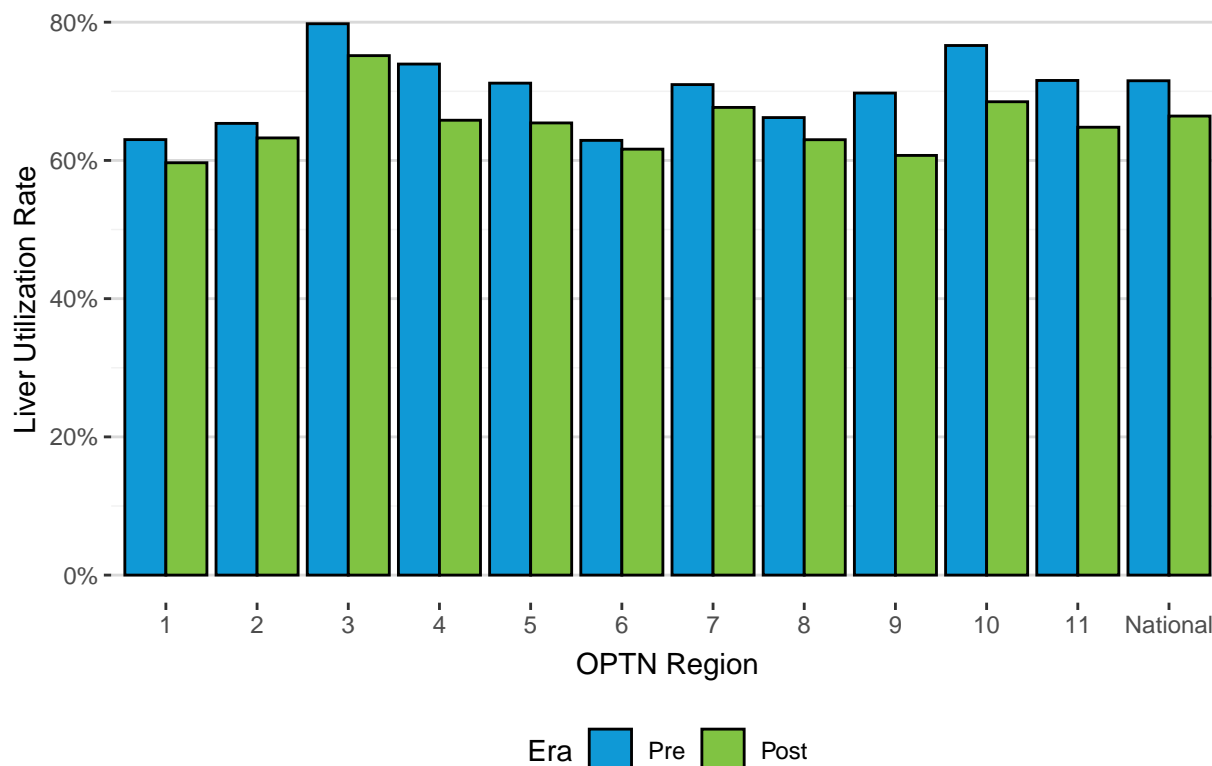
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 59. Liver Discard Rate by Donor Age and Era

Donor Age Group	Pre-Policy	Post-Policy
	%	%
Pediatric (0-10 years)	6.19	4.77
Pediatric (11-17 years)	3.97	4.73
Adult (18-69 years)	9.45	9.41
Adult (70+ years)	13.77	15.18

Liver utilization rate is defined as the number of livers transplanted over the total number of organ donors recovered, multiplied by 100 to get a percentage. Nationally, the liver utilization rate decreased post-policy; this was similar for all OPTN regions as well.

Figure 70. Liver Utilization Rate by OPTN Region and Era



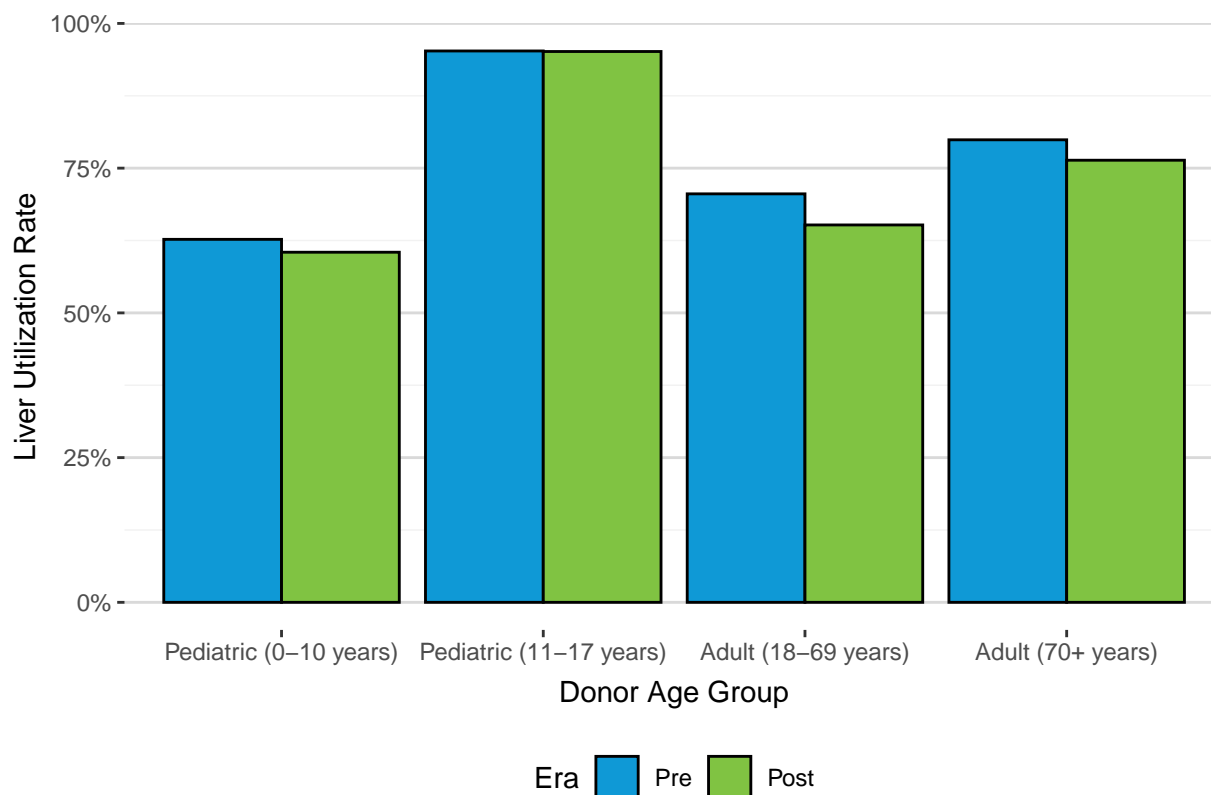
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 60. Liver Utilization Rate by OPTN Region and Era

OPTN Region	Pre-Policy	Post-Policy
	%	%
1	63.01	59.66
2	65.36	63.25
3	79.78	75.16
4	73.94	65.81
5	71.18	65.42
6	62.90	61.63
7	70.97	67.67
8	66.20	63.00
9	69.75	60.72
10	76.63	68.49
11	71.57	64.80
National	71.53	66.42

The decrease in utilization rate post-policy was also seen by donor age, particularly in the adult age groups.

Figure 71. Liver Utilization Rate by Donor Age and Era



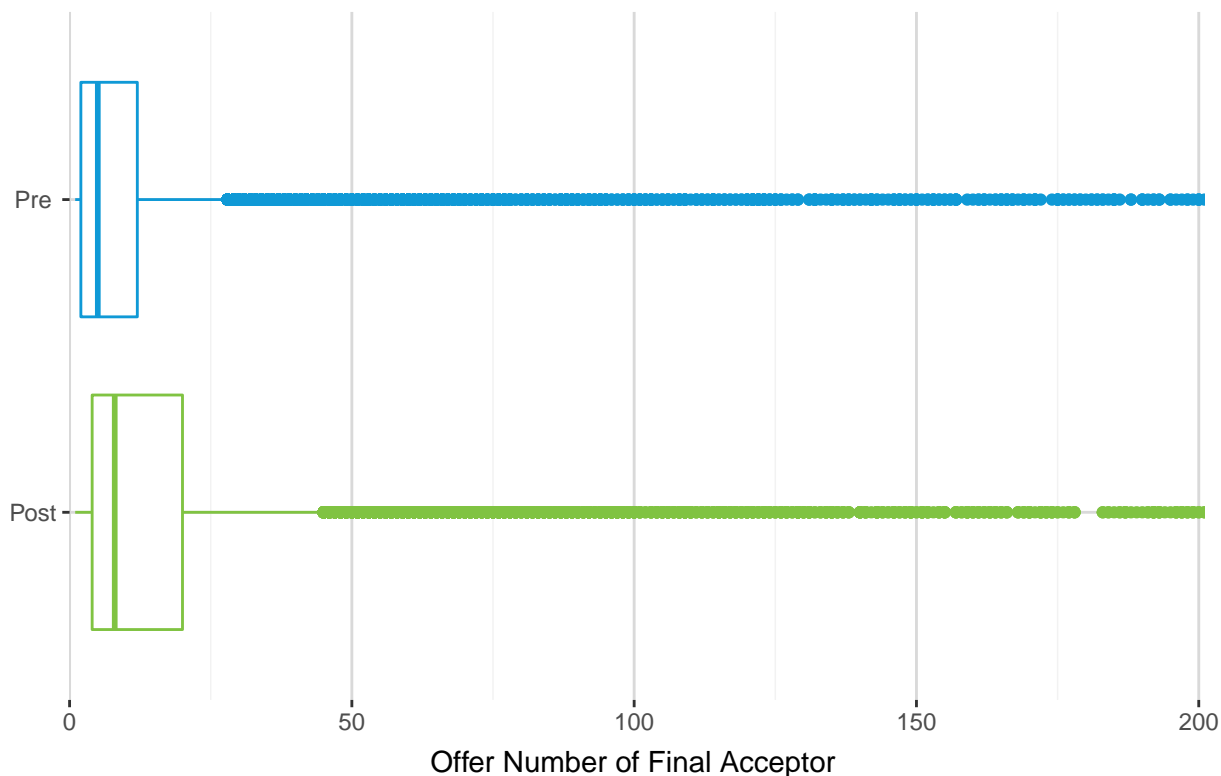
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 61. Liver Utilization Rate by Donor Age and Era

Donor Age Group	Pre-Policy	Post-Policy
	%	%
Pediatric (0-10 years)	62.70	60.48
Pediatric (11-17 years)	95.24	95.15
Adult (18-69 years)	70.56	65.19
Adult (70+ years)	79.90	76.37

The distribution of the sequence number of the final acceptor on liver match runs is shown below. “Final acceptor” is used, as it is possible for two liver segments to be placed on the same match run; in these cases, the last of these is used if both segments are placed. Accepting candidate sequence number increased pre- to post-policy, as indicated by shifts in the first quartile, median, and 3rd quartile of the boxplots in the post-policy eras. However, the median offer number of the final acceptor remained under 10.

Figure 72. Distribution of Sequence Number of Final Acceptor on Liver Match Run by Era



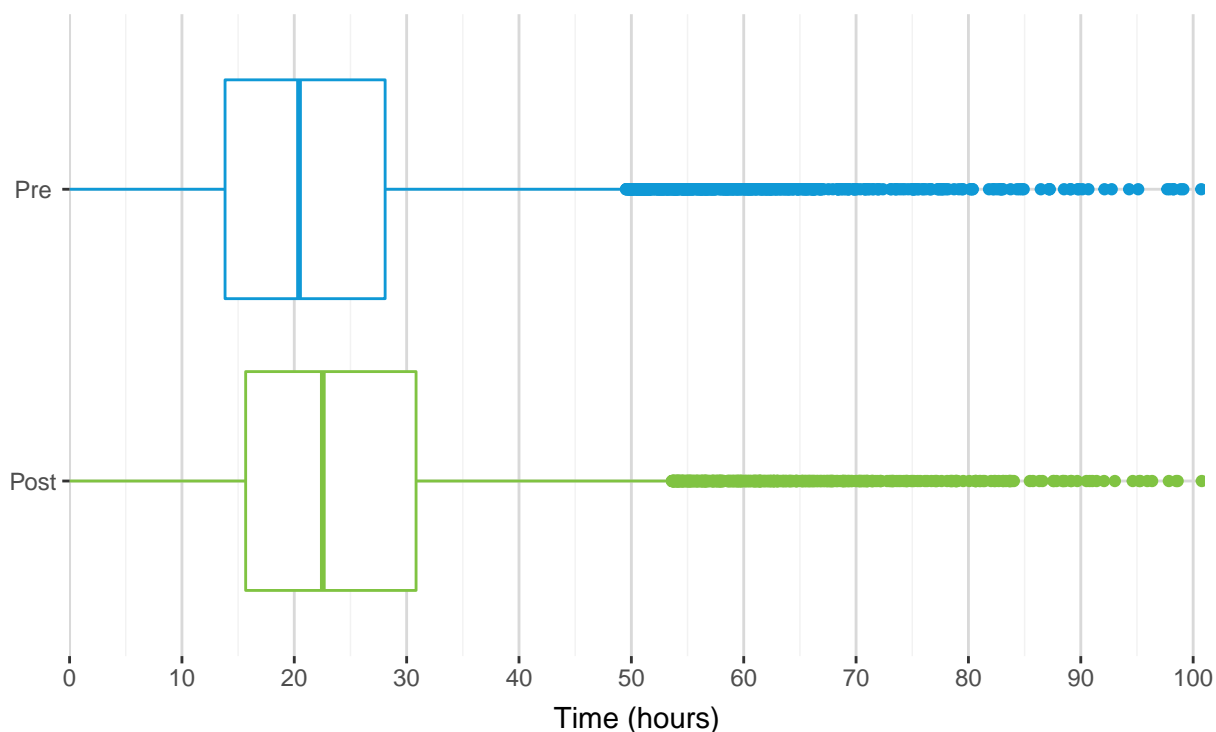
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.
** There were 807 final acceptances pre-policy and 541 post-policy with an offer number >200.

Table 62. Distribution of Sequence Number of Final Acceptor on Liver Match Run by Era

Era	N Matches	Final Acceptor Sequence Number						
		Min	25th Percentile	Median	Mean	75th Percentile	90th Percentile	Max
Pre	12396	1	2	5	77	14	48	9951
Post	13117	1	4	9	106	25	92	7988

Median time from first electronic offer being sent to actual cross clamp time increased by roughly 2 hours pre- to post-policy.

Figure 73. Distribution of Time from First Electronic Offer to Cross Clamp for Deceased Liver Donors by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

* There were 0 matches pre-policy and 2 post-policy with a time >100 hours that are not included.

** There were 5 matches pre-policy and 2 post-policy with the first electronic offer prior to cross-clamp that are not included.

Table 63. Distribution of Time from First Electronic Offer to Cross Clamp for Deceased Liver Donors by Era

Era	N Matches	Time (Hours)					
		Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Pre	15860	0.02	13.84	20.44	22.37	28.12	353.92
Post	17862	0.01	15.68	22.54	24.41	30.86	160.84

Section V. Intestine

There were 178 intestine candidates added to the waiting list pre-policy and 215 post-policy. Few intestine registrations were removed in the pre-policy era (6) or post-policy era (1) due to death or too sick to transplant.

A total of 148 deceased intestine donors were recovered pre-policy and 135 were recovered post-policy. The same amount of deceased donor intestine transplants occurred pre- and post-policy (133 pre- and 133 post-policy). Note that this includes all deceased donor intestine recipients - intestine alone as well as intestine multi-organ. The following table illustrates the distribution of intestine-alone versus intestine multi-organ transplants in each policy era. There was a larger proportion of intestine only transplants post-policy compared to pre-policy.

Table 64. Number of Deceased Donor Intestine Transplants by Multi-Organ Type and Era

Multi-Organ Type	Pre-Policy	Post-Policy
Intestine Only	51 (38.3%)	60 (45.1%)
Intestine-Kidney	5 (3.8%)	3 (2.3%)
Intestine-Kidney-Pancreas	0 (0.0%)	1 (0.8%)
Intestine-Liver	2 (1.5%)	0 (0.0%)
Intestine-Liver-Kidney	8 (6.0%)	6 (4.5%)
Intestine-Liver-Pancreas	58 (43.6%)	53 (39.8%)
Intestine-Pancreas	8 (6.0%)	10 (7.5%)
Intestine-VCA	1 (0.8%)	0 (0.0%)
Total	133 (100.0%)	133 (100.0%)

The distribution of intestine transplants by classification distance groups were similar between the policy eras, with a smaller proportion of intestines traveling >500 NM post-policy.

Table 65. Number of Deceased Donor Intestine Transplants by Classification Distance and Era

Classification Distance	Pre-Policy	Post-Policy
0-150 NM	29 (21.8%)	32 (24.1%)
>150-250 NM	10 (7.5%)	10 (7.5%)
>250-500 NM	34 (25.6%)	38 (28.6%)
>500 NM	60 (45.1%)	53 (39.8%)
Total	133 (100.0%)	133 (100.0%)

Conclusion

This report provides a review of the first 18 months acuity circle allocation changes. A national state of emergency was declared due to COVID-19 on March 13, 2020, making the true impact of this policy change challenging to determine. While changes pre- to post-policy must be considered in light of this national emergency, many of the results thus far are supported by the predictions of the SRTR modeling prior to implementation of the acuity circle allocation policy. Takeaways at a national-level of these policy changes are as follows.

Generally the waitlist has remained consistent with regards to characteristics of new additions pre- to post-policy. There was an increase in adult waitlist additions with an alcohol-related liver disease post-policy. Although there were more adult waitlist additions overall post-policy, there were fewer pediatric waitlist additions, particularly in the 0-2 year old age group.

Overall, waitlist mortality rates per 100 person-years increased post-policy in the MELD/PELD 29-32, MELD/PELD 33-36, and MELD/PELD 37+ groups despite fewer death or too sick events post-policy, likely due to the smaller number of candidates in these groups. Conversely, transplant rates per 100 active person-years increased in the MELD <15, MELD/PELD 29-32, MELD/PELD 33-36, MELD/PELD 37+, and Status 1 groups, indicating that more patients are being transplanted more quickly post-policy. Despite an increase in waitlist mortality for some groups, the number of adult and pediatric liver-alone registrations for death or too sick decreased post-policy compared to pre-policy.

There was an increase in the number of adult deceased donor liver-alone transplants post-policy. The national median allocation MELD score at transplant remained consistent at 28 pre- and post-policy, and there were fewer HCC exception and non-HCC exception transplants post-policy. There were more DCD transplants post-policy, particularly for recipients with MELD scores of 28 or lower. There was a decrease in the proportion of livers traveling within 150 NMs and an increase in the proportion of livers traveling between 250 and 500 NMs. Despite an increase in distance, median cold ischemia time only increased by about 11 minutes.

The number of pediatric liver-alone deceased donor transplants remained stable pre- to post-policy despite the decrease in pediatric waitlist additions. There was a substantial decrease in the proportion and volume of Status 1A and 1B transplants and an increase in the proportion and volume of 12-17 year old transplant recipients. There were fewer transplants in the 0-2 year old age group, perhaps corresponding with the decrease in 0-2 year old waitlist additions. Similar to adult transplants, there was a decrease in pediatric transplants of livers traveling less than 150 NMs and an increase in livers traveling greater than 250 NMs. Median cold ischemia time for pediatric transplants increased roughly 33 minutes post-policy.

There was an increase in simultaneous liver-kidney multi-organ transplants post-policy. However, liver-alone transplants still make up about 90% of all liver transplants. One year post-transplant survival did decrease, although slightly, post-policy. While offer rates increased across all MELD or PELD score/status groups, age groups, and race/ethnicity groups, this was by varying degrees. The national discard rate remained similar pre- and post-policy and the liver utilization rate decreased nationally as well as in all regions.

