

## Median MELD at Transplant Around the Donor Hospital Two-Year Monitoring Report

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## Executive Summary

This report provides a review of the first two years under the Median MELD at Transplant (MMaT) around the donor hospital policy. After implementation of the MMaT around the donor hospital policy:

- The number of waiting list registrations and proportion of registrations by exception type (no exception, HCC exception, non-HCC exception) remained consistent pre- versus post-policy, both overall and when examined by OPTN Region.
- Waiting list removal rates due to death or too sick by exception type remained fairly consistent (slight, statistically insignificant decreases across exception types) pre- versus post-policy, both overall and for most OPTN Regions.
- Transplant rates by exception type increased pre- to post-policy, both overall and for nearly all OPTN Regions.
- The proportion of initial and extension requests that were approved remained constant or had a slight decrease from pre- to post-policy, although the extent of this decrease varied by review board assignment and by OPTN Region.
- The median score adjustment requested for standard initial and extension MELD or PELD exceptions remained the same across policy eras. The interquartile range (difference between the 75th and 25th percentile) of score adjustments requested was similar as well (with an increase in the Initial forms' range). Similar trends were seen by OPTN Region.
- The median allocation MELD or PELD score at transplant increased slightly pre- to post-policy for those transplanted with an exception. The spread of allocation MELD or PELD score at transplant was smaller (i.e. the interquartile range was tighter) post-policy for both HCC and non-HCC exceptions. Similar trends were seen by OPTN Region.
- The median MMaT scores for adult liver-alone transplant recipients who were transplanted with exceptions increased slightly pre- to post-policy. The spread of MMaT scores for adult liver-alone transplant recipients who were transplanted with exceptions was smaller post-policy. Similar trends were seen by OPTN Region.

This report also evaluates the impact of the Ischemic Cholangiopathy and Polycystic Liver Disease (PLD) guidances. Given the smaller number of candidates and transplants with these diagnoses, the findings below should be interpreted cautiously:

- As expected, the median score adjustment requested for exception candidates with ischemic cholangiopathy or polycystic liver disease increased pre- versus post-guidance.
- For exception candidates with ischemic cholangiopathy, the median allocation MELD or PELD score at transplant slightly decreased pre- to post-guidance and the interquartile range also decreased.
- For exception candidates with Polycystic Liver Disease (PLD), the median allocation MELD or PELD score at transplant increased pre- to post-guidance and the interquartile range decreased.

## Background/Purpose

The Model for End Stage Liver Disease (MELD) score is used to prioritize liver transplant candidates who are 12 years of age or older, while the Pediatric End Stage Liver Disease (PELD) score prioritizes liver transplant candidates who are less than 12 years old. MELD and PELD are measures of medical urgency that are calculated based on clinical data. In some cases, however, candidates' MELD or PELD scores do not adequately reflect their true medical urgency. In these cases, the median MELD at transplant (MMaT) is used to assign MELD exception scores to liver transplant candidates who are 12 years of age or older; median PELD at transplant (MPaT) is used to assign PELD exception scores to liver transplant candidates who are less than 12 years old.

Historically, MMaT was calculated as the median of the MELD scores at the time of transplant of all recipients at least 12 years old who were transplanted at hospitals within 250 nautical miles of a candidate's transplant hospital in a 365 day cohort (excluding recipients who were transplanted with livers from living donors, donation after circulatory death (DCD) donors, donors from donor hospitals outside 500 nautical miles of the transplant hospital, or who were status 1A or 1B at the time of transplant). As a result, each transplant program had its own MMaT, and allocation scores for exception candidates on the waiting list were known. However, this approach also implied that exception candidates at transplant programs within close geographic proximity could have different exception scores even if their medical urgency was the same. To address this concern, on June 28, 2022, the OPTN implemented the "Calculate Median MELD at Transplant Around the Donor Hospital and Update Sorting Within Liver Allocation" policy. Under this policy, the MMaT calculation is now based on a subset of transplants with a MELD score performed within a specified distance of the donor hospital, rather than the transplant program. As a result, each donor hospital now has an MMaT, and allocation scores for exception candidates on the waiting list are not known until the match is run. Note that this policy did not impact how MPaT values are calculated; MPaT is still calculated as the median of the PELD scores at the time of transplant of all recipients less than 12 years old in the nation in a 365 day cohort (excluding recipients who are transplanted with livers from living donors, donation after circulatory death (DCD) donors, donors from donor hospitals outside 500 nautical miles of the transplant hospital, or who were status 1A or 1B at the time of transplant). For more details on this policy change, please see the MMAT around the donor hospital briefing paper.

The purpose of this report is to assess the impact of the new MMaT around the donor hospital calculation on patient rankings and access to transplant. More specifically, the report aims to determine whether non-exception and exception candidates are ranked more appropriately with each other under the MMaT around the donor hospital calculation compared to the previous MMaT around the transplant center calculation. We also aim to determine whether exception candidates across the country have more equitable access to transplant post-policy compared to pre-policy. Additionally, we include metrics to assess the impact of the Ischemic Cholangiopathy and Polycystic Liver Disease (PLD) National Liver Review Board (NLRB) guidance documents that were implemented on July 26, 2022.

## Monitoring Plan

Monitoring of the effect of the MMaT around the donor hospital policy change implemented on June 28, 2022 will be performed at approximately 6 months, 1 year, and 2 years post-implementation. National results will be provided and some analyses will be stratified by various geographic units, specialty board type (i.e., Adult HCC, Adult Other Diagnosis, and Pediatric), age group (i.e., <2, 2-11, 12-17, 18+ years old), and other features as appropriate.

Relevant analyses:

- Waiting list removal rates, defined as removal due to death or too sick to transplant, by exception type (no exception, HCC exception, non-HCC exception)
- Waiting list transplant rates by exception type
- Count and percent of the waiting list by exception type
- Distribution of score adjustment requested for standard MELD or PELD exception requests

- Count and percent of MELD or PELD exception requests approved
- Count and percent of deceased donor transplant recipients by exception type
- Distribution of allocation MELD or PELD score or status at transplant by exception type
- Distribution of transplant recipients by donor age and recipient age
- Other metrics deemed relevant and necessary to the evaluation of the policy by the OPTN Liver and Intestinal Transplantation Committee at time of analysis

This report also includes the following metrics to evaluate the impact of the Ischemic Cholangiopathy and Polycystic Liver Disease (PLD) guidances that were implemented on July 26, 2022:

- Count of exception forms submitted with an ischemic cholangiopathy diagnosis or a PLD diagnosis
- Distribution of score adjustment requested for ischemic cholangiopathy and PLD exception requests
- Count of transplants with an ischemic cholangiopathy or PLD diagnosis
- Distribution of allocation MELD or PELD score at transplant for recipients with an ischemic cholangiopathy or PLD diagnosis

Key results can be found in the main report. Supporting figures and tables can be found in the Appendix.

## 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. The report also summarizes liver exception requests including liver MELD and PELD exception request forms submitted during the timeframes noted below. Analyses are based on OPTN data as of January 03, 2025 and are subject to change based on future data submission or correction.

### Cohorts

This report includes cohorts of liver-alone registrations ever waiting during 06/27/2020 - 06/27/2022 (pre-policy) and 06/28/2022 - 06/27/2024 (post-policy) for waiting list removal due to death or too sick to transplant and transplant rates. Multi-organ listings are excluded.

The report also summarizes all liver exception requests including liver MELD and PELD exception request forms submitted during 06/27/2020 - 06/27/2022 (pre-policy) and 06/28/2022 - 06/27/2024 (post-policy).

Deceased donor, liver-alone transplant cohorts are defined as 06/27/2020 - 06/27/2022 (pre-policy) and 06/28/2022 - 06/27/2024 (post-policy).

For the ischemic cholangiopathy and PLD guidances, the pre- and post-guidance cohorts are defined as (07/26/2020 - 07/25/2022) and (07/26/2022 - 07/25/2024), respectively.

Analyses are based on OPTN data as of January 03, 2025 and are subject to change based on future data submission or correction.

### Methods

Counts and percentages were used to summarize categorical variables or characteristics, while density curves and distribution summaries (minimum, maximum, mean, median, percentiles) were provided for continuous characteristics. If statistical tests of comparison were performed, Chi-Square tests were used for categorical comparisons pre- versus post-policy, and either t-tests or Kolmogorov-Smirnov tests were used for continuous variable comparisons pre- versus post-policy, as appropriate for differences in mean values or full distributions.

Removal rates as 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 (expressed per 100 person-years). Dividing by the number of person-years serves to normalize the rates to account for differences in the number of candidates and duration of time waited within each era by different patient characteristics. For each time interval, all waiting time (active and inactive) within the interval analyzed was used for the person-years calculation. 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. Deaths within 30 days of non-transplant-related removal were counted as removals for death or too sick to transplant.

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 person-years). 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.

For removal and transplant rates by exception type 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 an HCC diagnosis within that era. 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 submitted form was used. All other candidates' person-years waiting was attributed to the non-exception group. This exception type definition differs from that used in counts of transplants, where 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.

In some cases, removal and transplant rates were further stratified by age. Note that the MPaT was equal to 35 for the majority of the study period examined in this report, but did decrease to 31 during the most recent scheduled update.

Finally, some registrations with exceptions might have been waiting in both the pre- and post-policy periods. In these circumstances, the exception scores were converted to match the new score adjustment requirements after implementation of the policy.