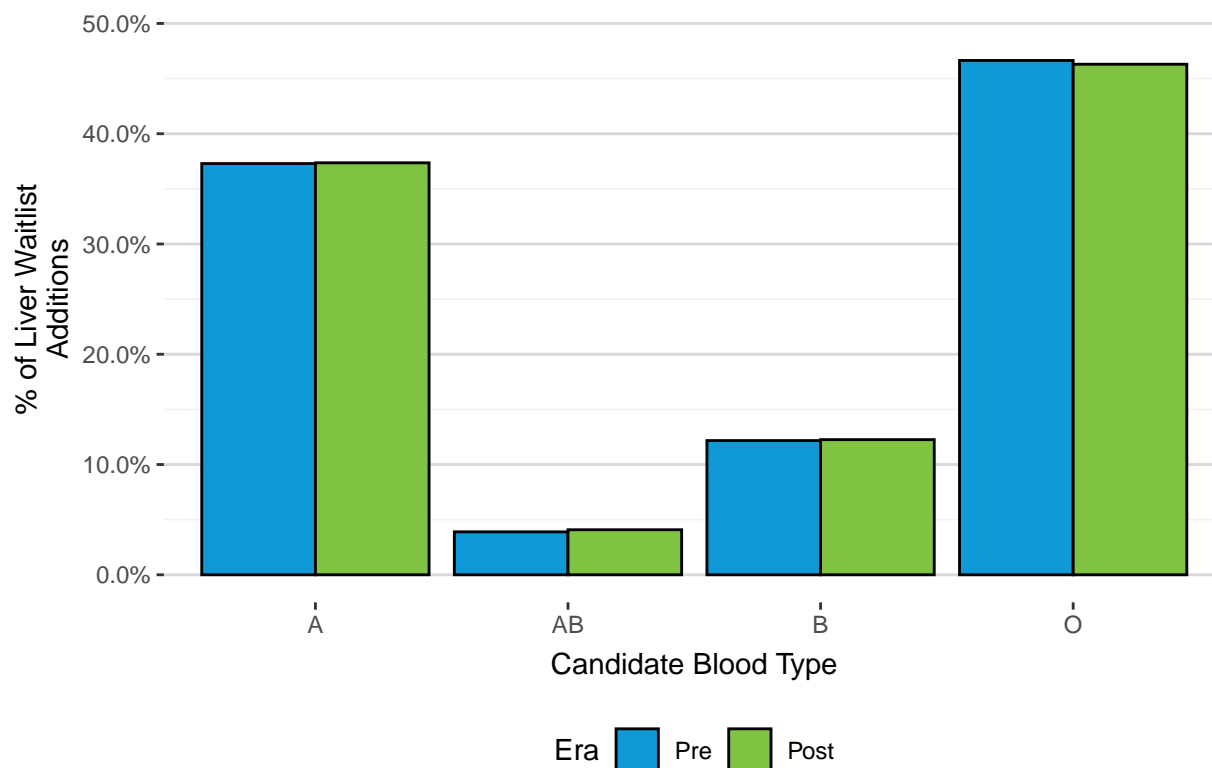
Intestine transplantation remained stable during this policy change with fewer intestine registrations removed for death or too sick post-policy and the same amount of intestine transplants performed pre- and post-policy. The distribution of intestine transplants by classification distance groups remained similar between the policy eras.

The COVID-19 crisis has created challenges in many sectors, but particularly the medical field. Specific to transplantation, changes in potential patient evaluation, organ procurement, and transplant recipient selection process, as well as acceptance behaviors and routine outpatient activities, including clinical testing, have made it difficult to parse out COVID-19 from potential policy effects. Continued data accumulation and monitoring of the system will be needed and more detailed evaluation will be possible as more data become available and sample sizes increase.

Appendix

Additional Waitlist Registration Additions Information

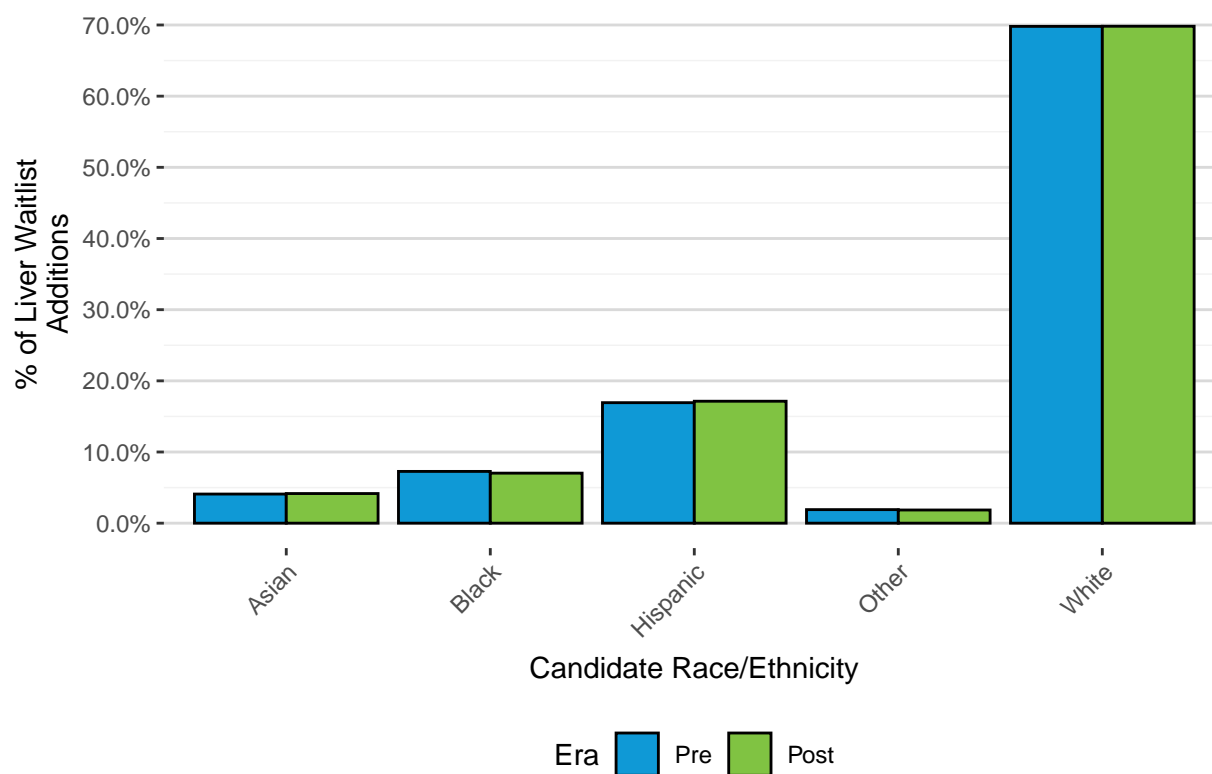
Figure 74. Adult Registrations Added to Liver Waitlist by Candidate Blood Type and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 66. Number and Percent of Adult Registrations Added to Liver Waitlist by Candidate Blood Type and Era

Candidate Blood Type	Pre-Policy	Post-Policy
A	7020 (37.3%)	7200 (37.4%)
AB	733 (3.9%)	787 (4.1%)
B	2291 (12.2%)	2362 (12.3%)
O	8780 (46.6%)	8923 (46.3%)
Total	18824 (100.0%)	19272 (100.0%)

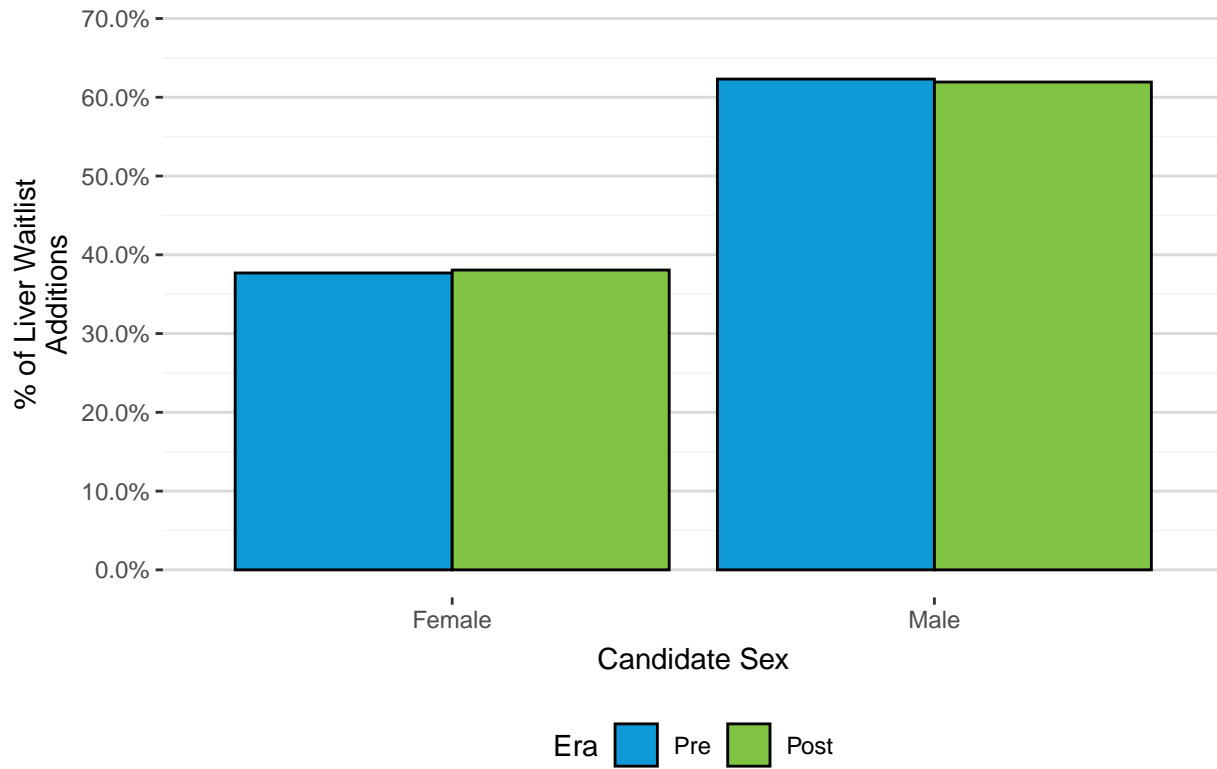
Figure 75. Adult Registrations Added to Liver Waitlist by Candidate Race/Ethnicity and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 67. Number and Percent of Adult Registrations Added to Liver Waitlist by Candidate Race/Ethnicity and Era

Candidate Race/Ethnicity	Pre-Policy	Post-Policy
Asian	770 (4.1%)	802 (4.2%)
Black	1369 (7.3%)	1355 (7.0%)
Hispanic	3187 (16.9%)	3302 (17.1%)
Other	358 (1.9%)	357 (1.9%)
White	13140 (69.8%)	13456 (69.8%)
Total	18824 (100.0%)	19272 (100.0%)

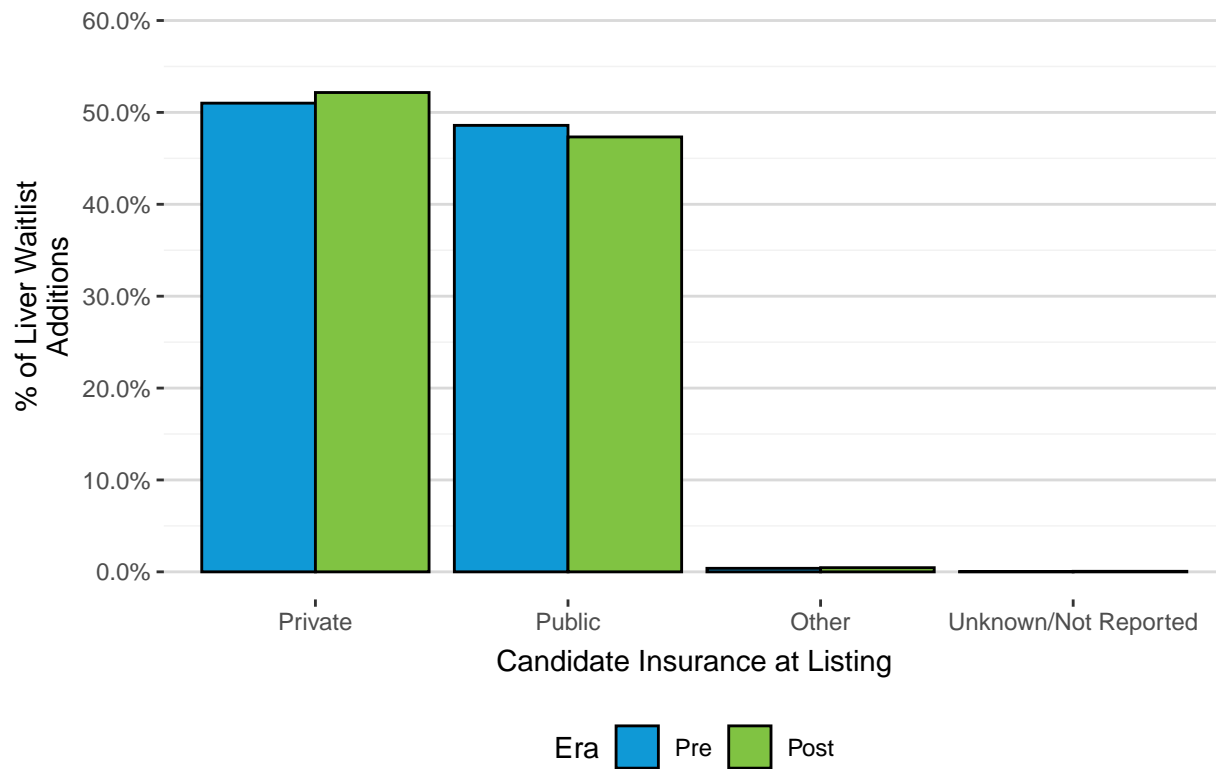
Figure 76. Adult Registrations Added to Liver Waitlist by Candidate Sex and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 68. Number and Percent of Adult Registrations Added to Liver Waitlist by Candidate Sex and Era

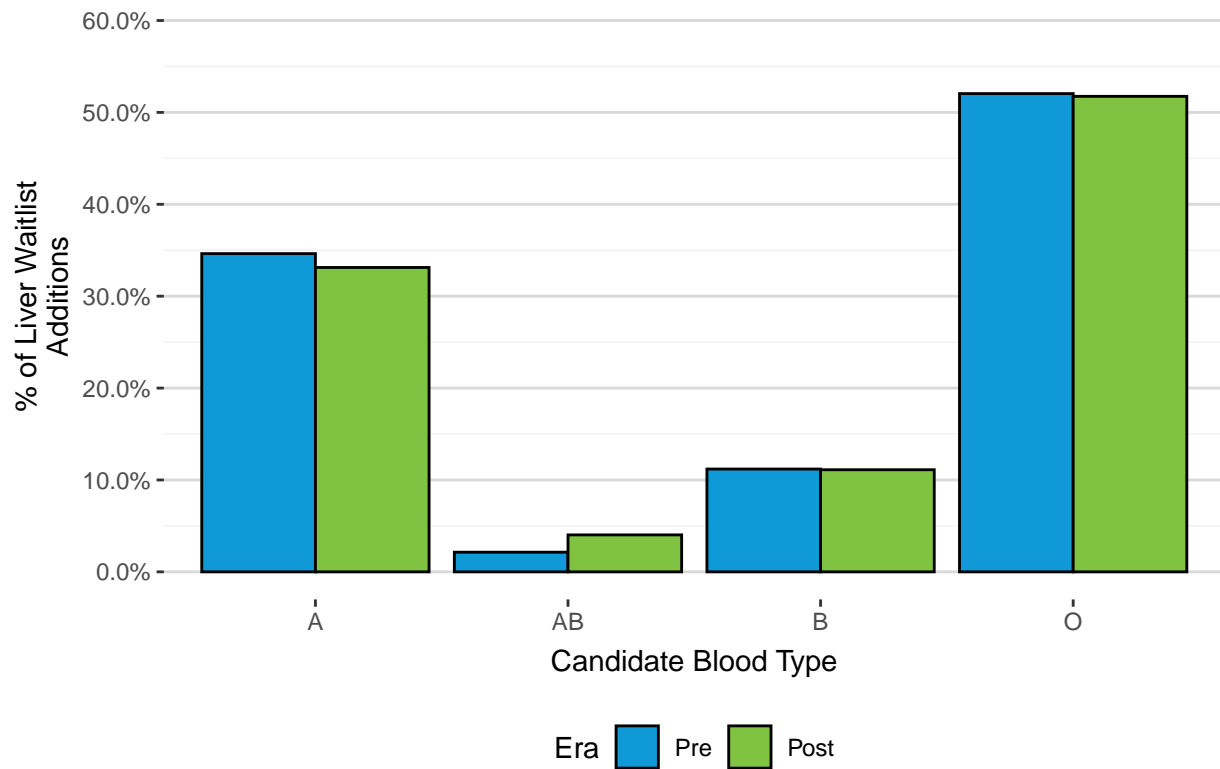
Candidate Sex	Pre-Policy	Post-Policy
Female	7095 (37.7%)	7336 (38.1%)
Male	11729 (62.3%)	11936 (61.9%)
Total	18824 (100.0%)	19272 (100.0%)

Figure 77. Adult Registrations Added to Liver Waitlist by Candidate Insurance at Listing and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 69. Number and Percent of Adult Registrations Added to Liver Waitlist by Candidate Insurance at Listing and Era

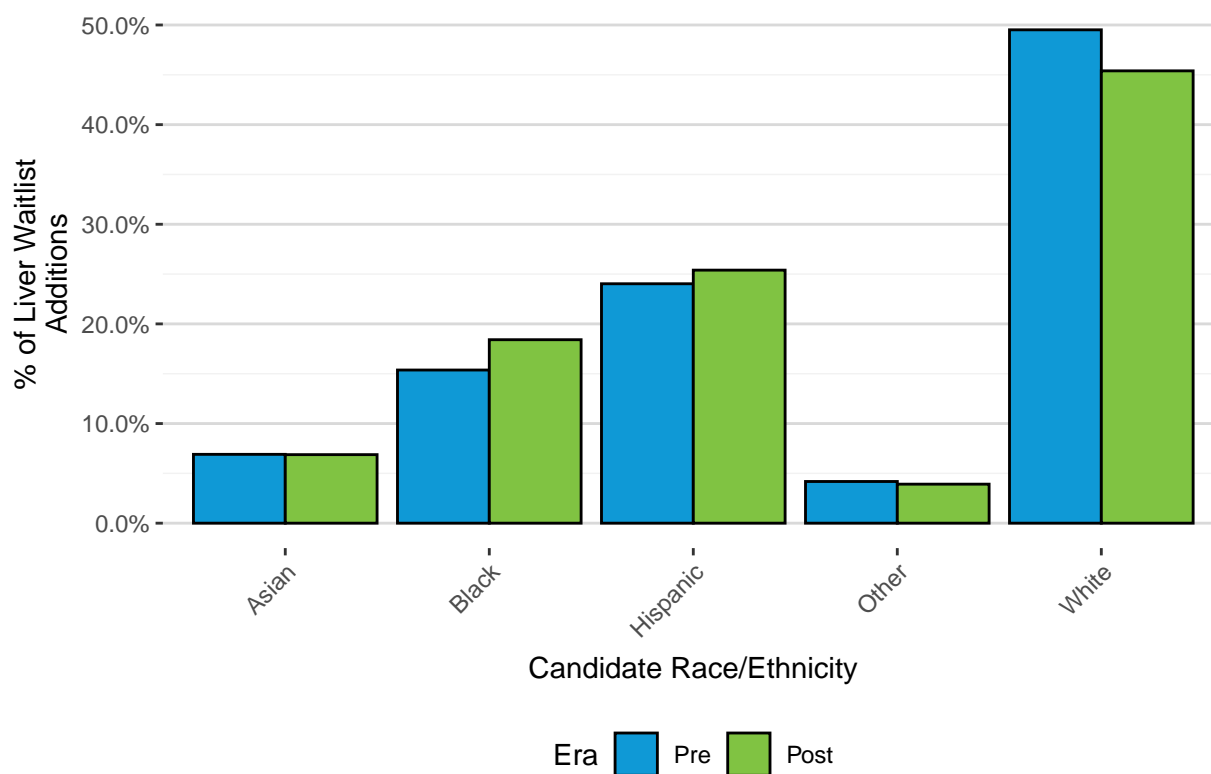
Candidate Insurance at Listing	Pre-Policy	Post-Policy
Private	9601 (51.0%)	10053 (52.2%)
Public	9146 (48.6%)	9121 (47.3%)
Other	72 (0.4%)	87 (0.5%)
Unknown/Not Reported	5 (0.0%)	11 (0.1%)
Total	18824 (100.0%)	19272 (100.0%)