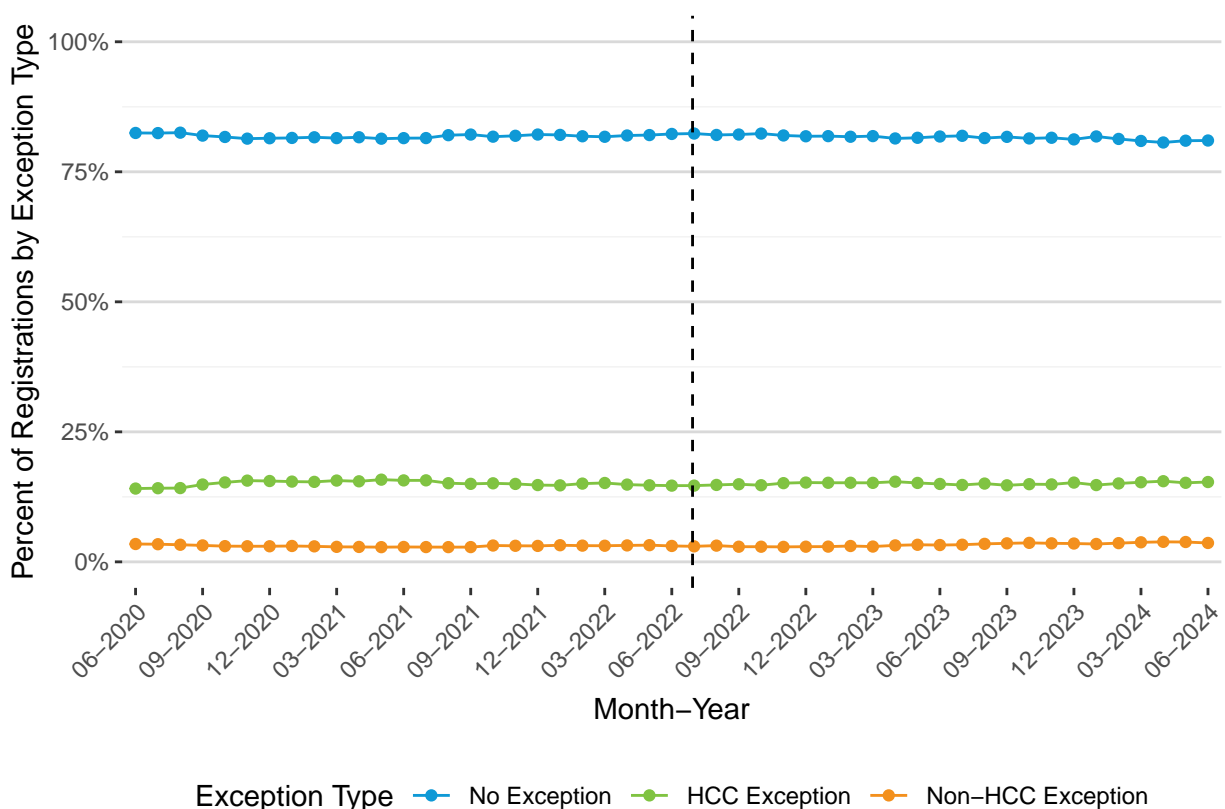
## Results

### Waiting List

This section of the report examines the composition of the liver-alone waiting list, rates of removal due to death or too sick to transplant, and transplant rates pre- and post-implementation of the MMaT around the donor hospital policy. All analyses in this section are stratified by exception type (no exception, HCC exception, non-HCC exception).

**Figure 1** and **Table 1** show the count and percent of liver waiting list registrations at the end of each month by exception type. On average, 11262 registrations were waiting at the end of each month. The majority of registrations had no exception, followed by HCC exceptions and non-HCC exceptions. Counts and percents remained consistent pre- and post-policy. On average, 81.7% of registrations had no exceptions at the end of each month, 15.1% of registrations had HCC exceptions at the end of each month, and 3.2% of registrations had non-HCC exceptions at the end of each month. Similar trends were seen when examined by OPTN Region (**Appendix Figure 1** and **Appendix Table 1**).

**Figure 1. Percent of Liver Waiting List Registrations at the End of each Month by Exception Type**



Dotted line represents implementation of MMaT around the donor hospital on June 28, 2022.

**Table 1. Count and Percent of Liver Waiting List Registrations at the End of each Month by Exception Type**

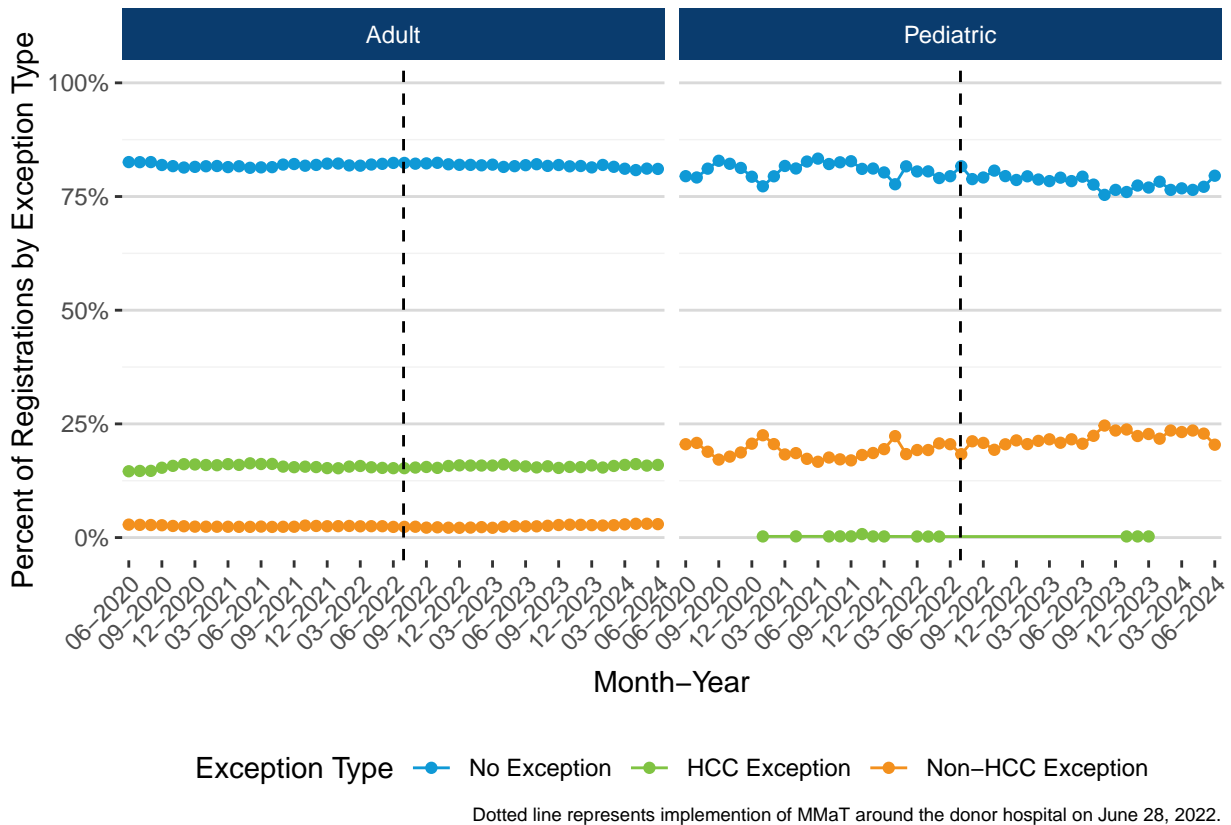
Month-Year	No Exception		HCC Exception		Non-HCC Exception	
	N	%	N	%	N	%
06-2020	10397	82.47	1777	14.10	433	3.43
07-2020	10298	82.44	1769	14.16	424	3.39
08-2020	10233	82.52	1759	14.19	408	3.29
09-2020	10132	81.96	1839	14.88	391	3.16
10-2020	10110	81.70	1891	15.28	374	3.02
11-2020	9996	81.37	1919	15.62	369	3.00
12-2020	9965	81.45	1902	15.55	367	3.00
01-2021	9872	81.51	1869	15.43	370	3.06
02-2021	9857	81.64	1857	15.38	360	2.98
03-2021	9798	81.48	1880	15.63	347	2.89
04-2021	9847	81.64	1868	15.49	346	2.87
05-2021	9862	81.36	1916	15.81	343	2.83
06-2021	9837	81.47	1891	15.66	346	2.87
07-2021	9774	81.48	1880	15.67	341	2.84
08-2021	9785	82.04	1804	15.13	338	2.83
09-2021	9843	82.16	1797	15.00	340	2.84
10-2021	9722	81.75	1796	15.10	374	3.14
11-2021	9702	81.92	1775	14.99	366	3.09
12-2021	9694	82.17	1742	14.77	362	3.07
01-2022	9577	82.09	1716	14.71	373	3.20
02-2022	9468	81.83	1741	15.05	361	3.12
03-2022	9415	81.73	1747	15.17	357	3.10
04-2022	9380	81.98	1700	14.86	362	3.16
05-2022	9356	82.06	1679	14.73	366	3.21
06-2022	9457	82.28	1685	14.66	352	3.06
07-2022	9354	82.36	1665	14.66	339	2.98
08-2022	9278	82.08	1672	14.79	353	3.12
09-2022	9307	82.17	1690	14.92	330	2.91
10-2022	9186	82.35	1644	14.74	325	2.91
11-2022	9107	81.99	1681	15.13	320	2.88
12-2022	9032	81.83	1683	15.25	322	2.92
01-2023	8848	81.86	1644	15.21	317	2.93
02-2023	8796	81.74	1637	15.21	328	3.05
03-2023	8735	81.87	1621	15.19	314	2.94

*(continued)*

Month-Year	N	%	N	%	N	%
04-2023	8628	81.41	1634	15.42	336	3.17
05-2023	8581	81.54	1597	15.17	346	3.29
06-2023	8523	81.79	1561	14.98	337	3.23
07-2023	8472	81.92	1529	14.78	341	3.30
08-2023	8400	81.48	1552	15.05	357	3.46
09-2023	8376	81.72	1509	14.72	365	3.56
10-2023	8336	81.41	1529	14.93	374	3.65
11-2023	8394	81.54	1533	14.89	367	3.57
12-2023	8271	81.23	1552	15.24	359	3.53
01-2024	8208	81.79	1482	14.77	345	3.44
02-2024	8192	81.32	1519	15.08	363	3.60
03-2024	8089	80.93	1530	15.31	376	3.76
04-2024	7959	80.64	1531	15.51	380	3.85
05-2024	7932	80.98	1489	15.20	374	3.82
06-2024	7826	81.01	1483	15.35	351	3.63

**Figure 2** and **Table 2** show the count and percent of liver waiting list registrations at the end of each month by exception type and age (pediatric: <18 years old vs. adult: 18+ years old). In both age groups, the majority of registrations had no exception. Among adult registrations, HCC exceptions made up a larger proportion of registrations compared to non-HCC exceptions. Conversely, among pediatric registrations, non-HCC exceptions were more common, with very few pediatric candidates receiving HCC exceptions. Counts and percents remained fairly consistent pre- and post-policy, although the small sample size among pediatric candidates led to more variability.

**Figure 2. Percent of Liver Waiting List Registrations each Month by Exception Type and Age**



**Table 2. Count and Percent of Liver Waiting List Registrations each Month by Exception Type and Age**

Month-Year	Recipient Age	No Exception		HCC Exception		Non-HCC Exception	
		N	%	N	%	N	%
06-2020	Adult	10063	82.57	1777	14.58	347	2.85
	Pediatric	333	79.47	0	0.00	86	20.53
07-2020	Adult	9967	82.56	1769	14.65	337	2.79
	Pediatric	331	79.19	0	0.00	87	20.81
08-2020	Adult	9902	82.57	1759	14.67	331	2.76
	Pediatric	331	81.13	0	0.00	77	18.87
09-2020	Adult	9813	81.93	1839	15.35	325	2.71
	Pediatric	319	82.86	0	0.00	66	17.14
10-2020	Adult	9795	81.68	1891	15.77	306	2.55
	Pediatric	314	82.20	0	0.00	68	17.80
11-2020	Adult	9678	81.38	1919	16.14	296	2.49
	Pediatric	317	81.28	0	0.00	73	18.72
12-2020	Adult	9645	81.52	1902	16.08	284	2.40
	Pediatric	319	79.35	0	0.00	83	20.65
01-2021	Adult	9562	81.66	1868	15.95	280	2.39
	Pediatric	309	77.25	1	0.25	90	22.50
02-2021	Adult	9539	81.71	1857	15.91	278	2.38
	Pediatric	317	79.45	0	0.00	82	20.55
03-2021	Adult	9484	81.47	1880	16.15	277	2.38
	Pediatric	313	81.72	0	0.00	70	18.28
04-2021	Adult	9540	81.66	1867	15.98	276	2.36
	Pediatric	306	81.17	1	0.27	70	18.57
05-2021	Adult	9541	81.32	1916	16.33	276	2.35
	Pediatric	320	82.69	0	0.00	67	17.31
06-2021	Adult	9516	81.41	1891	16.18	282	2.41
	Pediatric	320	83.33	0	0.00	64	16.67
07-2021	Adult	9451	81.46	1879	16.20	272	2.34
	Pediatric	322	82.14	1	0.26	69	17.60
08-2021	Adult	9478	82.03	1803	15.60	274	2.37
	Pediatric	307	82.53	1	0.27	64	17.20
09-2021	Adult	9531	82.14	1796	15.48	276	2.38
	Pediatric	312	82.76	1	0.27	64	16.98
10-2021	Adult	9405	81.78	1793	15.59	303	2.63
	Pediatric	317	81.07	3	0.77	71	18.16
	Adult	9379	81.95	1774	15.50	292	2.55