Figure 78. Pediatric Registrations Added to Liver Waitlist by Candidate Blood Type and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 70. Number and Percent of Pediatric Registrations Added to Liver Waitlist by Candidate Blood Type and Era

Candidate Blood Type	Pre-Policy	Post-Policy
A	356 (34.6%)	313 (33.1%)
AB	22 (2.1%)	38 (4.0%)
B	115 (11.2%)	105 (11.1%)
O	535 (52.0%)	489 (51.7%)
Total	1028 (100.0%)	945 (100.0%)

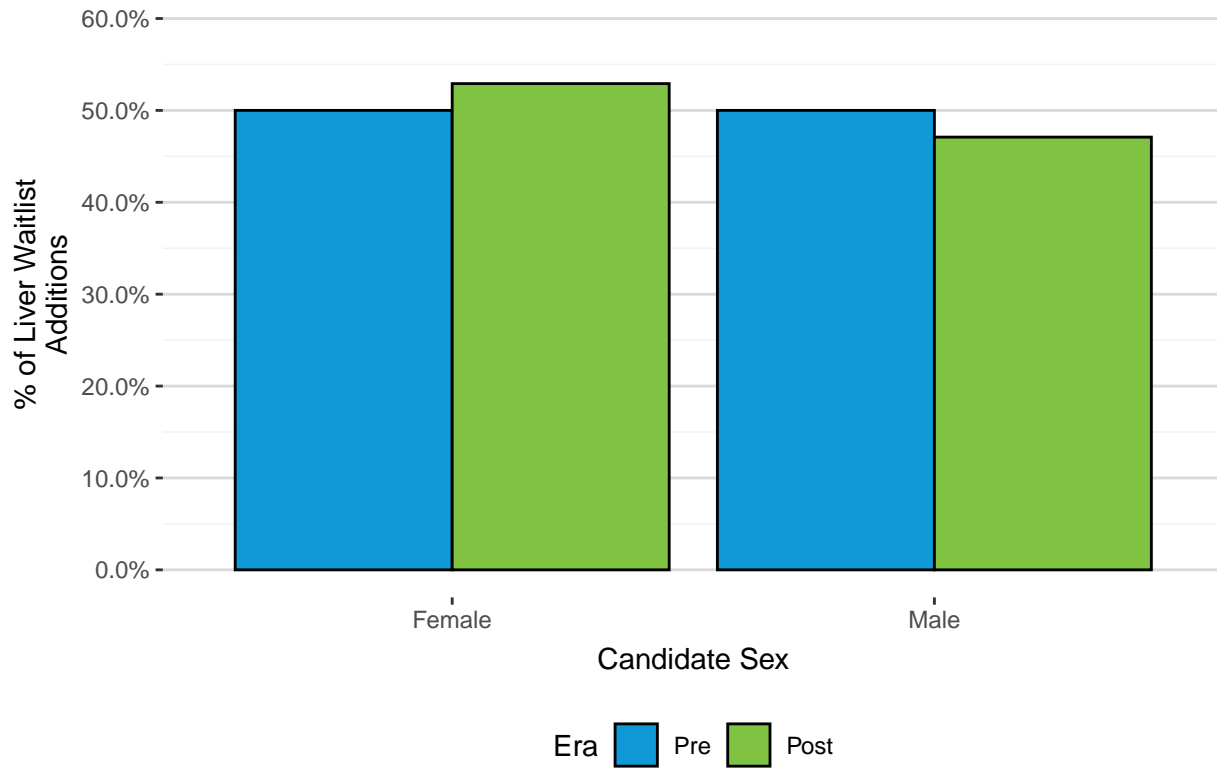
Figure 79. Pediatric Registrations Added to Liver Waitlist by Candidate Race/Ethnicity and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 71. Number and Percent of Pediatric Registrations Added to Liver Waitlist by Candidate Race/Ethnicity and Era

Candidate Race/Ethnicity	Pre-Policy	Post-Policy
Asian	71 (6.9%)	65 (6.9%)
Black	158 (15.4%)	174 (18.4%)
Hispanic	247 (24.0%)	240 (25.4%)
Other	43 (4.2%)	37 (3.9%)
White	509 (49.5%)	429 (45.4%)
Total	1028 (100.0%)	945 (100.0%)

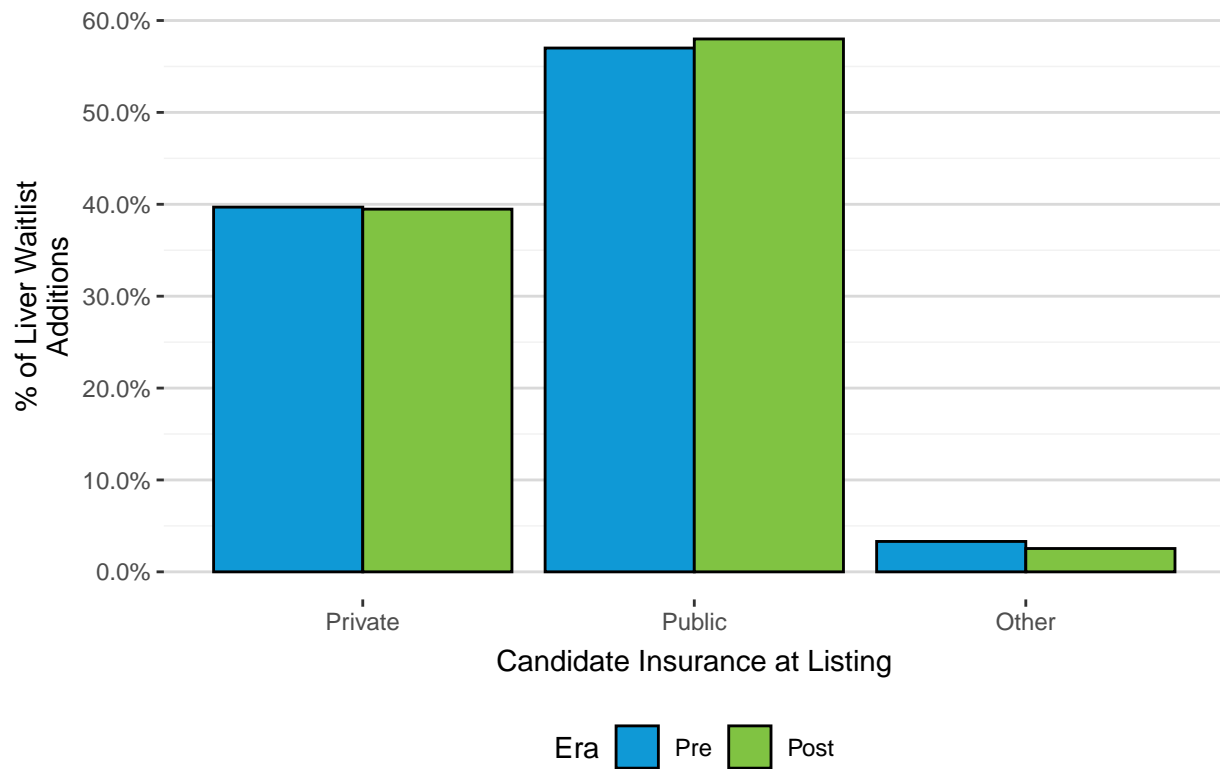
Figure 80. Pediatric Registrations Added to Liver Waitlist by Candidate Sex and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 72. Number and Percent of Pediatric Registrations Added to Liver Waitlist by Candidate Sex and Era

Candidate Sex	Pre-Policy	Post-Policy
Female	514 (50.0%)	500 (52.9%)
Male	514 (50.0%)	445 (47.1%)
Total	1028 (100.0%)	945 (100.0%)

Figure 81. Pediatric Registrations Added to Liver Waitlist by Candidate Insurance at Listing and Era

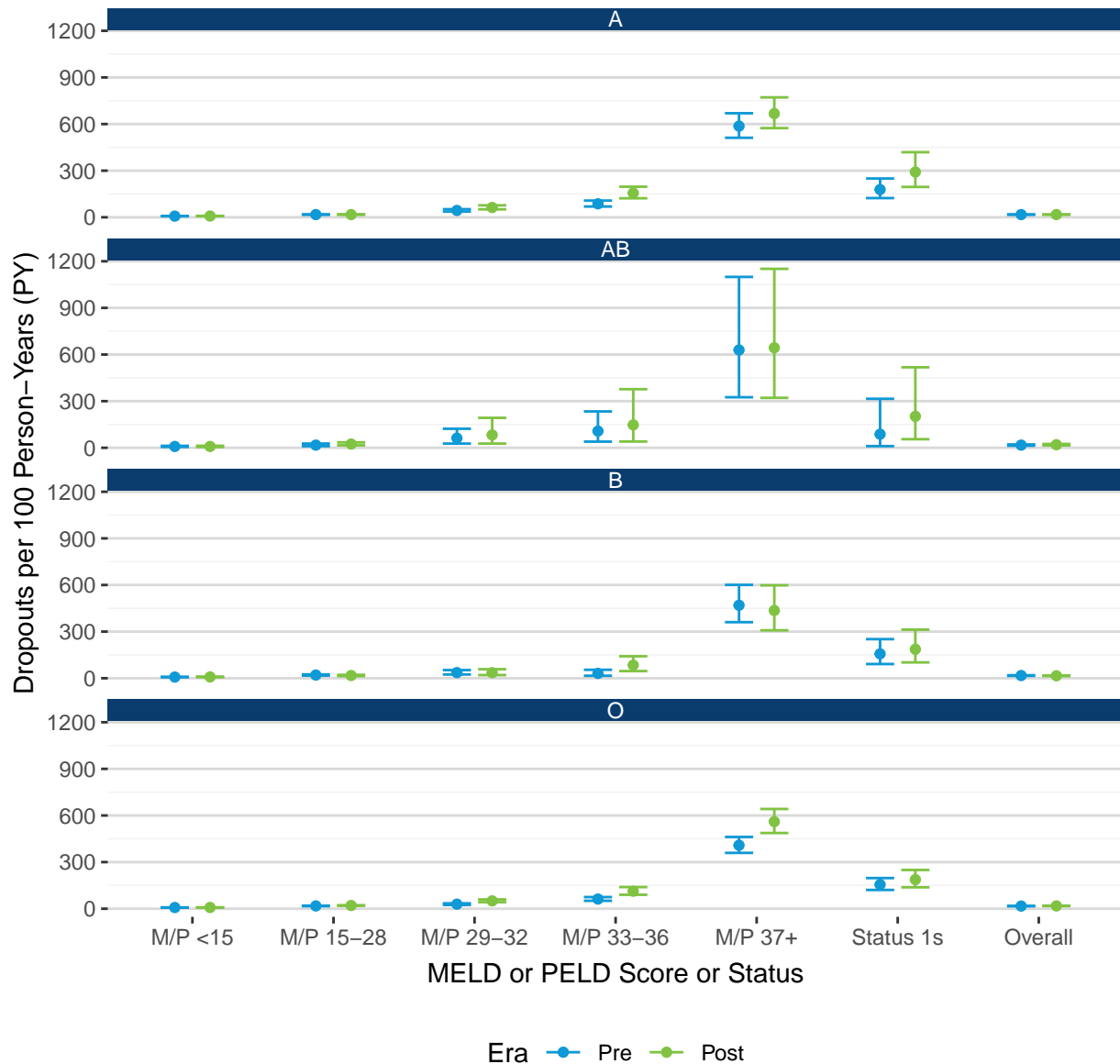
National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 73. Number and Percent of Pediatric Registrations Added to Liver Waitlist by Candidate Insurance at Listing and Era

Candidate Insurance at Listing	Pre-Policy	Post-Policy
Private	408 (39.7%)	373 (39.5%)
Public	586 (57.0%)	548 (58.0%)
Other	34 (3.3%)	24 (2.5%)
Total	1028 (100.0%)	945 (100.0%)

Additional Waitlist Removal Rates Information

Figure 82. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Candidate ABO, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

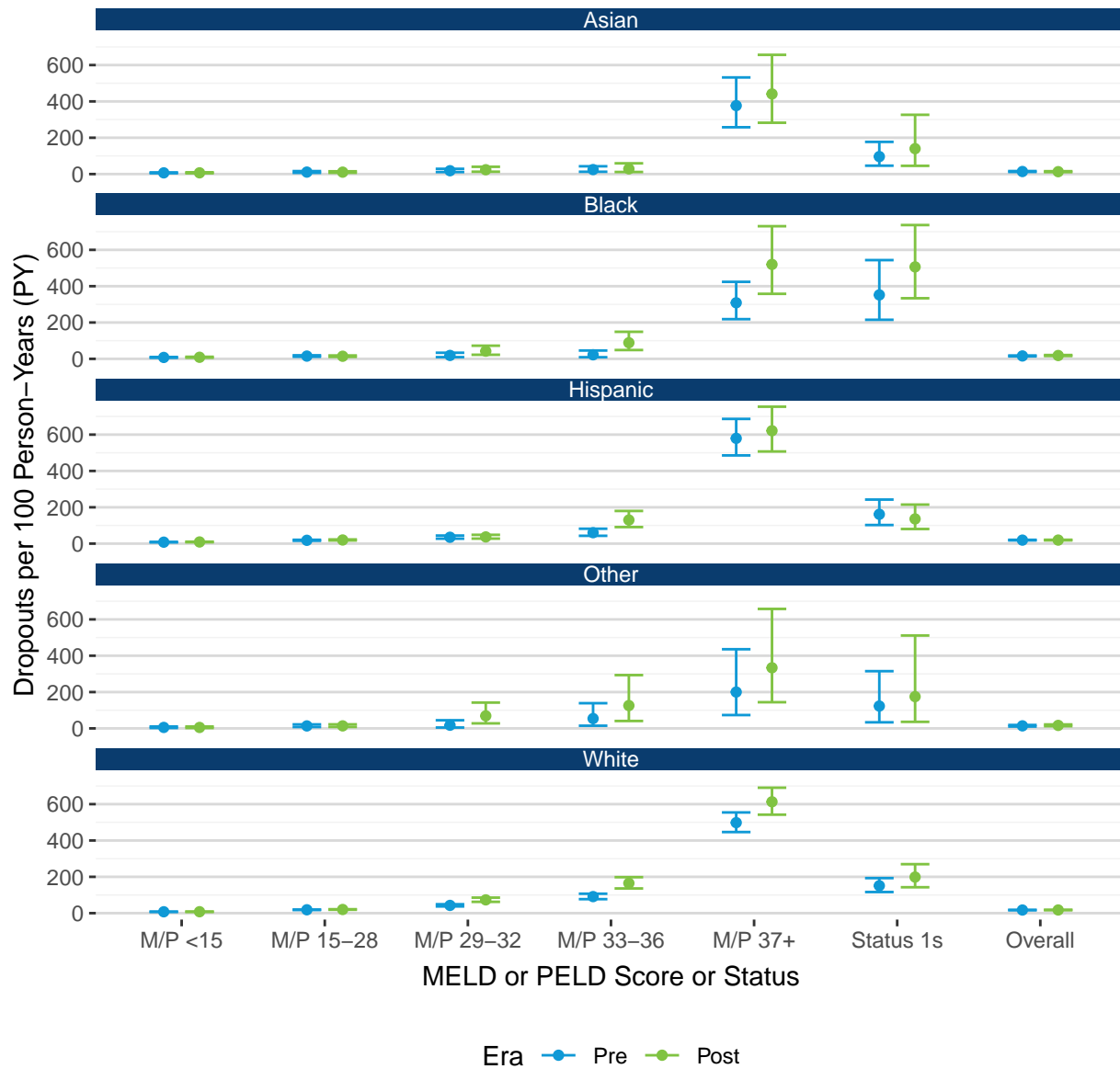
Table 74. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Candidate ABO, and Era

Candidate ABO	Score or Status Group	Era	Ever Waiting	Death/ Too Sick Events	Person-Years	Dropouts per 100 PY	
			N	N	PY	Estimate	95% CI
A	M/P <15	Pre	6796	289	3855.9	7.50	6.66, 8.41
		Post	6350	291	3619.0	8.04	7.14, 9.02
	M/P 15-28	Pre	6439	427	2452.0	17.41	15.80, 19.15
		Post	6226	434	2473.3	17.55	15.93, 19.28
	M/P 29-32	Pre	2201	134	304.5	44.01	36.88, 52.13
		Post	1733	97	153.9	63.03	51.12, 76.89
	M/P 33-36	Pre	1107	84	96.7	86.85	69.28, 107.53
		Post	935	72	46.1	156.21	122.22, 196.71
	M/P 37+	Pre	999	220	37.5	586.69	511.72, 669.55
		Post	1020	182	27.3	667.24	573.82, 771.53
	Status 1s	Pre	303	34	19.1	178.46	123.59, 249.38
		Post	241	29	9.9	291.60	195.29, 418.78
	Overall	Pre	10869	1191	6827.5	17.44	16.47, 18.46
		Post	10777	1117	6386.4	17.49	16.48, 18.55
AB	M/P <15	Pre	511	23	273.7	8.40	5.33, 12.61
		Post	474	20	241.1	8.29	5.07, 12.81
	M/P 15-28	Pre	506	18	105.6	17.05	10.10, 26.94
		Post	516	27	112.6	23.98	15.81, 34.89
	M/P 29-32	Pre	131	8	12.9	62.05	26.79, 122.26
		Post	125	5	6.1	82.47	26.78, 192.45
	M/P 33-36	Pre	91	6	5.6	107.41	39.42, 233.78
		Post	62	4	2.7	147.18	40.10, 376.83
	M/P 37+	Pre	73	12	1.9	629.31	325.17, 1099.28
		Post	84	11	1.7	643.43	321.20, 1151.27
	Status 1s	Pre	29	2	2.3	87.22	10.56, 315.06
		Post	35	4	2.0	202.22	55.10, 517.75
	Overall	Pre	920	70	410.1	17.07	13.30, 21.56
		Post	952	73	374.3	19.50	15.29, 24.52
	M/P <15	Pre	1988	89	1155.9	7.70	6.18, 9.48
		Post	1808	90	1054.8	8.53	6.86, 10.49
	M/P 15-28	Pre	1873	114	557.6	20.44	16.86, 24.56
		Post	1709	89	503.3	17.68	14.20, 21.76

(continued)

Candidate ABO	Score or Status Group	Era	N	N	PY	Estimate	95% CI	
B	M/P 29-32	Pre	570	28	77.2	36.26	24.10, 52.41	
		Post	439	16	44.8	35.69	20.40, 57.96	
	M/P 33-36	Pre	298	12	38.6	31.09	16.07, 54.31	
		Post	279	14	16.6	84.30	46.09, 141.43	
	M/P 37+	Pre	297	63	13.4	469.57	360.83, 600.79	
		Post	295	38	8.7	435.75	308.36, 598.10	
	Status 1s	Pre	113	17	10.8	157.13	91.53, 251.58	
		Post	108	14	7.5	186.43	101.92, 312.80	
	Overall	Pre	3334	323	1869.7	17.28	15.44, 19.27	
		Post	3192	264	1656.4	15.94	14.07, 17.98	
	O	M/P <15	Pre	8548	371	4802.5	7.73	6.96, 8.55
			Post	7821	358	4483.4	7.98	7.18, 8.86
M/P 15-28		Pre	7909	529	2955.2	17.90	16.41, 19.49	
		Post	7634	612	2942.9	20.80	19.18, 22.51	
M/P 29-32		Pre	2754	129	442.3	29.17	24.35, 34.66	
		Post	2168	128	253.6	50.47	42.11, 60.01	
M/P 33-36		Pre	1491	109	175.5	62.10	50.99, 74.91	
		Post	1285	85	75.5	112.64	89.97, 139.28	
M/P 37+		Pre	1289	252	61.7	408.24	359.39, 461.88	
		Post	1195	209	37.3	560.55	487.12, 641.91	
Status 1s		Pre	459	68	43.7	155.53	120.78, 197.18	
		Post	390	47	25.1	187.47	137.74, 249.29	
Overall		Pre	13616	1474	8601.5	17.14	16.27, 18.03	
		Post	13394	1449	7944.5	18.24	17.31, 19.20	