*(continued)*

Month-Year	Recipient Age	N	%	N	%	N	%
11-2021	Pediatric	323	81.16	1	0.25	74	18.59
	Adult	9372	82.23	1741	15.28	284	2.49
12-2021	Pediatric	322	80.30	1	0.25	78	19.45
	Adult	9260	82.25	1716	15.24	282	2.50
01-2022	Pediatric	317	77.70	0	0.00	91	22.30
	Adult	9130	81.84	1741	15.61	285	2.55
02-2022	Pediatric	338	81.64	0	0.00	76	18.36
	Adult	9072	81.78	1746	15.74	275	2.48
03-2022	Pediatric	343	80.52	1	0.23	82	19.25
	Adult	9016	82.04	1699	15.46	275	2.50
04-2022	Pediatric	364	80.53	1	0.22	87	19.25
	Adult	9001	82.19	1678	15.32	273	2.49
05-2022	Pediatric	355	79.06	1	0.22	93	20.71
	Adult	9097	82.39	1685	15.26	259	2.35
06-2022	Pediatric	360	79.47	0	0.00	93	20.53
	Adult	8989	82.38	1665	15.26	257	2.36
07-2022	Pediatric	365	81.66	0	0.00	82	18.34
	Adult	8928	82.22	1672	15.40	259	2.39
08-2022	Pediatric	350	78.83	0	0.00	94	21.17
	Adult	8956	82.29	1690	15.53	238	2.19
09-2022	Pediatric	350	79.19	0	0.00	92	20.81
	Adult	8839	82.41	1644	15.33	242	2.26
10-2022	Pediatric	347	80.70	0	0.00	83	19.30
	Adult	8766	82.09	1681	15.74	232	2.17
11-2022	Pediatric	341	79.49	0	0.00	88	20.51
	Adult	8686	81.97	1683	15.88	228	2.15
12-2022	Pediatric	346	78.64	0	0.00	94	21.36
	Adult	8504	81.96	1644	15.84	228	2.20
01-2023	Pediatric	344	79.45	0	0.00	89	20.55
	Adult	8459	81.86	1637	15.84	237	2.29
02-2023	Pediatric	337	78.74	0	0.00	91	21.26
	Adult	8393	82.01	1621	15.84	220	2.15
03-2023	Pediatric	341	78.39	0	0.00	94	21.61
	Adult	8275	81.51	1634	16.10	243	2.39
04-2023	Pediatric	353	79.15	0	0.00	93	20.85
	Adult	8240	81.67	1597	15.83	252	2.50
05-2023	Pediatric	341	78.39	0	0.00	94	21.61