Figure 83. Liver-Alone Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Candidate Race/Ethnicity, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 75. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Candidate Race/Ethnicity, and Era

Candidate Race/Ethnicity	Score or Status Group	Era	Ever Waiting	Death/ Too Sick Events	Person- Years	Dropouts per 100 PY		
			N	N	PY	Estimate	95% CI	
Asian	M/P <15	Pre	907	37	550.7	6.72	4.73, 9.26	
		Post	795	32	465.3	6.88	4.70, 9.71	
	M/P 15-28	Pre	611	23	211.2	10.89	6.90, 16.34	
		Post	628	28	263.3	10.63	7.07, 15.37	
	M/P 29-32	Pre	347	19	102.8	18.49	11.13, 28.87	
		Post	265	14	58.6	23.88	13.05, 40.06	
	M/P 33-36	Pre	172	12	48.7	24.62	12.72, 43.01	
		Post	139	7	24.3	28.76	11.56, 59.26	
	M/P 37+	Pre	132	32	8.5	376.77	257.71, 531.89	
		Post	136	24	5.4	441.09	282.61, 656.30	
	Status 1s	Pre	86	10	10.4	96.36	46.21, 177.20	
		Post	63	5	3.6	139.85	45.41, 326.36	
	Overall	Pre	1371	133	947.7	14.03	11.75, 16.63	
		Post	1315	111	841.3	13.19	10.85, 15.89	
	Black	M/P <15	Pre	1184	53	682.1	7.77	5.82, 10.16
			Post	1076	54	627.3	8.61	6.47, 11.23
		M/P 15-28	Pre	1082	58	382.9	15.15	11.50, 19.58
			Post	1052	56	390.8	14.33	10.82, 18.61
		M/P 29-32	Pre	388	11	58.5	18.79	9.38, 33.62
			Post	282	13	30.7	42.32	22.53, 72.37
M/P 33-36		Pre	237	7	31.5	22.23	8.94, 45.80	
		Post	230	14	15.8	88.73	48.51, 148.88	
M/P 37+		Pre	225	38	12.3	308.77	218.50, 423.81	
		Post	217	33	6.3	519.85	357.84, 730.07	
Status 1s		Pre	134	20	5.7	351.98	215.00, 543.60	
		Post	159	27	5.3	506.16	333.56, 736.44	
Overall		Pre	1987	188	1179.6	15.94	13.74, 18.39	
		Post	2002	198	1080.1	18.33	15.87, 21.07	
M/P <15		Pre	3220	139	1726.4	8.05	6.77, 9.51	
		Post	3064	151	1664.2	9.07	7.68, 10.64	
		Pre	2889	191	1047.7	18.23	15.74, 21.01	
		Post	2768	217	1084.3	20.01	17.44, 22.86	

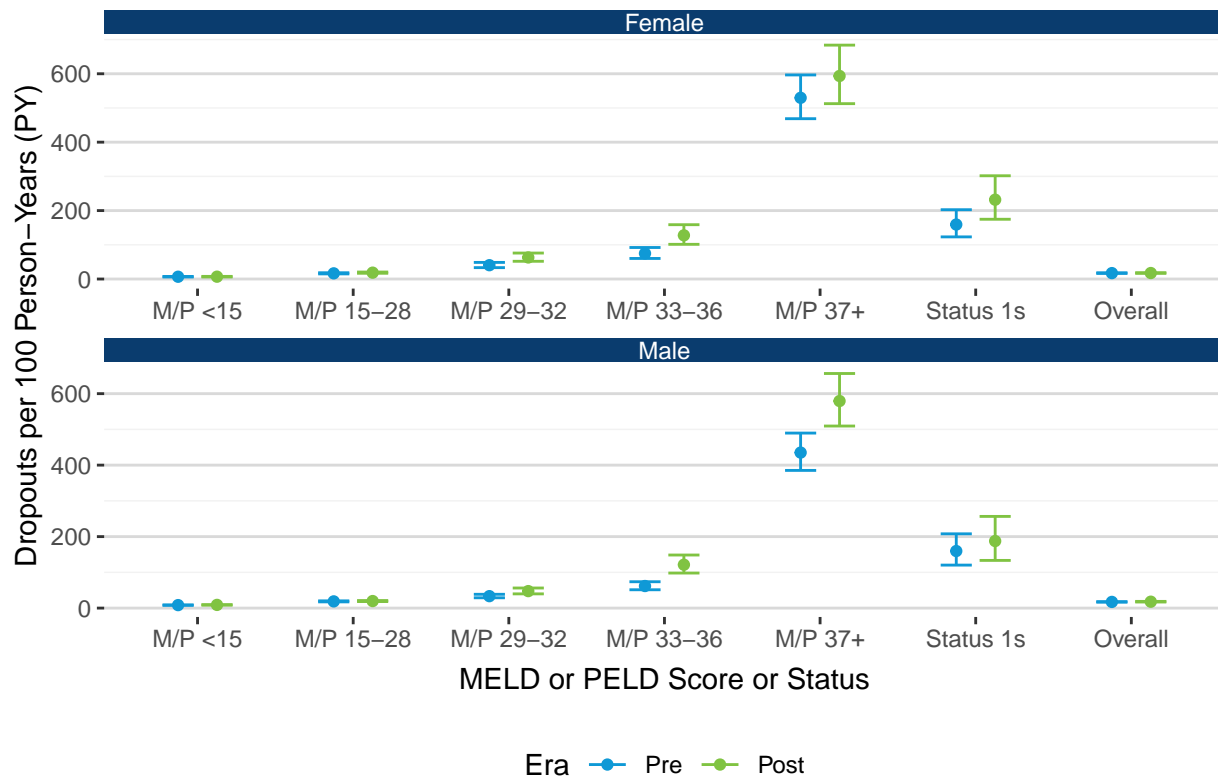
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Candidate Race/Ethnicity	Score or Status Group	Era	N	N	PY	Estimate	95% CI	
Hispanic	M/P 29-32	Pre	1182	68	194.3	35.00	27.18, 44.37	
		Post	1003	52	140.8	36.93	27.58, 48.43	
	M/P 33-36	Pre	624	40	66.4	60.23	43.03, 82.02	
		Post	538	36	27.7	129.93	91.00, 179.88	
	M/P 37+	Pre	614	134	23.1	579.57	485.60, 686.42	
		Post	519	103	16.6	621.40	507.21, 753.63	
	Status 1s	Pre	168	23	14.2	161.57	102.42, 242.43	
		Post	155	18	13.2	135.88	80.53, 214.76	
	Overall	Pre	4958	599	3106.9	19.28	17.77, 20.89	
		Post	4970	583	2985.9	19.53	17.97, 21.18	
	Other	M/P <15	Pre	287	8	149.7	5.35	2.31, 10.53
			Post	288	8	153.6	5.21	2.25, 10.26
		M/P 15-28	Pre	310	16	117.8	13.58	7.76, 22.05
			Post	302	17	122.3	13.90	8.10, 22.26
M/P 29-32		Pre	130	4	22.9	17.49	4.77, 44.78	
		Post	85	7	10.1	68.98	27.73, 142.12	
M/P 33-36		Pre	68	4	7.4	54.17	14.76, 138.71	
		Post	60	5	4.0	125.69	40.81, 293.32	
M/P 37+		Pre	57	6	3.0	200.18	73.46, 435.71	
		Post	63	8	2.4	333.71	144.07, 657.55	
Status 1s		Pre	34	4	3.3	123.00	33.51, 314.93	
		Post	28	3	1.7	174.92	36.07, 511.19	
Overall		Pre	529	43	308.2	13.95	10.10, 18.79	
		Post	539	49	297.4	16.48	12.19, 21.78	
Other	M/P <15	Pre	12262	536	6983.4	7.68	7.04, 8.35	
		Post	11247	514	6491.7	7.92	7.25, 8.63	
	M/P 15-28	Pre	11856	800	4314.5	18.54	17.28, 19.87	
		Post	11359	844	4178.8	20.20	18.86, 21.61	
	M/P 29-32	Pre	3614	197	460.3	42.80	37.03, 49.21	
		Post	2839	160	218.3	73.28	62.37, 85.56	
	M/P 33-36	Pre	1886	148	162.4	91.15	77.05, 107.07	
		Post	1597	114	69.2	164.86	135.99, 198.04	
	M/P 37+	Pre	1630	337	67.6	498.28	446.49, 554.42	
		Post	1662	271	44.2	613.01	542.19, 690.51	
	Status 1s	Pre	484	64	42.3	151.16	116.41, 193.03	
		Post	369	41	20.6	198.71	142.60, 269.58	

(continued)

Candidate Race/Ethnicity	Score or Status Group	Era	N	N	PY	Estimate	95% CI
		Pre	19941	2096	12177.0	17.21	16.48, 17.97
White	Overall	Post	19539	1962	11168.5	17.57	16.80, 18.36

Figure 84. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Candidate Sex, and Era



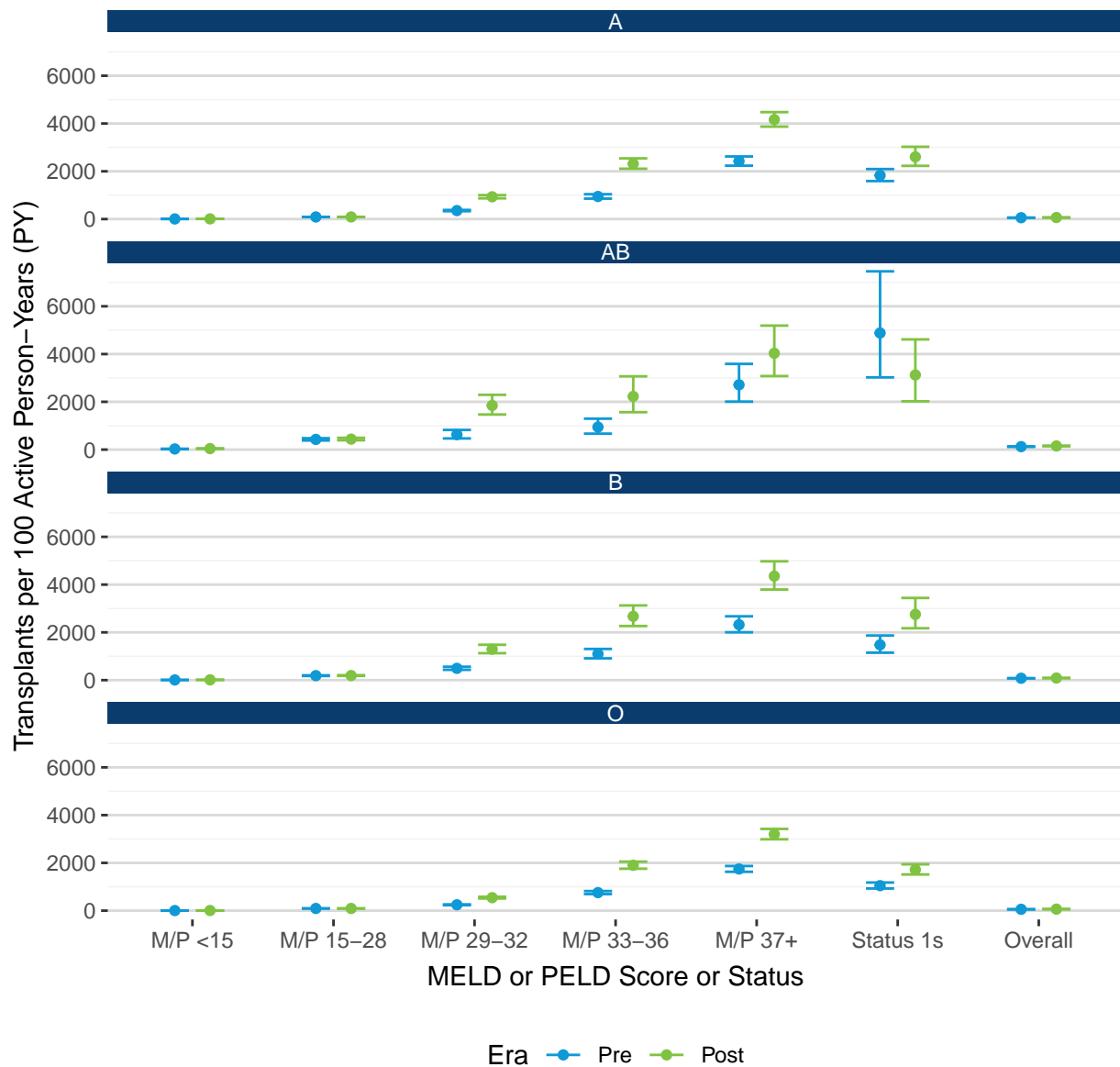
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Table 76. Liver-Along Waitlist Rates of Removal Due to Death or Too Sick Per 100 Person-Years Waiting by MELD or PELD Score or Status, Candidate Sex, and Era

Candidate Sex	Score or Status Group	Era	Ever Waiting	Death/ Too Sick Events	Person- Years	Dropouts per 100 PY	
			N	N	PY	Estimate	95% CI
Female	M/P <15	Pre	6753	269	4025.6	6.68	5.91, 7.53
		Post	6358	257	3770.4	6.82	6.01, 7.70
	M/P 15-28	Pre	6220	385	2324.3	16.56	14.95, 18.30
		Post	6034	426	2291.5	18.59	16.87, 20.44
	M/P 29-32	Pre	2099	112	277.3	40.38	33.25, 48.59
		Post	1848	111	176.1	63.03	51.85, 75.90
	M/P 33-36	Pre	1237	89	118.9	74.87	60.13, 92.13
		Post	1073	81	63.4	127.72	101.43, 158.74
	M/P 37+	Pre	1131	272	51.4	529.69	468.61, 596.53
		Post	1026	192	32.3	593.55	512.56, 683.70
	Status 1s	Pre	502	66	41.4	159.26	123.17, 202.62
		Post	431	55	23.7	231.87	174.67, 301.81
	Overall	Pre	10989	1201	6949.5	17.28	16.32, 18.29
		Post	11003	1132	6468.7	17.50	16.49, 18.55
Male	M/P <15	Pre	11091	503	6062.3	8.30	7.59, 9.06
		Post	10096	502	5627.9	8.92	8.16, 9.74
	M/P 15-28	Pre	10508	703	3746.3	18.77	17.40, 20.21
		Post	10053	736	3741.0	19.67	18.28, 21.15
	M/P 29-32	Pre	3558	187	559.6	33.42	28.80, 38.57
		Post	2617	134	282.3	47.47	39.77, 56.22
	M/P 33-36	Pre	1750	122	197.5	61.76	51.29, 73.74
		Post	1488	94	77.5	121.36	98.07, 148.52
	M/P 37+	Pre	1527	275	63.2	435.13	385.21, 489.71
		Post	1567	247	42.6	579.44	509.42, 656.39
	Status 1s	Pre	402	55	34.4	159.68	120.29, 207.85
		Post	343	39	20.8	187.65	133.44, 256.52
	Overall	Pre	17752	1857	10759.6	17.26	16.48, 18.06
		Post	17316	1769	9893.3	17.88	17.06, 18.73

Additional Transplant Rates Information

Figure 85. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Candidate ABO, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

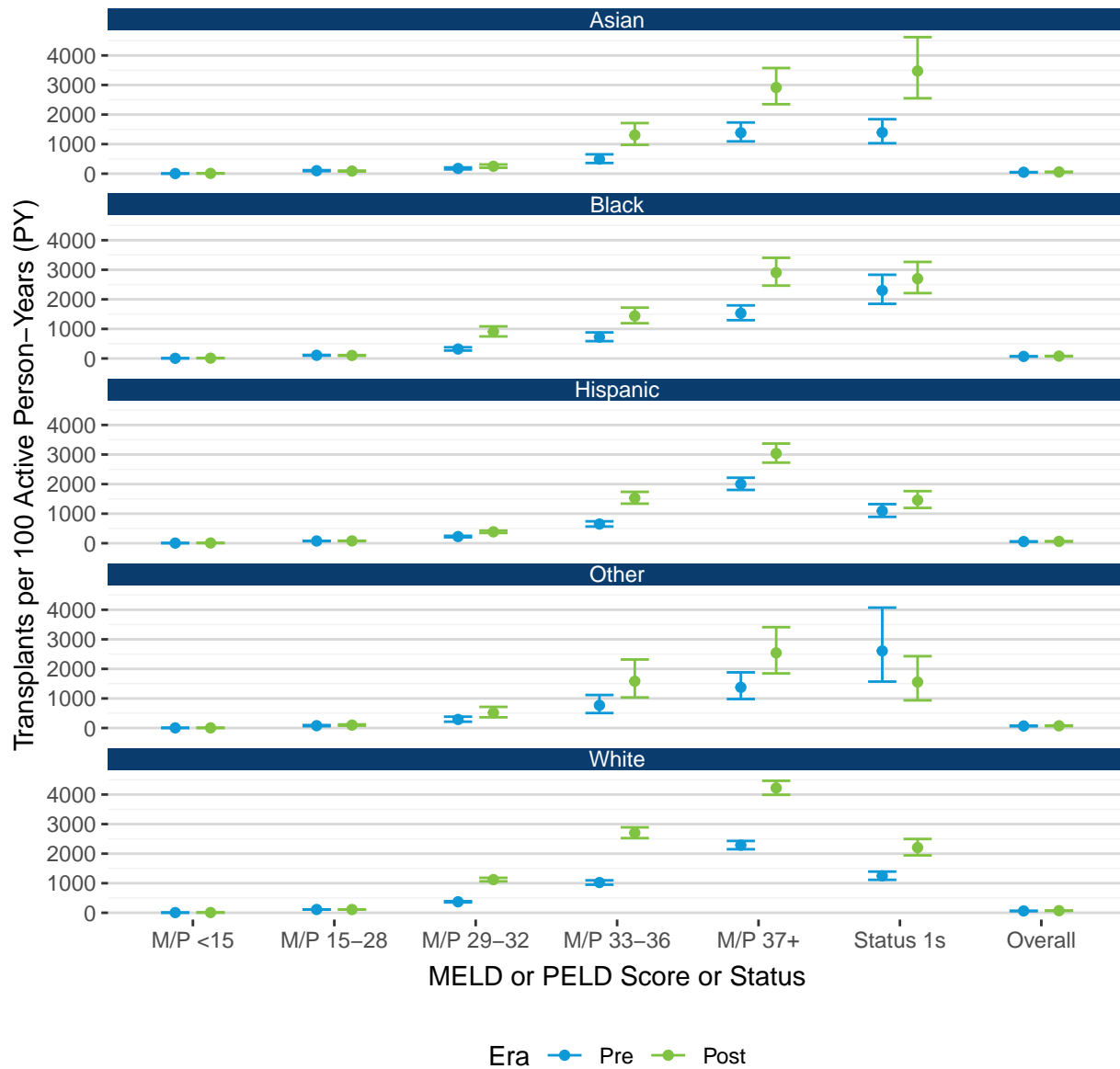
Table 77. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Candidate ABO, and Era

Candidate ABO	Score or Status Group	Era	Ever Waiting	Transplant Events	Person-Years	Transplants per 100 Active PY	
			N	N	PY	Estimate	95% CI
A	M/P <15	Pre	6335	157	3167.0	4.96	4.21, 5.80
		Post	5924	238	2877.5	8.27	7.25, 9.39
	M/P 15-28	Pre	6182	1757	2010.9	87.37	83.34, 91.56
		Post	6004	1771	2003.8	88.38	84.31, 92.60
	M/P 29-32	Pre	2152	761	214.5	354.81	330.04, 380.94
		Post	1676	765	82.0	933.08	868.12, 1001.61
	M/P 33-36	Pre	1072	408	43.2	944.56	855.12, 1040.82
		Post	908	449	19.4	2316.40	2107.06, 2540.90
	M/P 37+	Pre	985	618	25.5	2422.88	2235.60, 2621.66
		Post	1008	743	17.8	4165.18	3871.03, 4475.76
	Status 1s	Pre	297	211	11.5	1829.33	1590.82, 2093.53
		Post	237	170	6.5	2603.86	2227.15, 3026.05
	Overall	Pre	10869	3912	6827.5	57.30	55.52, 59.12
		Post	10777	4136	6386.4	64.76	62.80, 66.77
AB	M/P <15	Pre	450	46	172.9	26.60	19.48, 35.48
		Post	414	63	154.1	40.87	31.41, 52.29
	M/P 15-28	Pre	485	306	71.7	426.95	380.45, 477.57
		Post	493	302	68.8	439.01	390.88, 491.42
	M/P 29-32	Pre	123	51	8.1	626.56	466.51, 823.81
		Post	122	82	4.4	1846.39	1468.49, 2291.86
	M/P 33-36	Pre	89	38	4.0	942.90	667.25, 1294.20
		Post	60	37	1.7	2224.88	1566.52, 3066.70
	M/P 37+	Pre	73	49	1.8	2713.96	2007.80, 3588.00
		Post	83	60	1.5	4033.15	3077.72, 5191.46
	Status 1s	Pre	27	21	0.4	4882.17	3022.14, 7462.91
		Post	33	25	0.8	3125.00	2022.34, 4613.12
	Overall	Pre	920	511	410.1	124.59	114.02, 135.87
		Post	952	569	374.3	152.03	139.79, 165.05
	M/P <15	Pre	1838	70	926.8	7.55	5.89, 9.54
		Post	1668	100	828.9	12.06	9.82, 14.67
	M/P 15-28	Pre	1785	783	417.9	187.35	174.46, 200.95
		Post	1626	703	365.9	192.12	178.18, 206.86
		Pre	552	235	47.6	493.33	432.27, 560.60

(continued)

Candidate ABO	Score or Status Group	Era	N	N	PY	Estimate	95% CI
B	M/P 29-32	Post	413	216	16.7	1295.01	1128.05, 1479.71
		Pre	279	125	11.4	1095.44	911.83, 1305.17
	M/P 33-36	Post	265	154	5.8	2670.31	2265.22, 3126.94
		Pre	289	192	8.3	2319.76	2003.22, 2672.11
	M/P 37+	Post	289	216	5.0	4353.40	3792.15, 4974.30
		Pre	109	69	4.7	1476.26	1148.62, 1868.30
	Status 1s	Post	103	77	2.8	2752.69	2172.38, 3440.39
		Pre	3334	1474	1869.7	78.83	74.86, 82.96
	Overall	Post	3192	1466	1656.4	88.50	84.03, 93.15
		Pre	7966	158	3869.4	4.08	3.47, 4.77
O	M/P <15	Post	7268	221	3549.8	6.23	5.43, 7.10
		Pre	7644	2256	2446.7	92.20	88.44, 96.09
	M/P 15-28	Post	7367	2205	2400.1	91.87	88.08, 95.79
		Pre	2693	835	340.0	245.61	229.23, 262.85
	M/P 29-32	Post	2100	935	171.9	543.80	509.49, 579.80
		Pre	1420	557	73.8	755.25	693.82, 820.65
	M/P 33-36	Post	1238	648	34.1	1899.61	1756.14, 2051.67
		Pre	1279	811	46.5	1745.58	1627.49, 1869.97
	M/P 37+	Post	1175	852	26.6	3199.38	2988.13, 3421.63
		Pre	450	278	26.6	1046.73	927.29, 1177.29
	Status 1s	Post	382	259	15.1	1718.19	1515.29, 1940.69
		Pre	13616	4895	8601.5	56.91	55.33, 58.53
	Overall	Post	13394	5120	7944.5	64.45	62.69, 66.24

Figure 86. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Candidate Race/Ethnicity, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 78. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Candidate Race/Ethnicity, and Era

Candidate Race/Ethnicity	Score or Status Group	Era	Ever Waiting	Transplant Events	Person-Years	Transplants per 100 Active PY		
			N	N	PY	Estimate	95% CI	
Asian	M/P <15	Pre	813	17	417.0	4.08	2.37, 6.53	
		Post	718	31	343.9	9.01	6.12, 12.79	
	M/P 15-28	Pre	575	159	157.2	101.15	86.04, 118.15	
		Post	601	180	202.4	88.95	76.43, 102.93	
	M/P 29-32	Pre	328	116	65.8	176.31	145.69, 211.46	
		Post	240	84	33.4	251.44	200.55, 311.29	
	M/P 33-36	Pre	143	47	9.5	492.39	361.79, 654.78	
		Post	118	52	4.0	1305.36	974.91, 1711.81	
	M/P 37+	Pre	129	77	5.6	1385.17	1093.15, 1731.22	
		Post	134	92	3.2	2914.93	2349.85, 3574.90	
	Status 1s	Pre	82	49	3.5	1394.00	1031.29, 1842.94	
		Post	61	47	1.4	3472.67	2551.59, 4617.92	
	Overall	Pre	1371	465	947.7	49.07	44.71, 53.74	
		Post	1315	486	841.3	57.77	52.75, 63.14	
	Black	M/P <15	Pre	1103	29	543.5	5.34	3.57, 7.66
			Post	994	50	483.5	10.34	7.68, 13.63
		M/P 15-28	Pre	1034	316	295.7	106.88	95.42, 119.34
			Post	998	309	304.9	101.34	90.36, 113.30
		M/P 29-32	Pre	378	133	41.6	319.52	267.53, 378.67
			Post	269	114	12.6	903.39	745.18, 1085.24
M/P 33-36		Pre	224	97	13.4	722.40	585.82, 881.27	
		Post	221	120	8.3	1437.48	1191.81, 1718.87	
M/P 37+		Pre	223	150	9.8	1529.76	1294.75, 1795.09	
		Post	217	153	5.3	2905.57	2463.41, 3404.17	
Status 1s		Pre	132	89	3.9	2300.64	1847.60, 2831.13	
		Post	156	106	3.9	2699.93	2210.48, 3265.49	
Overall		Pre	1987	814	1179.6	69.01	64.35, 73.92	
		Post	2002	852	1080.1	78.88	73.67, 84.36	
M/P <15		Pre	3025	68	1434.8	4.74	3.68, 6.01	
		Post	2878	101	1313.9	7.69	6.26, 9.34	
M/P 15-28		Pre	2808	676	896.3	75.42	69.84, 81.32	
		Post	2684	703	890.7	78.93	73.20, 84.98	
			Pre	1163	336	149.6	224.66	201.27, 250.01

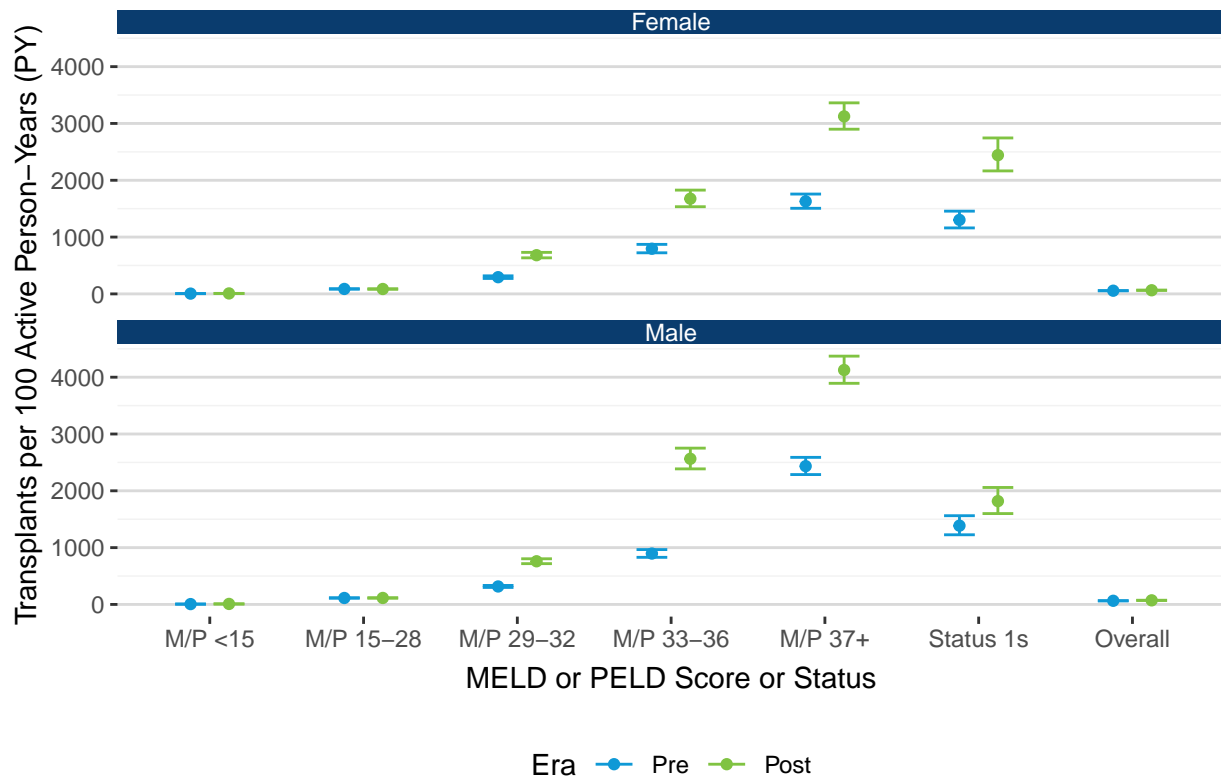
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Candidate Race/Ethnicity	Score or Status Group	Era	N	N	PY	Estimate	95% CI
Hispanic	M/P 29-32	Post	971	382	98.9	386.07	348.32, 426.80
		Pre	605	216	33.3	648.68	565.05, 741.19
	M/P 33-36	Post	525	233	15.2	1528.49	1338.51, 1737.87
		Pre	608	371	18.5	2001.70	1803.17, 2216.12
	M/P 37+	Post	512	350	11.5	3036.61	2726.77, 3372.00
		Pre	165	104	9.5	1091.43	891.78, 1322.45
	Status 1s	Post	152	106	7.3	1457.25	1193.08, 1762.50
		Pre	4958	1771	3106.9	57.00	54.38, 59.72
	Overall	Post	4970	1875	2985.9	62.80	59.99, 65.70
		Pre	264	3	112.3	2.67	0.55, 7.81
	M/P <15	Post	261	4	109.5	3.65	0.99, 9.35
		Pre	299	74	94.5	78.31	61.49, 98.31
	M/P 15-28	Post	287	92	93.8	98.13	79.11, 120.35
		Pre	127	48	16.6	289.06	213.13, 383.25
	M/P 29-32	Post	83	36	7.0	516.10	361.47, 714.51
		Pre	66	27	3.5	767.52	505.80, 1116.71
	M/P 33-36	Post	59	26	1.6	1581.67	1033.20, 2317.51
		Pre	57	39	2.8	1376.69	978.96, 1881.98
M/P 37+	Post	61	44	1.7	2541.14	1846.40, 3411.36	
	Pre	32	19	0.7	2607.14	1569.67, 4071.38	
Status 1s	Post	27	19	1.2	1554.93	936.17, 2428.22	
	Pre	529	210	308.2	68.14	59.24, 78.01	
Overall	Post	539	221	297.4	74.31	64.83, 84.78	
	Pre	11397	310	5630.1	5.51	4.91, 6.15	
M/P <15	Post	10437	433	5161.3	8.39	7.62, 9.22	
	Pre	11401	3880	3506.2	110.66	107.21, 114.20	
M/P 15-28	Post	10941	3700	3350.9	110.42	106.89, 114.04	
	Pre	3528	1252	336.8	371.70	351.39, 392.87	
M/P 29-32	Post	2757	1383	123.3	1121.92	1063.56, 1182.64	
	Pre	1822	742	72.6	1022.08	949.85, 1098.34	
M/P 33-36	Post	1550	858	31.7	2702.77	2524.92, 2889.84	
	Pre	1609	1036	45.3	2286.08	2148.97, 2429.64	
M/P 37+	Post	1634	1235	29.3	4221.93	3989.72, 4464.12	
	Pre	474	319	25.6	1248.10	1114.88, 1392.85	
Status 1s	Post	359	252	11.4	2205.76	1941.80, 2495.58	
	Pre	19941	7539	12177.0	61.91	60.52, 63.33	

(continued)

Candidate Race/Ethnicity	Score or Status Group	Era	N	N	PY	Estimate	95% CI
White	Overall	Post	19539	7861	11168.5	70.39	68.84, 71.96

Figure 87. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Candidate Sex, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 79. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by MELD or PELD Score or Status, Candidate Sex, and Era

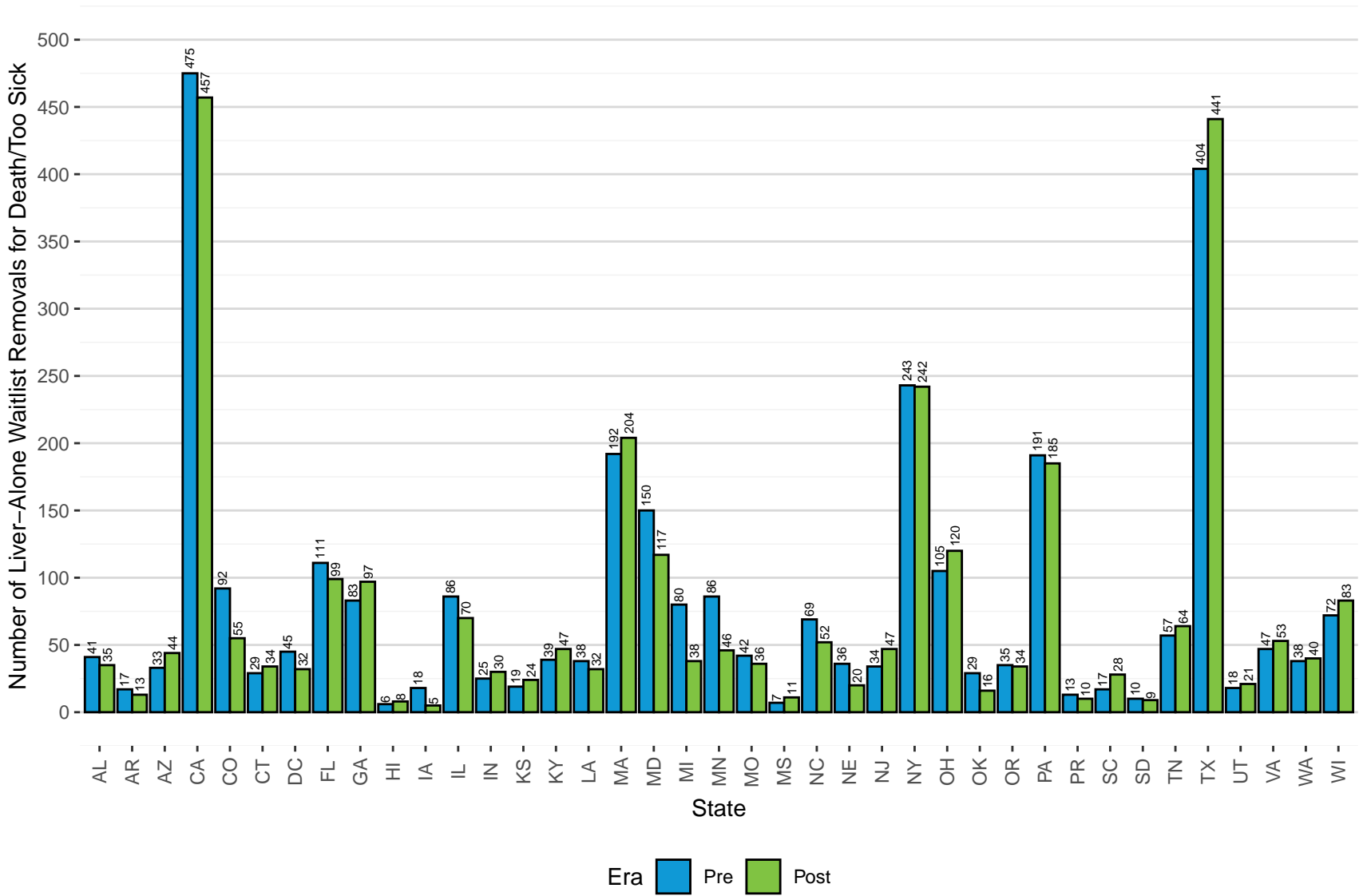
Candidate Sex	Score or Status Group	Era	Ever Waiting	Transplant Events	Person-Years	Transplants per 100 Active PY	
			N	N	PY	Estimate	95% CI
Female	M/P <15	Pre	6249	147	3233.9	4.55	3.84, 5.34
		Post	5878	232	2962.4	7.83	6.86, 8.91
	M/P 15-28	Pre	6006	1671	1925.0	86.81	82.69, 91.07
		Post	5827	1607	1873.7	85.77	81.62, 90.06
	M/P 29-32	Pre	2063	640	217.7	294.01	271.67, 317.70
		Post	1804	788	115.7	681.18	634.44, 730.44
	M/P 33-36	Pre	1197	454	57.1	794.73	723.30, 871.31
		Post	1038	517	30.9	1675.74	1534.39, 1826.61
	M/P 37+	Pre	1120	661	40.6	1628.30	1506.52, 1757.30
		Post	1009	712	22.8	3124.31	2899.00, 3362.47
	Status 1s	Pre	491	308	23.6	1302.36	1160.96, 1456.24
		Post	418	281	11.5	2442.02	2164.82, 2744.89
	Overall	Pre	10989	3881	6949.5	55.85	54.10, 57.63
		Post	11003	4137	6468.7	63.95	62.02, 65.93
Male	M/P <15	Pre	10341	284	4902.2	5.79	5.14, 6.51
		Post	9397	390	4447.9	8.77	7.92, 9.68
	M/P 15-28	Pre	10091	3431	3022.4	113.52	109.75, 117.38
		Post	9665	3375	2965.2	113.82	110.01, 117.73
	M/P 29-32	Pre	3458	1242	392.6	316.35	298.99, 334.44
		Post	2507	1211	159.4	759.89	717.69, 803.93
	M/P 33-36	Pre	1663	674	75.3	895.56	829.22, 965.80
		Post	1433	771	30.1	2563.91	2386.10, 2751.46
	M/P 37+	Pre	1506	1009	41.5	2433.98	2286.09, 2588.92
		Post	1545	1160	28.1	4126.30	3892.24, 4370.77
	Status 1s	Pre	392	271	19.5	1386.33	1226.18, 1561.60
		Post	337	249	13.7	1818.43	1599.56, 2058.88
	Overall	Pre	17752	6911	10759.6	64.23	62.73, 65.76
		Post	17316	7156	9893.3	72.33	70.67, 74.03

Additional Waitlist Removals Information

Table 80. Liver-Alone Registrations Removed for Death or Too Sick to Transplant by State and Era