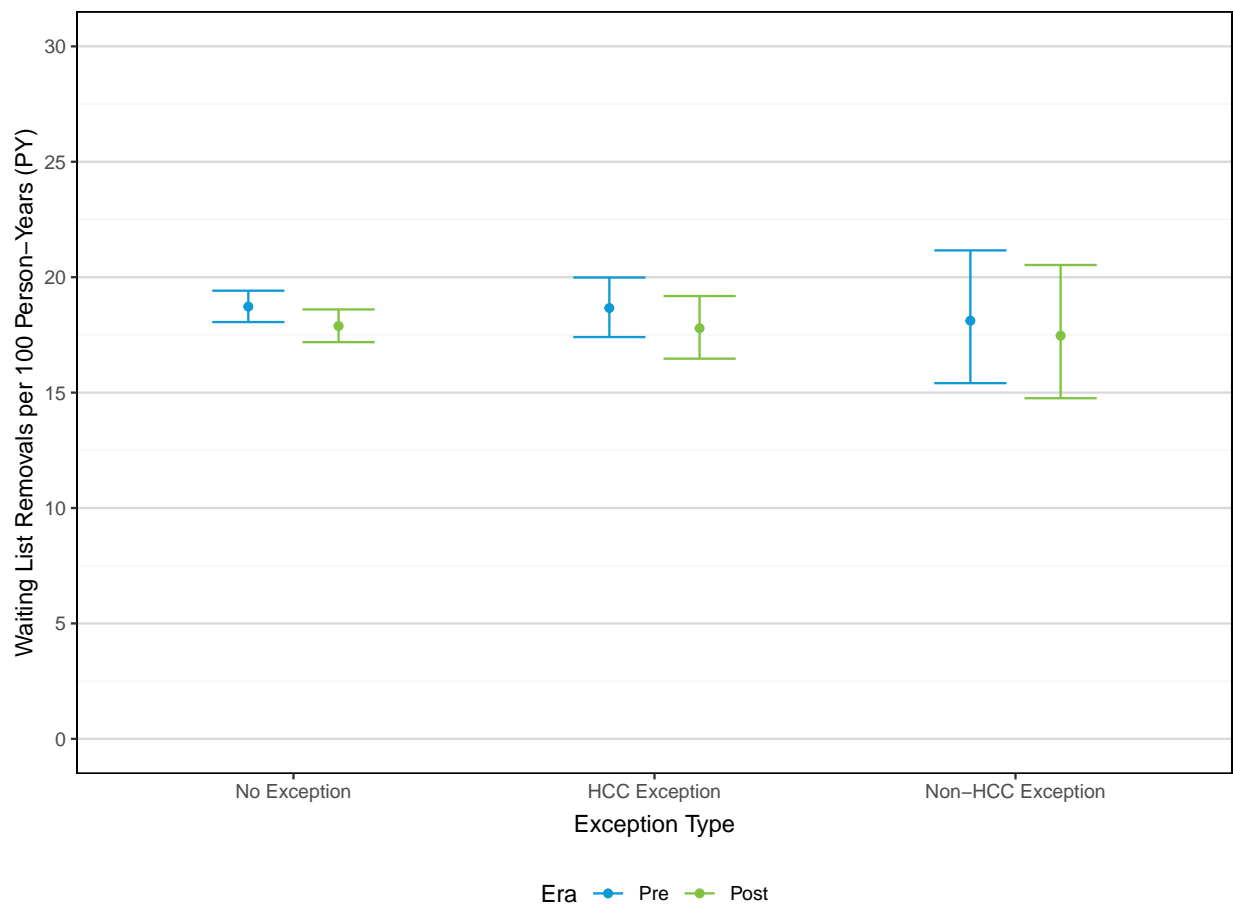
*(continued)*

Month-Year	Recipient Age	N	%	N	%	N	%
06-2023	Adult	8173	81.89	1561	15.64	246	2.46
	Pediatric	350	79.37	0	0.00	91	20.63
07-2023	Adult	8139	82.10	1529	15.42	245	2.47
	Pediatric	333	77.62	0	0.00	96	22.38
08-2023	Adult	8091	81.74	1552	15.68	256	2.59
	Pediatric	309	75.37	0	0.00	101	24.63
09-2023	Adult	8074	81.93	1509	15.31	272	2.76
	Pediatric	302	76.46	0	0.00	93	23.54
10-2023	Adult	8029	81.64	1528	15.54	278	2.83
	Pediatric	307	75.99	1	0.25	96	23.76
11-2023	Adult	8082	81.71	1532	15.49	277	2.80
	Pediatric	312	77.42	1	0.25	90	22.33
12-2023	Adult	7960	81.41	1551	15.86	267	2.73
	Pediatric	311	76.98	1	0.25	92	22.77
01-2024	Adult	7884	81.95	1482	15.40	255	2.65
	Pediatric	324	78.26	0	0.00	90	21.74
02-2024	Adult	7864	81.53	1519	15.75	262	2.72
	Pediatric	328	76.46	0	0.00	101	23.54
03-2024	Adult	7768	81.11	1530	15.98	279	2.91
	Pediatric	321	76.79	0	0.00	97	23.21
04-2024	Adult	7657	80.81	1531	16.16	287	3.03
	Pediatric	302	76.46	0	0.00	93	23.54
05-2024	Adult	7635	81.14	1489	15.82	286	3.04
	Pediatric	297	77.14	0	0.00	88	22.86
06-2024	Adult	7526	81.07	1483	15.98	274	2.95
	Pediatric	300	79.58	0	0.00	77	20.42

**Figure 3** and **Table 3** show the rate of waiting list removal due to death or too sick to transplant per 100 person-years waiting for liver-alone candidates by exception type and era. In the post-policy era, removal rates due to death or too sick were highest for candidates with no exceptions (Pre: 18.73 [ 18.06, 19.41] per 100 person-years, Post: 17.88 [ 17.18, 18.60] per 100 person-years), followed by candidates with non-HCC exceptions (Pre: 18.12 [ 15.41, 21.16] per 100 person-years, Post: 17.47 [ 14.76, 20.53] per 100 person-years), and HCC exceptions (Pre: 18.66 [ 17.41, 19.99] per 100 person-years, Post: 17.79 [ 16.47, 19.18] per 100 person-years). Within each exception type, removal rates were comparable pre- and post-policy, as evidenced by the overlapping confidence intervals.

Similar results were obtained when removal rates were stratified by exception type and OPTN Region (**Appendix Figure 3** and **Appendix Table 3**), although the number of HCC and non-HCC exceptions was low or zero in some regions. Results were also similar when examined by age group (pediatric: <18 years old versus adult: 18+ years) as well (**Appendix Figure 4** and **Appendix Table 4**). However, care should be taken when interpreting pediatric results, as small numbers can lead to very wide confidence intervals.