State	Pre-Policy	Post-Policy
AL	41 (1.3%)	35 (1.2%)
AR	17 (0.5%)	13 (0.4%)
AZ	33 (1.1%)	44 (1.5%)
CA	475 (15.2%)	457 (15.2%)
CO	92 (2.9%)	55 (1.8%)
CT	29 (0.9%)	34 (1.1%)
DC	45 (1.4%)	32 (1.1%)
FL	111 (3.5%)	99 (3.3%)
GA	83 (2.7%)	97 (3.2%)
HI	6 (0.2%)	8 (0.3%)
IA	18 (0.6%)	5 (0.2%)
IL	86 (2.7%)	70 (2.3%)
IN	25 (0.8%)	30 (1.0%)
KS	19 (0.6%)	24 (0.8%)
KY	39 (1.2%)	47 (1.6%)
LA	38 (1.2%)	32 (1.1%)
MA	192 (6.1%)	204 (6.8%)
MD	150 (4.8%)	117 (3.9%)
MI	80 (2.6%)	38 (1.3%)
MN	86 (2.7%)	46 (1.5%)
MO	42 (1.3%)	36 (1.2%)
MS	7 (0.2%)	11 (0.4%)
NC	69 (2.2%)	52 (1.7%)
NE	36 (1.1%)	20 (0.7%)
NJ	34 (1.1%)	47 (1.6%)
NY	243 (7.8%)	242 (8.1%)
OH	105 (3.4%)	120 (4.0%)
OK	29 (0.9%)	16 (0.5%)
OR	35 (1.1%)	34 (1.1%)
PA	191 (6.1%)	185 (6.2%)
PR	13 (0.4%)	10 (0.3%)
SC	17 (0.5%)	28 (0.9%)
SD	10 (0.3%)	9 (0.3%)
TN	57 (1.8%)	64 (2.1%)
TX	404 (12.9%)	441 (14.7%)
UT	18 (0.6%)	21 (0.7%)
VA	47 (1.5%)	53 (1.8%)
WA	38 (1.2%)	40 (1.3%)
WI	72 (2.3%)	83 (2.8%)
Total	3132 (100.0%)	2999 (100.0%)

Figure 88. Liver-Alone Registrations Removed for Death or Too Sick to Transplant by State and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Additional Deceased Donor Liver Transplant Information**Table 80. Number of Deceased Donor Liver-Alone Transplants by Transplant Program DSA and Era**

DSA	Pre-Policy	Post-Policy
ALOB	177 (1.6%)	129 (1.1%)
AROR	56 (0.5%)	63 (0.5%)
AZOB	449 (4.1%)	405 (3.5%)
CADN	405 (3.7%)	447 (3.9%)
CAOP	657 (6.0%)	699 (6.0%)
CASD	106 (1.0%)	157 (1.4%)
CORS	170 (1.5%)	180 (1.6%)
DCTC	137 (1.2%)	156 (1.3%)
FLFH	90 (0.8%)	83 (0.7%)
FLMP	258 (2.3%)	269 (2.3%)
FLUF	258 (2.3%)	342 (2.9%)
FLWC	211 (1.9%)	221 (1.9%)
GALL	379 (3.4%)	375 (3.2%)
HIOP	20 (0.2%)	24 (0.2%)
IAOP	48 (0.4%)	30 (0.3%)
ILIP	390 (3.5%)	475 (4.1%)
INOP	209 (1.9%)	188 (1.6%)
KYDA	96 (0.9%)	112 (1.0%)
LAOP	352 (3.2%)	264 (2.3%)
MAOB	394 (3.6%)	463 (4.0%)
MDPC	246 (2.2%)	278 (2.4%)
MIOP	281 (2.5%)	271 (2.3%)
MNOP	258 (2.3%)	303 (2.6%)
MOMA	224 (2.0%)	243 (2.1%)
MSOP	63 (0.6%)	53 (0.5%)
MWOB	126 (1.1%)	91 (0.8%)
NCCM	114 (1.0%)	112 (1.0%)
NCNC	217 (2.0%)	181 (1.6%)
NEOR	113 (1.0%)	142 (1.2%)
NJTO	81 (0.7%)	75 (0.6%)
NYFL	63 (0.6%)	128 (1.1%)
NYRT	471 (4.3%)	636 (5.5%)
OHLB	178 (1.6%)	244 (2.1%)
OHLP	175 (1.6%)	196 (1.7%)
OHOV	208 (1.9%)	240 (2.1%)
OKOP	89 (0.8%)	143 (1.2%)
ORUO	119 (1.1%)	119 (1.0%)
PADV	500 (4.5%)	454 (3.9%)
PATF	216 (2.0%)	198 (1.7%)
PRLL	57 (0.5%)	50 (0.4%)
SCOP	114 (1.0%)	93 (0.8%)
TNDS	202 (1.8%)	183 (1.6%)
TNMS	145 (1.3%)	160 (1.4%)
TXGC	472 (4.3%)	493 (4.2%)
TXSA	183 (1.7%)	199 (1.7%)

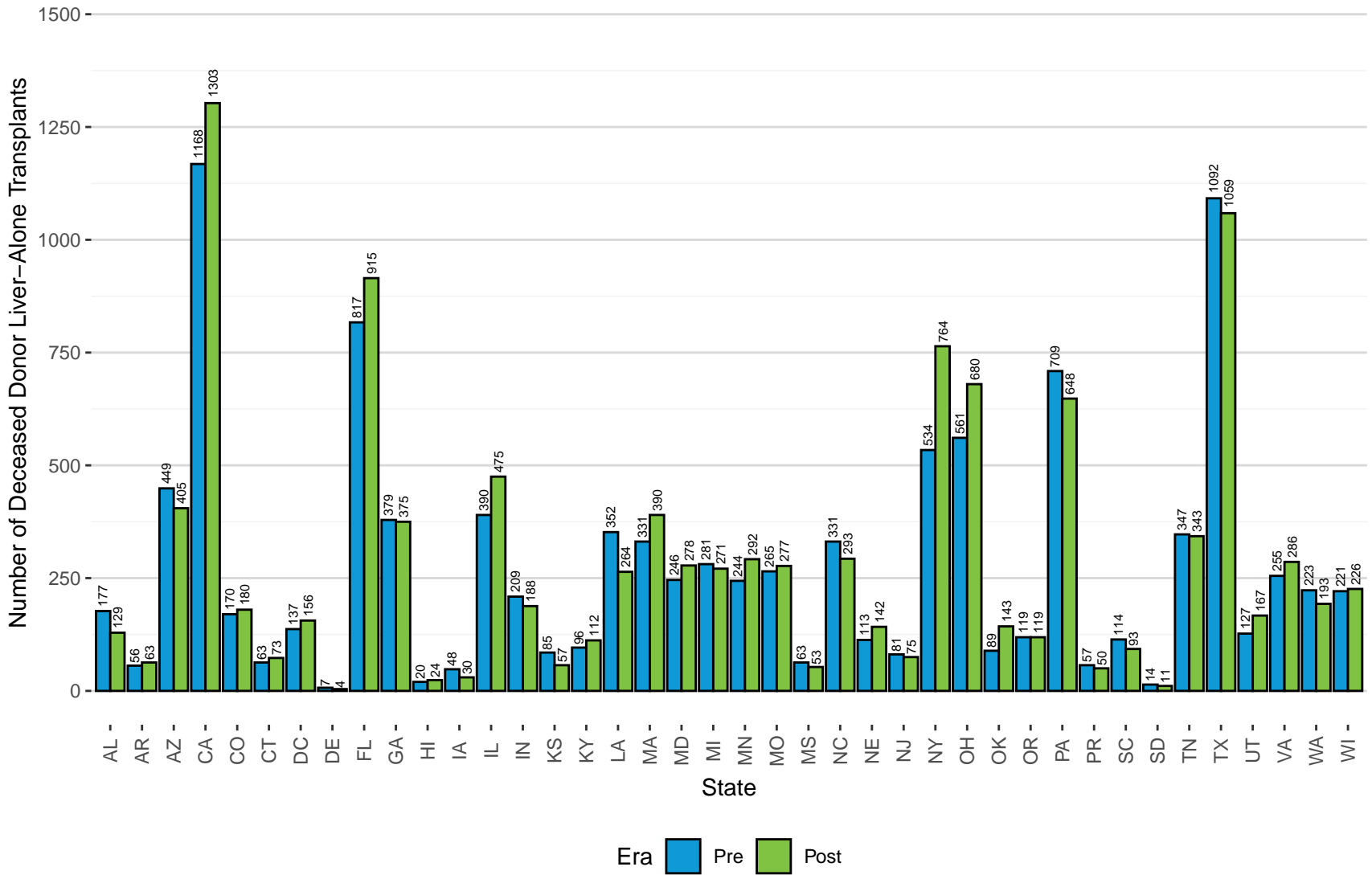
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DSA	Pre-Policy	Post-Policy
TXSB	437 (4.0%)	367 (3.2%)
UTOP	127 (1.2%)	167 (1.4%)
VATB	255 (2.3%)	286 (2.5%)
WALC	223 (2.0%)	193 (1.7%)
WIDN	77 (0.7%)	78 (0.7%)
WIUW	144 (1.3%)	148 (1.3%)
Total	11040 (100.0%)	11606 (100.0%)

Table 81. Number of Deceased Donor Liver-Alone Transplants by State and Era

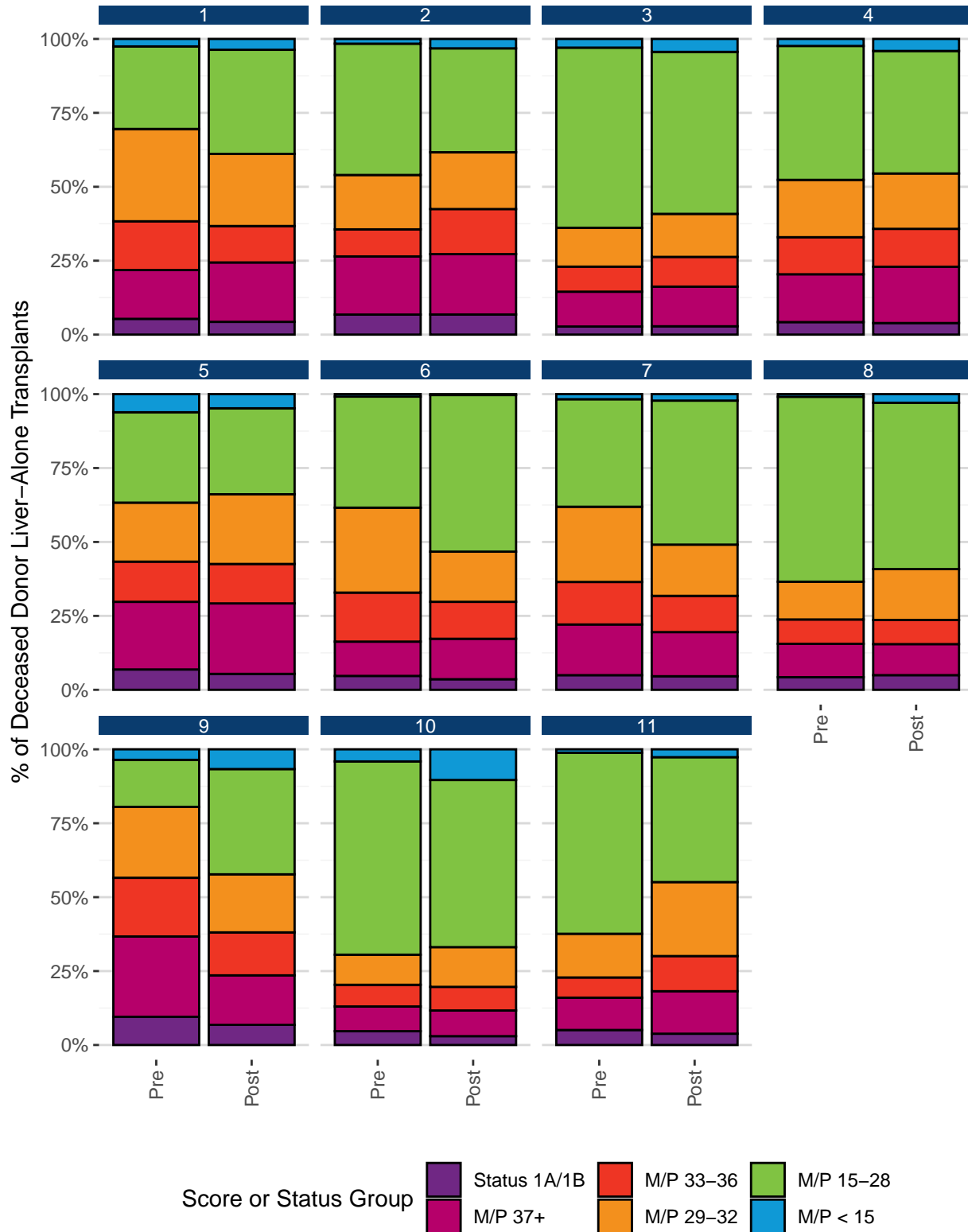
State	Pre-Policy	Post-Policy
AL	177 (1.6%)	129 (1.1%)
AR	56 (0.5%)	63 (0.5%)
AZ	449 (4.1%)	405 (3.5%)
CA	1168 (10.6%)	1303 (11.2%)
CO	170 (1.5%)	180 (1.6%)
CT	63 (0.6%)	73 (0.6%)
DC	137 (1.2%)	156 (1.3%)
DE	7 (0.1%)	4 (0.0%)
FL	817 (7.4%)	915 (7.9%)
GA	379 (3.4%)	375 (3.2%)
HI	20 (0.2%)	24 (0.2%)
IA	48 (0.4%)	30 (0.3%)
IL	390 (3.5%)	475 (4.1%)
IN	209 (1.9%)	188 (1.6%)
KS	85 (0.8%)	57 (0.5%)
KY	96 (0.9%)	112 (1.0%)
LA	352 (3.2%)	264 (2.3%)
MA	331 (3.0%)	390 (3.4%)
MD	246 (2.2%)	278 (2.4%)
MI	281 (2.5%)	271 (2.3%)
MN	244 (2.2%)	292 (2.5%)
MO	265 (2.4%)	277 (2.4%)
MS	63 (0.6%)	53 (0.5%)
NC	331 (3.0%)	293 (2.5%)
NE	113 (1.0%)	142 (1.2%)
NJ	81 (0.7%)	75 (0.6%)
NY	534 (4.8%)	764 (6.6%)
OH	561 (5.1%)	680 (5.9%)
OK	89 (0.8%)	143 (1.2%)
OR	119 (1.1%)	119 (1.0%)
PA	709 (6.4%)	648 (5.6%)
PR	57 (0.5%)	50 (0.4%)
SC	114 (1.0%)	93 (0.8%)
SD	14 (0.1%)	11 (0.1%)
TN	347 (3.1%)	343 (3.0%)
TX	1092 (9.9%)	1059 (9.1%)
UT	127 (1.2%)	167 (1.4%)
VA	255 (2.3%)	286 (2.5%)
WA	223 (2.0%)	193 (1.7%)
WI	221 (2.0%)	226 (1.9%)
Total	11040 (100.0%)	11606 (100.0%)

Figure 89. Number of Deceased Donor Liver-Alone Transplants by State and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Figure 90. Deceased Donor Liver-Alone Transplants by MELD or PELD Score or Status, OPTN Region, and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 81. Number of Deceased Donor Liver-Alone Transplants by Allocation MELD or PELD Score or Status, OPTN Region, and Era

OPTN Region	Score or Status Group	Pre-Policy	Post-Policy
1	Status 1A/1B	21 (5.3%)	20 (4.3%)
	M/P 37+	65 (16.5%)	93 (20.1%)
	M/P 33-36	65 (16.5%)	57 (12.3%)
	M/P 29-32	123 (31.2%)	113 (24.4%)
	M/P 15-28	110 (27.9%)	163 (35.2%)
	M/P < 15	10 (2.5%)	17 (3.7%)
	Total	394 (100.0%)	463 (100.0%)
	2	Status 1A/1B	80 (6.8%)
M/P 37+		232 (19.7%)	237 (20.4%)
M/P 33-36		108 (9.2%)	177 (15.2%)
M/P 29-32		217 (18.4%)	223 (19.2%)
M/P 15-28		524 (44.4%)	408 (35.1%)
M/P < 15		19 (1.6%)	37 (3.2%)
Total		1180 (100.0%)	1161 (100.0%)
3		Status 1A/1B	52 (2.7%)
	M/P 37+	224 (11.8%)	248 (13.4%)
	M/P 33-36	161 (8.5%)	186 (10.1%)
	M/P 29-32	250 (13.2%)	269 (14.5%)
	M/P 15-28	1158 (60.9%)	1013 (54.8%)
	M/P < 15	56 (2.9%)	81 (4.4%)
	Total	1901 (100.0%)	1849 (100.0%)
	4	Status 1A/1B	50 (4.2%)
M/P 37+		191 (16.2%)	229 (19.1%)
M/P 33-36		148 (12.5%)	154 (12.8%)
M/P 29-32		229 (19.4%)	225 (18.7%)
M/P 15-28		535 (45.3%)	498 (41.4%)
M/P < 15		28 (2.4%)	49 (4.1%)
Total		1181 (100.0%)	1202 (100.0%)
5		Status 1A/1B	120 (6.9%)
	M/P 37+	399 (22.9%)	447 (23.8%)
	M/P 33-36	237 (13.6%)	250 (13.3%)
	M/P 29-32	348 (20.0%)	442 (23.6%)
	M/P 15-28	533 (30.6%)	545 (29.1%)
	M/P < 15	107 (6.1%)	90 (4.8%)
	Total	1744 (100.0%)	1875 (100.0%)
		Status 1A/1B	17 (4.7%)

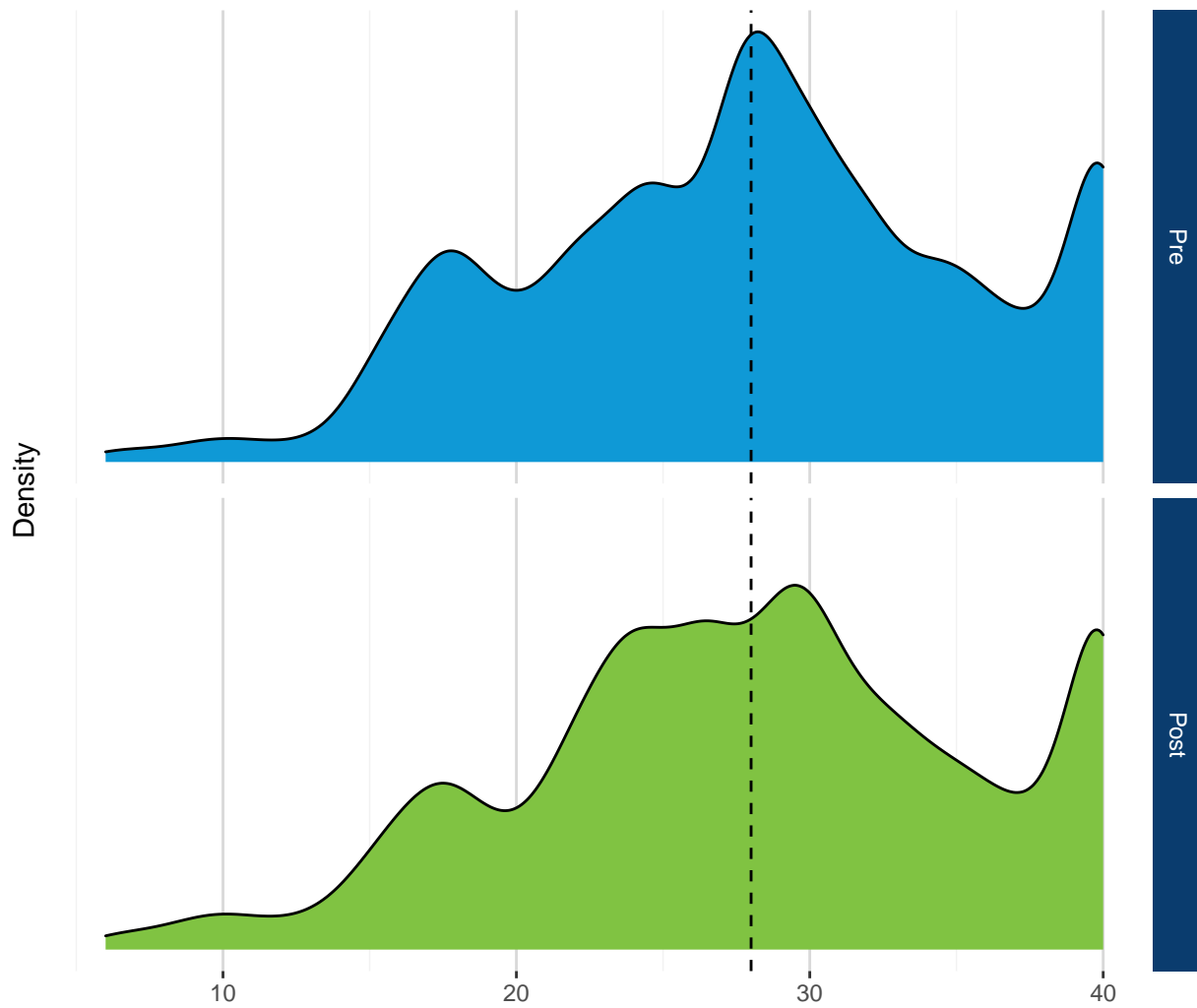
(continued)