**Figure 3. Liver-Alone Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting by Exception Type and Era**





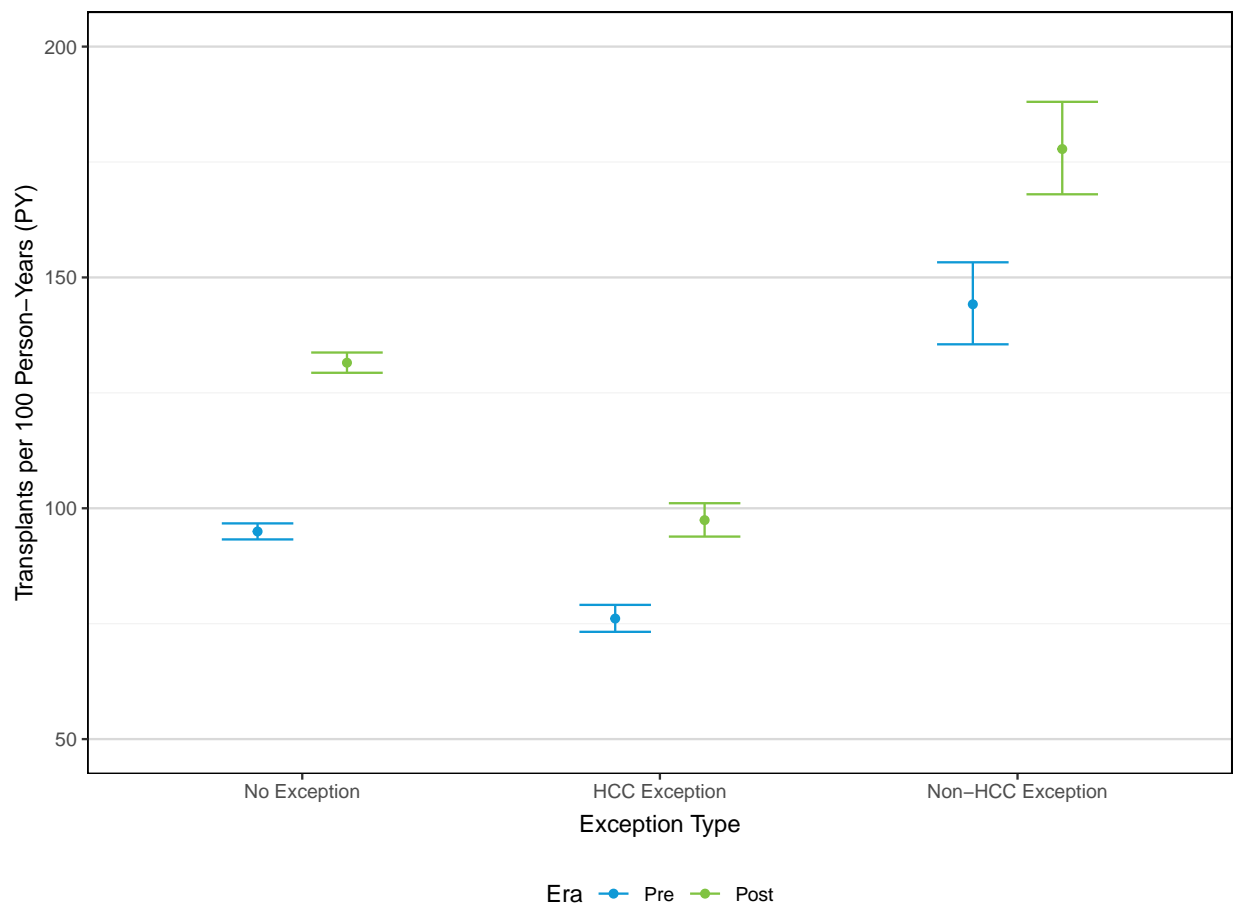
**Table 3. Liver-Along Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting by Exception Type and Era**

Era	Exception Type	Ever Waiting	Death/Too Sick Events	Person-Years	Removals per 100 PY	
		N	N	PY	Estimate	95% CI
Pre	No Exception	26550	2949	15747.7	18.73	(18.06, 19.41)
	HCC Exception	5975	818	4383.0	18.66	(17.41, 19.99)
	Non-HCC Exception	1713	159	877.7	18.12	(15.41, 21.16)
Post	No Exception	27402	2466	13789.3	17.88	(17.18, 18.60)
	HCC Exception	5726	674	3789.2	17.79	(16.47, 19.18)
	Non-HCC Exception	1892	147	841.6	17.47	(14.76, 20.53)

**Figure 4** and **Table 4** show liver-alone transplant rates per 100 person-years waiting by exception type and era. Transplant rates were highest for candidates with non-HCC exceptions (Pre: 144.19 [ 135.51, 153.27] per 100 person-years, Post: 177.81 [ 168.01, 188.04] per 100 person-years), followed by candidates with no exceptions (Pre: 94.97 [ 93.25, 96.72] per 100 person-years, Post: 131.53 [ 129.34, 133.73] per 100 person-years) and those with HCC exceptions (Pre: 76.11 [ 73.23, 79.07] per 100 person-years, Post: 97.43 [ 93.87, 101.09] per 100 person-years). Within each exception type, transplant rates increased post-policy compared to pre-policy. These increases were statistically significant. That said, the transplant rates for candidates with no exception and HCC exceptions were still noticeably lower than the transplant rate for candidates with non-HCC exceptions post-policy.

Similar results were obtained when transplant rates were stratified by exception type and OPTN Region (**Appendix Figure 5** and **Appendix Table 5**). Similar results were also obtained when transplant rates were stratified by age (pediatric: <18 years old versus adult: 18+ years old), although the small number of pediatric HCC exception candidates leads to wide confidence intervals (**Appendix Figure 6** and **Appendix Table 6**).

**Figure 4. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by Exception Type and Era**



**Table 4. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by Exception Type and Era**

Era	Exception Type	Ever Waiting	Transplant Events	Active Person-Years	Transplants per 100 Active PY	
		N	N	PY	Estimate	95% CI
Pre	No Exception	24668	11545	12156.2	94.97	(93.25, 96.72)
	HCC Exception	5748	2640	3468.7	76.11	(73.23, 79.07)
	Non-HCC Exception	1683	1029	713.7	144.19	(135.51, 153.27)
Post	No Exception	25845	13853	10532.5	131.53	(129.34, 133.73)
	HCC Exception	5469	2819	2893.4	97.43	(93.87, 101.09)
	Non-HCC Exception	1856	1229	691.2	177.81	(168.01, 188.04)