OPTN Region	Score or Status Group	Pre-Policy	Post-Policy
6	M/P 37+	42 (11.6%)	46 (13.7%)
	M/P 33-36	60 (16.6%)	42 (12.5%)
	M/P 29-32	104 (28.7%)	57 (17.0%)
	M/P 15-28	136 (37.6%)	178 (53.0%)
	M/P < 15	3 (0.8%)	1 (0.3%)
	Total	362 (100.0%)	336 (100.0%)
	Status 1A/1B	43 (4.9%)	46 (4.6%)
7	M/P 37+	149 (17.1%)	150 (14.9%)
	M/P 33-36	125 (14.4%)	123 (12.3%)
	M/P 29-32	221 (25.4%)	174 (17.3%)
	M/P 15-28	316 (36.4%)	489 (48.7%)
	M/P < 15	15 (1.7%)	22 (2.2%)
	Total	869 (100.0%)	1004 (100.0%)
	Status 1A/1B	29 (4.3%)	34 (5.0%)
8	M/P 37+	77 (11.3%)	72 (10.5%)
	M/P 33-36	56 (8.2%)	56 (8.2%)
	M/P 29-32	87 (12.8%)	118 (17.2%)
	M/P 15-28	426 (62.6%)	386 (56.3%)
	M/P < 15	6 (0.9%)	20 (2.9%)
	Total	681 (100.0%)	686 (100.0%)
	Status 1A/1B	51 (9.6%)	52 (6.8%)
9	M/P 37+	145 (27.2%)	128 (16.8%)
	M/P 33-36	106 (19.9%)	111 (14.5%)
	M/P 29-32	128 (24.0%)	150 (19.6%)
	M/P 15-28	85 (15.9%)	272 (35.6%)
	M/P < 15	19 (3.6%)	51 (6.7%)
	Total	534 (100.0%)	764 (100.0%)
	Status 1A/1B	49 (4.7%)	34 (3.0%)
10	M/P 37+	88 (8.4%)	99 (8.7%)
	M/P 33-36	77 (7.3%)	91 (8.0%)
	M/P 29-32	107 (10.2%)	153 (13.4%)
	M/P 15-28	687 (65.4%)	644 (56.5%)
	M/P < 15	43 (4.1%)	118 (10.4%)
	Total	1051 (100.0%)	1139 (100.0%)
	Status 1A/1B	58 (5.1%)	43 (3.8%)
	M/P 37+	125 (10.9%)	162 (14.4%)

(continued)

OPTN Region	Score or Status Group	Pre-Policy	Post-Policy
11	M/P 33-36	78 (6.8%)	134 (11.9%)
	M/P 29-32	169 (14.8%)	282 (25.0%)
	M/P 15-28	700 (61.2%)	476 (42.2%)
	M/P < 15	13 (1.1%)	30 (2.7%)
	Total	1143 (100.0%)	1127 (100.0%)

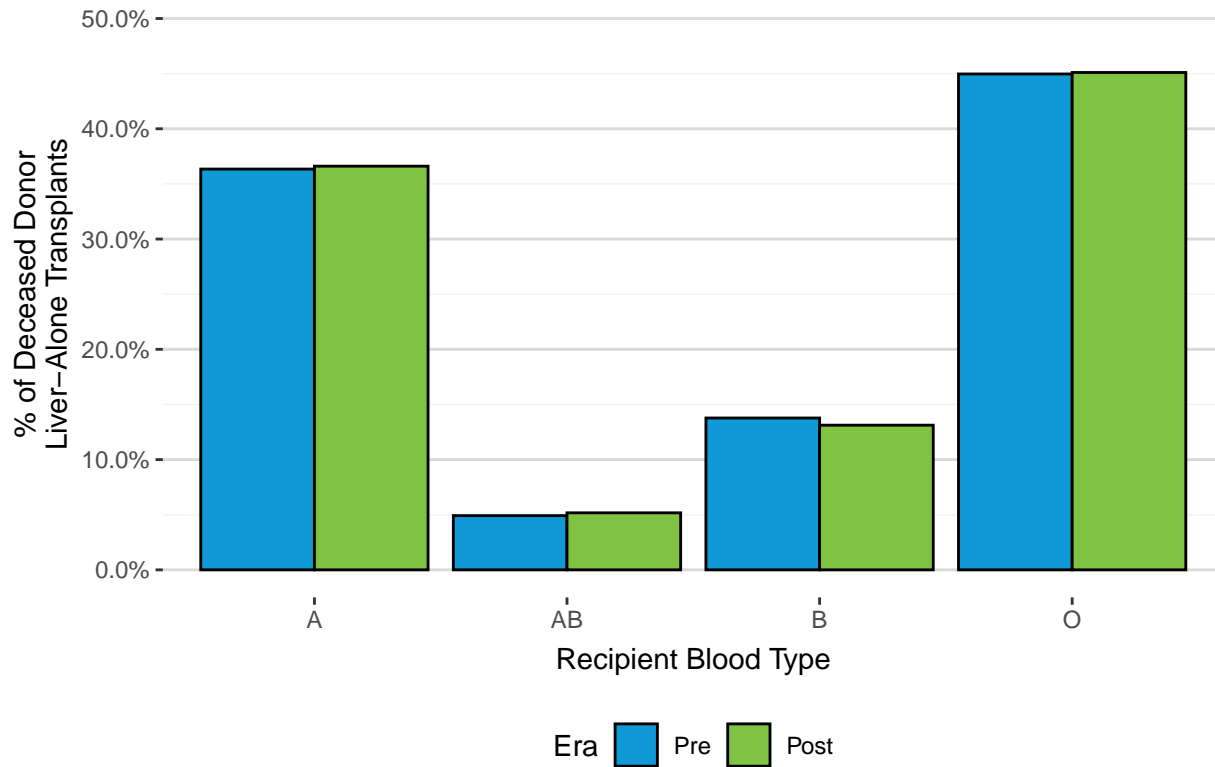
Figure 91. Distribution of Adult Deceased Donor Liver-Alone Recipient Allocation MELD Score at Transplant by Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.
 ** Dotted lines indicate median score within each era.

Table 82. Distribution of Adult Deceased Donor Liver-Alone Recipient Allocation MELD Score at Transplant by Era

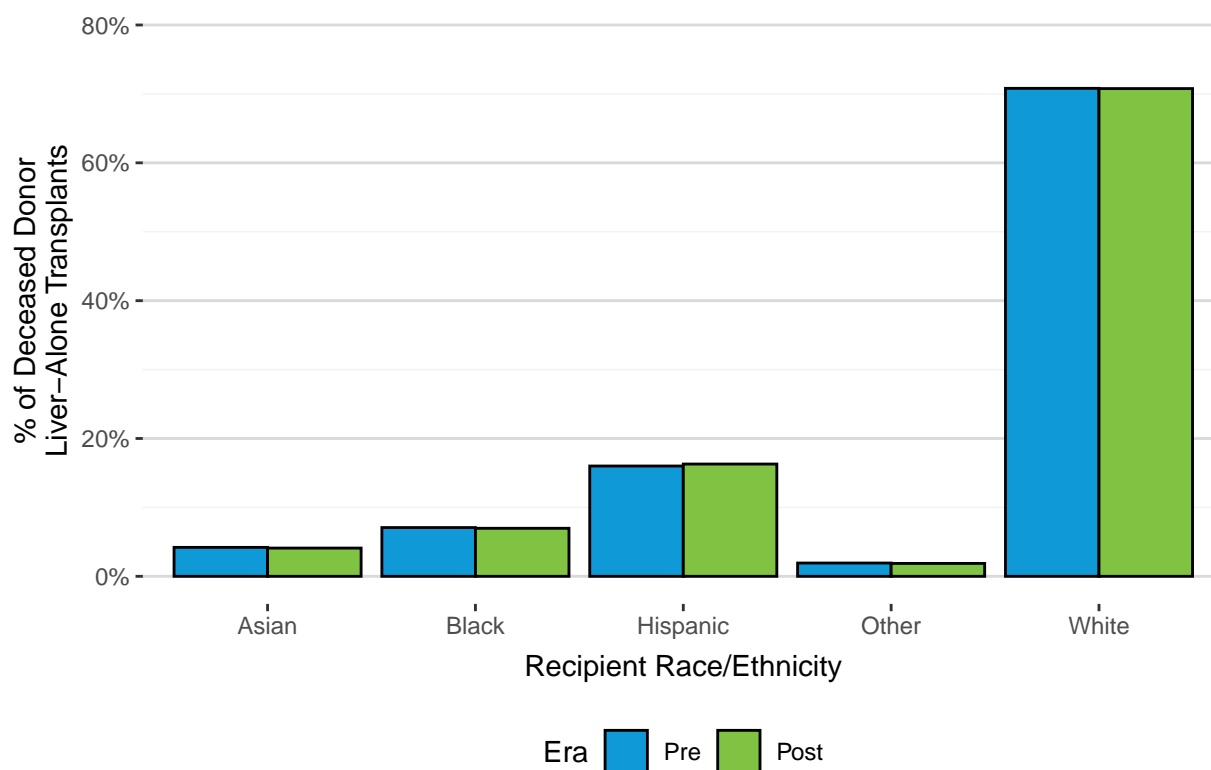
Era	N	Allocation MELD at Transplant					
		Minimum	25th Percentile	Mean	Median	75th Percentile	Maximum
Pre	10111	6	23	28	28	33	40
Post	10687	6	23	28	28	34	40

Figure 92. Adult Deceased Donor Liver-Alone Transplants by Recipient Blood Type and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 83. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Blood Type and Era

Recipient Blood Type	Pre-Policy	Post-Policy
A	3793 (36.3%)	4029 (36.6%)
AB	513 (4.9%)	569 (5.2%)
B	1437 (13.8%)	1444 (13.1%)
O	4693 (45.0%)	4964 (45.1%)
Total	10436 (100.0%)	11006 (100.0%)

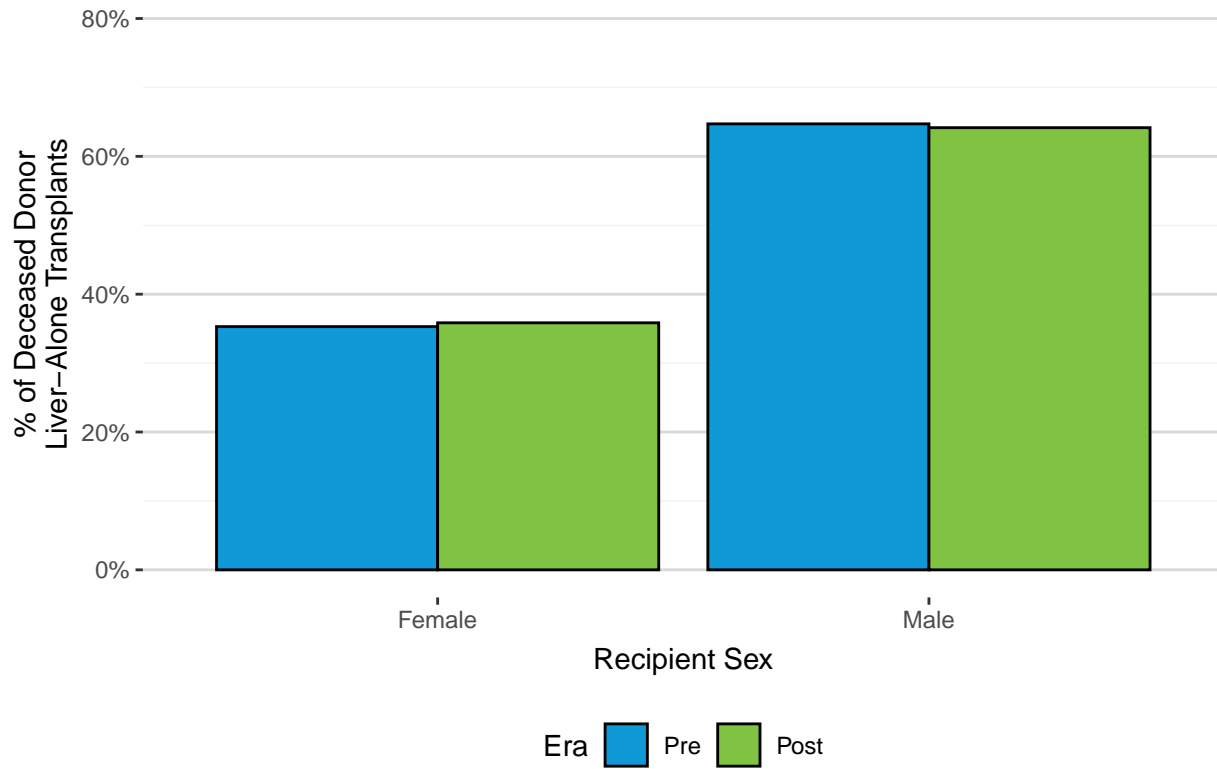
Figure 93. Adult Deceased Donor Liver-Alone Transplants by Recipient Race/Ethnicity and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 84. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Race/Ethnicity and Era

Recipient Race/Ethnicity	Pre-Policy	Post-Policy
Asian	438 (4.2%)	451 (4.1%)
Black	738 (7.1%)	767 (7.0%)
Hispanic	1670 (16.0%)	1793 (16.3%)
Other	201 (1.9%)	206 (1.9%)
White	7389 (70.8%)	7789 (70.8%)
Total	10436 (100.0%)	11006 (100.0%)

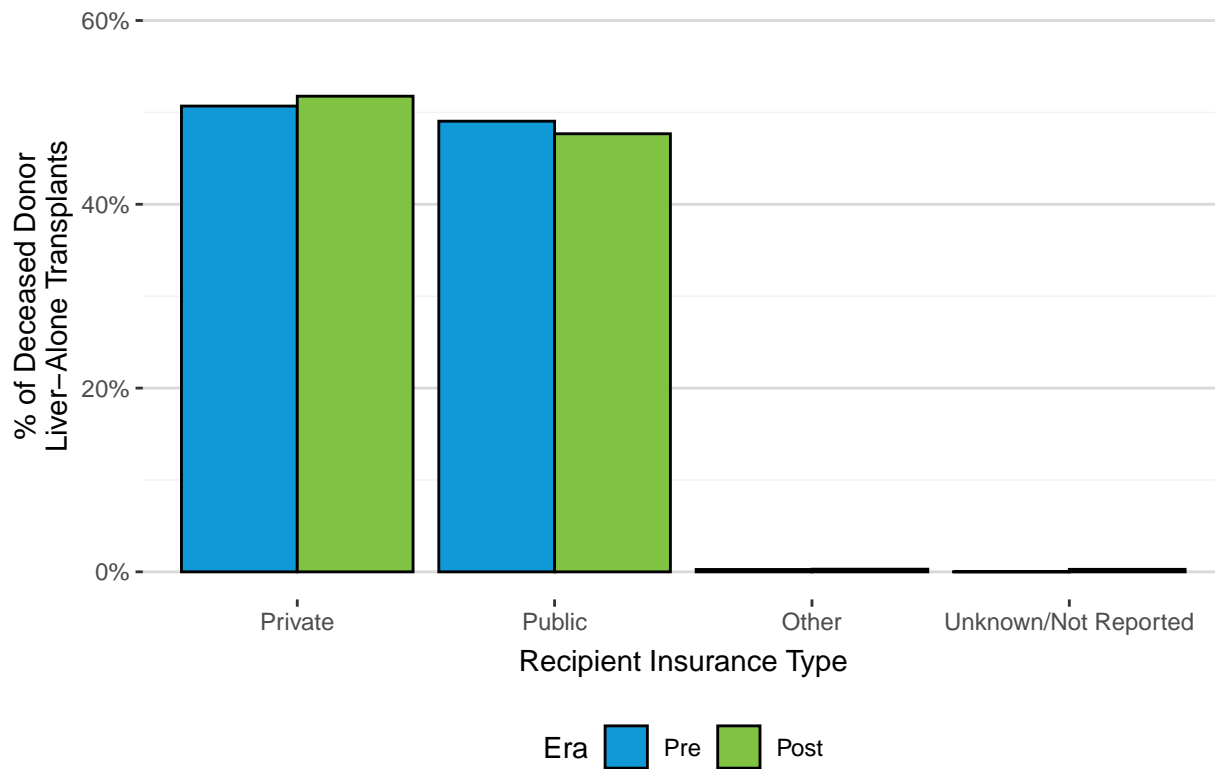
Figure 94. Adult Deceased Donor Liver-Alone Transplants by Recipient Sex and Era



National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 85. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Sex and Era

Recipient Sex	Pre-Policy	Post-Policy
Female	3683 (35.3%)	3945 (35.8%)
Male	6753 (64.7%)	7061 (64.2%)
Total	10436 (100.0%)	11006 (100.0%)

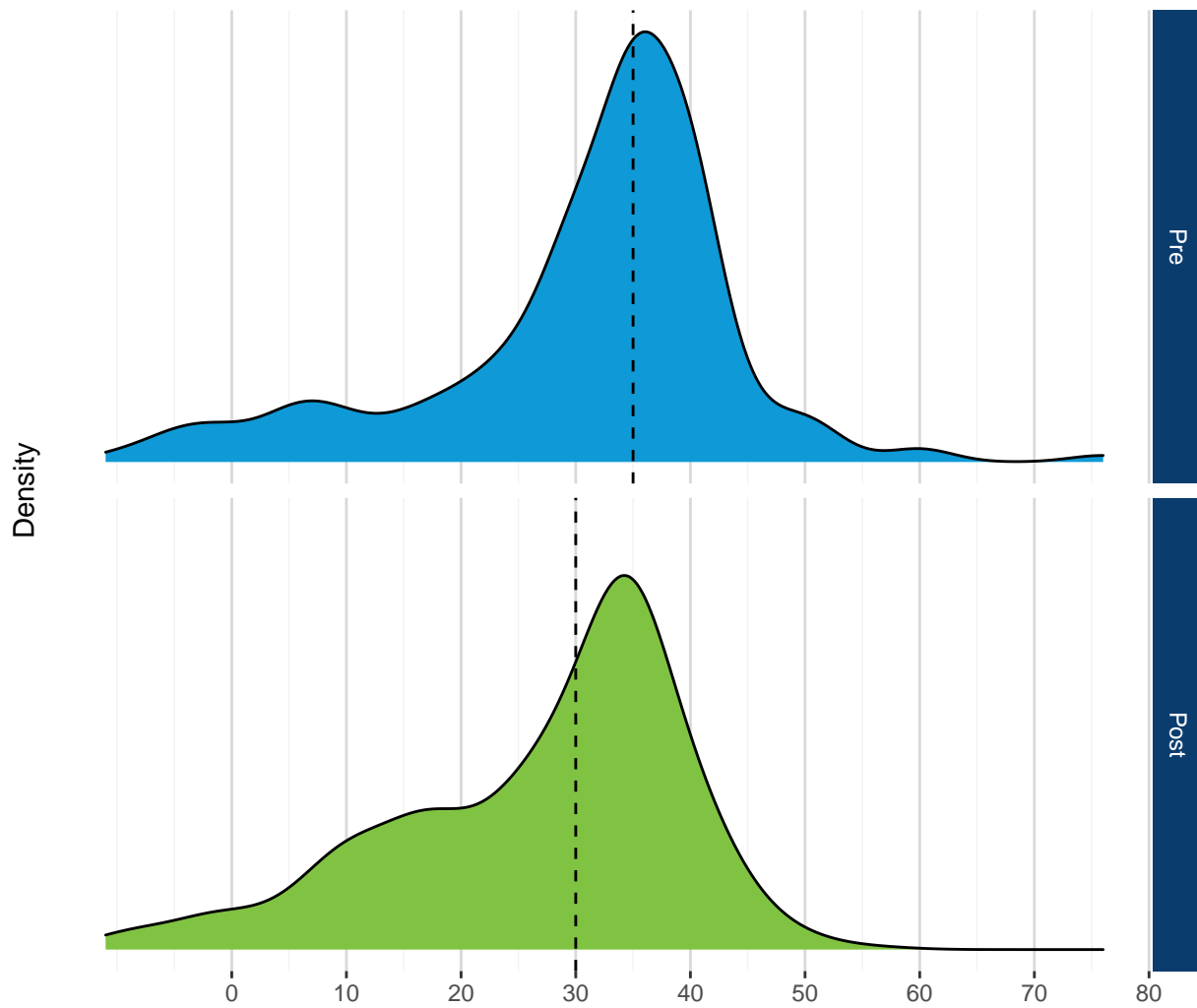
Figure 95. Adult Deceased Donor Liver-Alone Transplants by Recipient Insurance Type and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 86. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Insurance Type and Era

Recipient Insurance Type	Pre-Policy	Post-Policy
Private	5290 (50.7%)	5697 (51.8%)
Public	5118 (49.0%)	5247 (47.7%)
Other	27 (0.3%)	32 (0.3%)
Unknown/Not Reported	1 (0.0%)	30 (0.3%)
Total	10436 (100.0%)	11006 (100.0%)

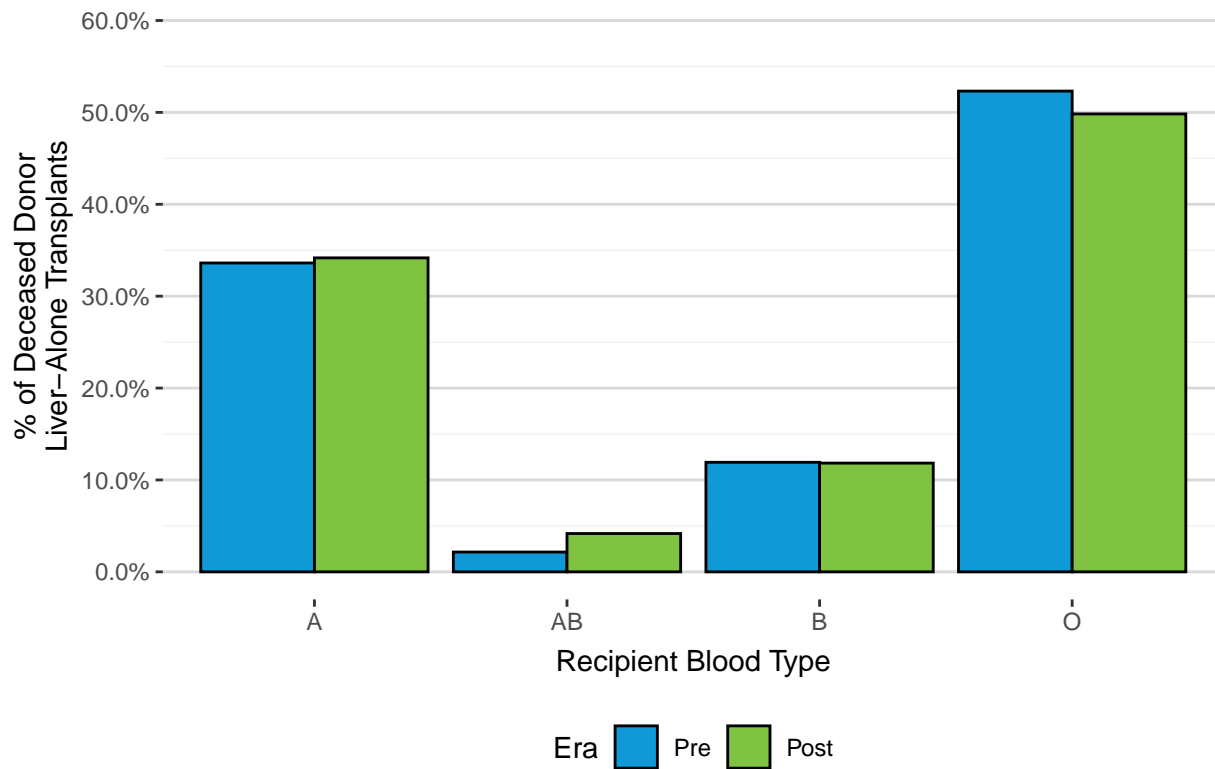
Figure 96. Distribution of Pediatric Deceased Donor Liver-Alone Recipient Allocation MELD or PELD Score at Transplant by Era



Allocation MELD or PELD Score at Transplant
 National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.
 ** Dotted lines indicate median score within each era.

Table 87. Distribution of Pediatric Deceased Donor Liver-Alone Recipient Allocation MELD or PELD Score at Transplant by Era

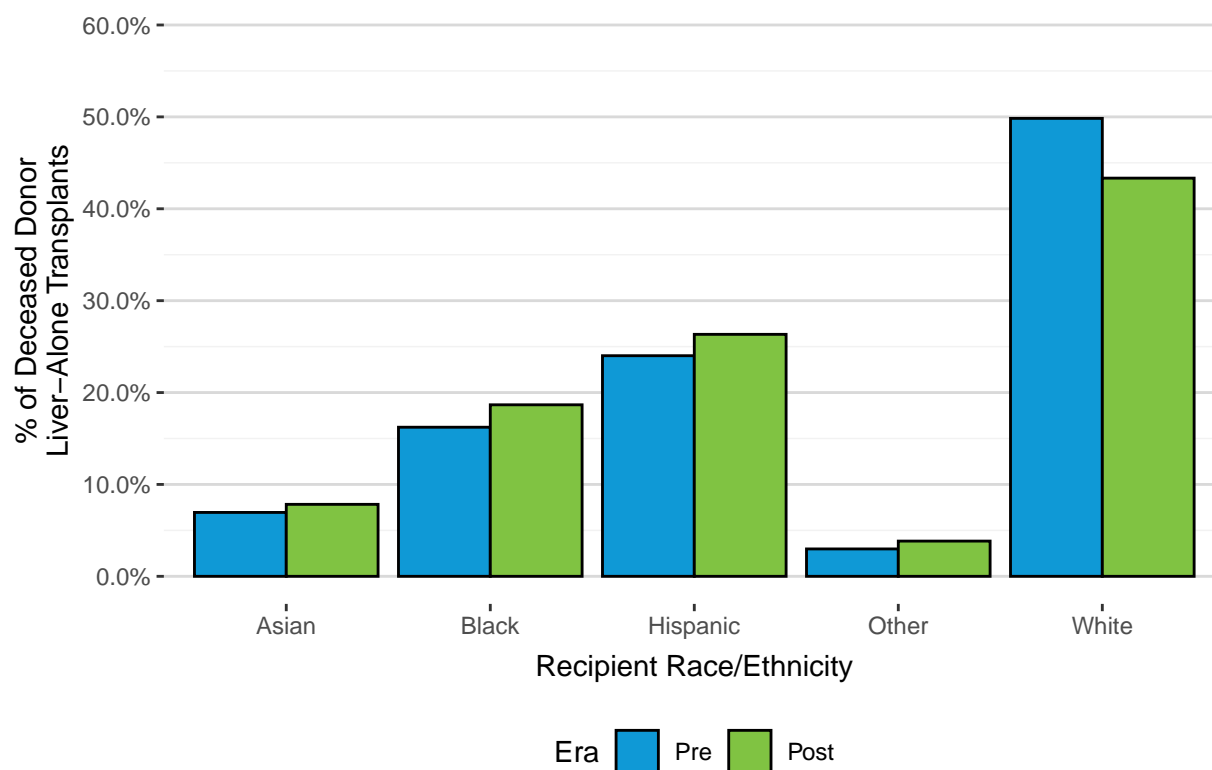
Era	N	Allocation MELD or PELD at Transplant					
		Minimum	25th Percentile	Mean	Median	75th Percentile	Maximum
Pre	359	-10	26	31	35	40	76
Post	399	-11	18	27	30	35	56

Figure 97. Pediatric Deceased Donor Liver-Alone Transplants by Recipient Blood Type and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 88. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Blood Type and Era

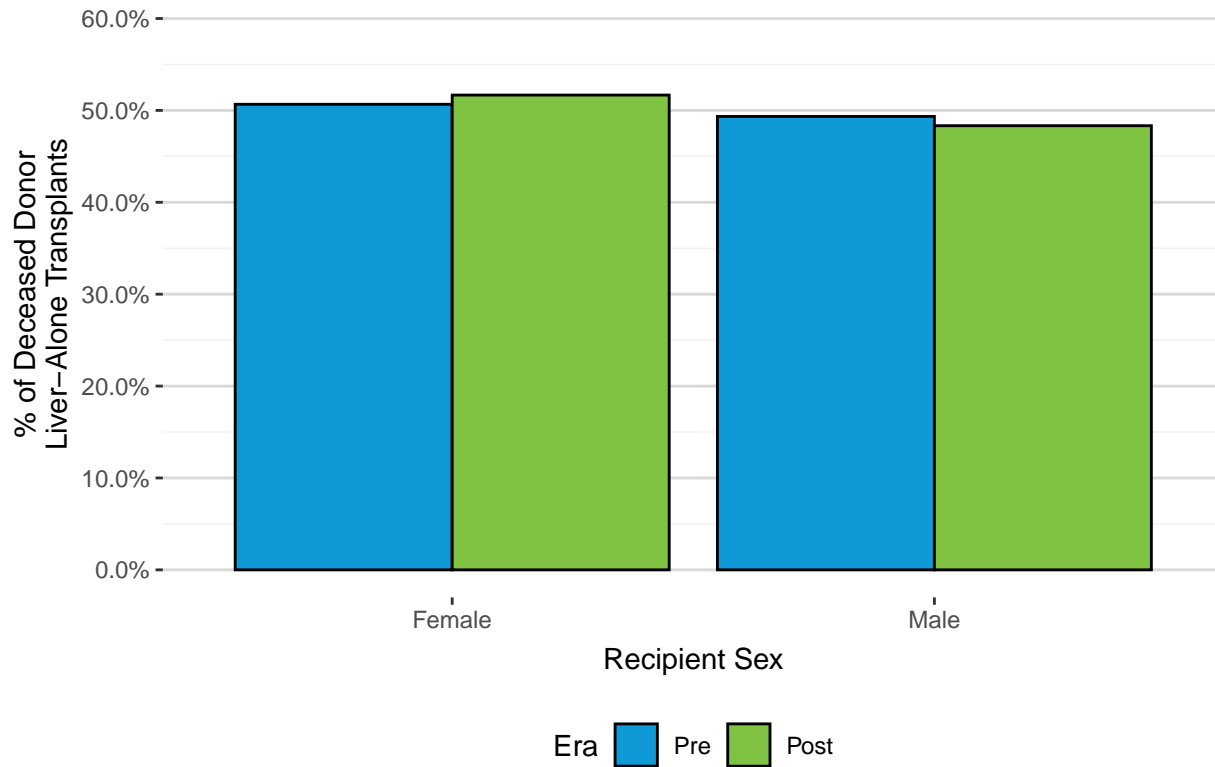
Recipient Blood Type	Pre-Policy	Post-Policy
A	203 (33.6%)	205 (34.2%)
AB	13 (2.2%)	25 (4.2%)
B	72 (11.9%)	71 (11.8%)
O	316 (52.3%)	299 (49.8%)
Total	604 (100.0%)	600 (100.0%)

Figure 98. Pediatric Deceased Donor Liver-Alone Transplants by Recipient Race/Ethnicity and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 89. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Race/Ethnicity and Era

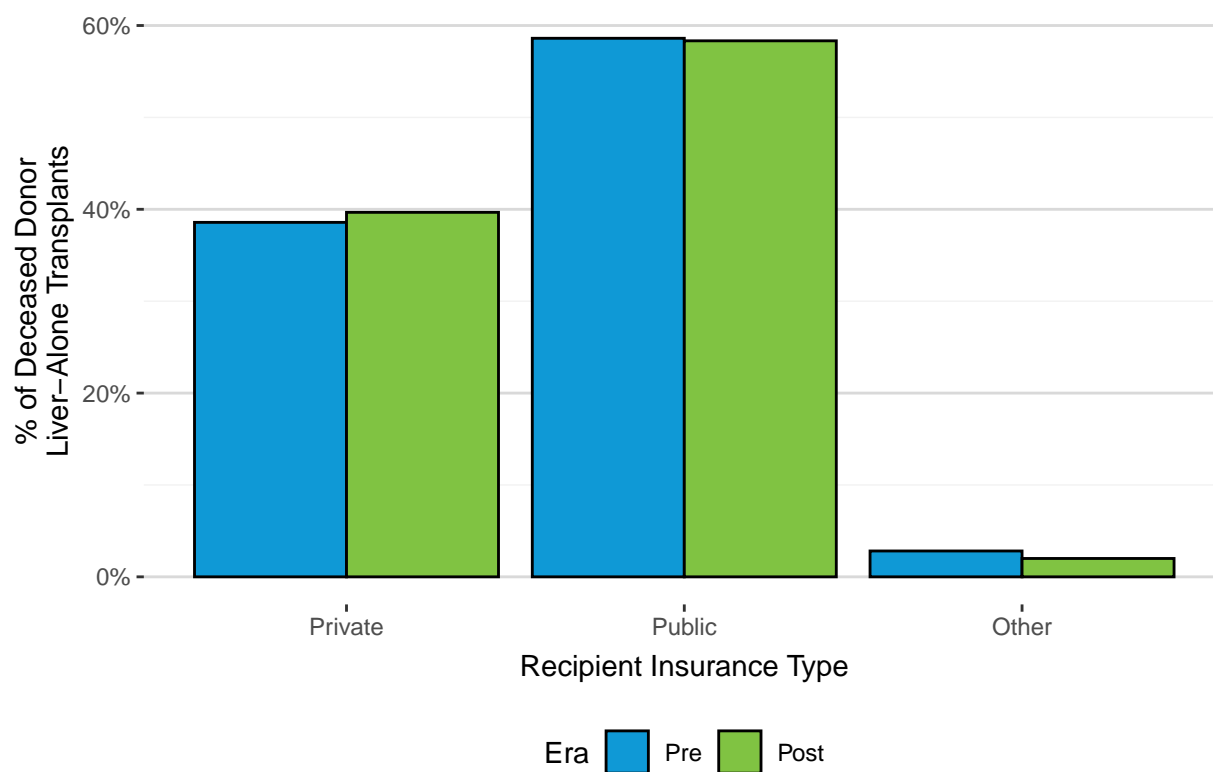
Recipient Race/Ethnicity	Pre-Policy	Post-Policy
Asian	42 (7.0%)	47 (7.8%)
Black	98 (16.2%)	112 (18.7%)
Hispanic	145 (24.0%)	158 (26.3%)
Other	18 (3.0%)	23 (3.8%)
White	301 (49.8%)	260 (43.3%)
Total	604 (100.0%)	600 (100.0%)

Figure 99. Pediatric Deceased Donor Liver-Alone Transplants by Recipient Sex and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 90. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Sex and Era

Recipient Sex	Pre-Policy	Post-Policy
Female	306 (50.7%)	310 (51.7%)
Male	298 (49.3%)	290 (48.3%)
Total	604 (100.0%)	600 (100.0%)

Figure 100. Pediatric Deceased Donor Liver-Alone Transplants by Recipient Insurance Type and Era

National state of emergency declared in US due to COVID-19 pandemic on March 13, 2020.
 Pre-Policy: 08/06/2018 – 02/03/2020; Post-Policy: 02/04/2020 – 08/03/2021.

Table 91. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Insurance Type and Era

Recipient Insurance Type	Pre-Policy	Post-Policy
Private	233 (38.6%)	238 (39.7%)
Public	354 (58.6%)	350 (58.3%)
Other	17 (2.8%)	12 (2.0%)
Total	604 (100.0%)	600 (100.0%)

Additional Utilization Information

Table 92. Number of Deceased Liver Donors Recovered by OPO and Era

OPO	Pre-Policy	Post-Policy
ALOB	247 (1.8%)	271 (1.9%)
AROR	90 (0.7%)	90 (0.6%)
AZOB	357 (2.6%)	385 (2.7%)
CADN	450 (3.3%)	447 (3.1%)
CAGS	88 (0.6%)	158 (1.1%)
CAOP	702 (5.2%)	647 (4.5%)
CASD	157 (1.2%)	145 (1.0%)
CORS	186 (1.4%)	223 (1.6%)
CTOP	78 (0.6%)	41 (0.3%)
DCTC	171 (1.3%)	156 (1.1%)
FLFH	211 (1.6%)	242 (1.7%)
FLMP	189 (1.4%)	202 (1.4%)
FLUF	240 (1.8%)	271 (1.9%)
FLWC	309 (2.3%)	367 (2.6%)
GALL	418 (3.1%)	414 (2.9%)
HIOP	36 (0.3%)	30 (0.2%)
IAOP	96 (0.7%)	110 (0.8%)
ILIP	532 (3.9%)	518 (3.6%)
INOP	271 (2.0%)	330 (2.3%)
KYDA	149 (1.1%)	210 (1.5%)
LAOP	284 (2.1%)	304 (2.1%)
MAOB	347 (2.6%)	328 (2.3%)
MDPC	198 (1.5%)	194 (1.4%)
MIOP	397 (2.9%)	372 (2.6%)
MNOP	224 (1.7%)	209 (1.5%)
MOMA	263 (1.9%)	286 (2.0%)
MSOP	108 (0.8%)	124 (0.9%)
MWOB	293 (2.2%)	358 (2.5%)
NCCM	144 (1.1%)	165 (1.2%)
NCNC	261 (1.9%)	297 (2.1%)
NEOR	68 (0.5%)	85 (0.6%)
NJTO	210 (1.6%)	231 (1.6%)
NMOP	57 (0.4%)	79 (0.6%)
NVLV	204 (1.5%)	226 (1.6%)
NYAP	70 (0.5%)	80 (0.6%)
NYFL	63 (0.5%)	61 (0.4%)
NYRT	371 (2.7%)	313 (2.2%)
NYWN	34 (0.3%)	32 (0.2%)
OHLB	171 (1.3%)	186 (1.3%)
OHLC	121 (0.9%)	156 (1.1%)
OHLP	154 (1.1%)	211 (1.5%)
OHOV	105 (0.8%)	114 (0.8%)
OKOP	191 (1.4%)	187 (1.3%)
ORUO	142 (1.0%)	190 (1.3%)
PADV	755 (5.6%)	745 (5.2%)

(continued)

OPO	Pre-Policy	Post-Policy
PATF	253 (1.9%)	347 (2.4%)
PRLL	136 (1.0%)	136 (1.0%)
SCOP	200 (1.5%)	212 (1.5%)
TNDS	387 (2.9%)	435 (3.0%)
TNMS	82 (0.6%)	83 (0.6%)
TXGC	532 (3.9%)	505 (3.5%)
TXSA	233 (1.7%)	249 (1.7%)
TXSB	517 (3.8%)	468 (3.3%)
UTOP	141 (1.0%)	178 (1.2%)
VATB	217 (1.6%)	243 (1.7%)
WALC	345 (2.5%)	337 (2.4%)
WIDN	125 (0.9%)	118 (0.8%)
WIUW	161 (1.2%)	175 (1.2%)
Total	13541 (100.0%)	14276 (100.0%)