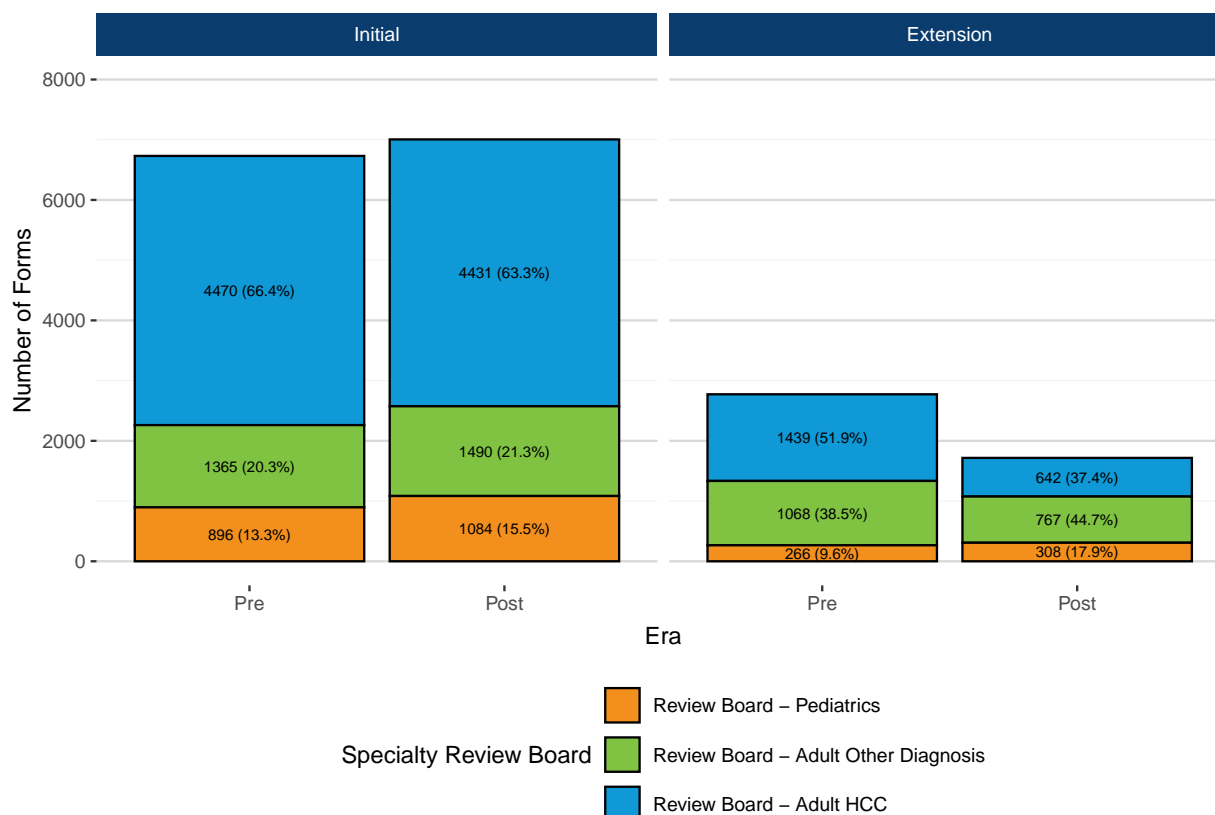
### Exception Requests

This section of the report examines liver MELD and PELD exception score request forms. Exception forms submitted for a candidate must be renewed or extended every 90 days in order to keep the exception score. A candidate may have multiple forms submitted during each of the pre- and post-policy eras, including initial, extension, and appeal forms. The following figures include only **initial** and **extension** exception requests to ensure that each form is unique.

**Figure 5** and **Table 5** show the number of initial and extension request forms submitted by Specialty Review Board (Adult HCC, Adult Other Diagnosis, and Pediatrics) and era. In both the pre- and post-policy eras, more initial request forms were submitted than extension requests (Pre: 6731 initial requests and 2773 extension requests; Post: 7005 initial requests and 1717 extension requests). The majority of initial request forms were submitted to the Adult HCC Review Board (Pre: 66.4%, Post: 63.3%), followed by Adult Other Diagnosis (Pre: 20.3%, Post: 21.3%) and Pediatrics (Pre: 13.3%, Post: 15.5%).

A higher proportion of extension requests were submitted to Adult HCC (Pre: 51.9% forms, Post: 37.4%) followed by the Adult Other Diagnosis Review Board (Pre: 38.5%, Post: 44.7%), and Pediatrics (Pre: 9.6%, Post: 17.9%).

**Figure 5. Initial and Extension Request Forms Submitted by Specialty Review Board and Era**



Auto approved forms and forms withdrawn prior to review board assignment are excluded.  
 In the Pre era, 3162 initial forms and 9660 extension forms were auto-approved; 70 initial forms and 11 extension forms were withdrawn prior to review board assignment.  
 In the Post era, 3058 initial forms and 9085 extension forms were auto-approved; 63 initial forms and 4 extension forms were withdrawn prior to review board assignment.

**Table 5. Initial and Extension Request Forms Submitted by Specialty Review Board and Era**

Application Type	Specialty Review Board	Pre-Policy		Post-Policy	
		N	%	N	%
Extension	Review Board - Adult HCC	1439	51.9%	642	37.4%
	Review Board - Adult Other Diagnosis	1068	38.5%	767	44.7%
	Review Board - Pediatrics	266	9.6%	308	17.9%
Initial	Review Board - Adult HCC	4470	66.4%	4431	63.3%
	Review Board - Adult Other Diagnosis	1365	20.3%	1490	21.3%
	Review Board - Pediatrics	896	13.3%	1084	15.5%

Auto approved forms and forms withdrawn prior to review board assignment are excluded.

In the Pre era, 3162 initial forms and 9660 extension forms were auto-approved;

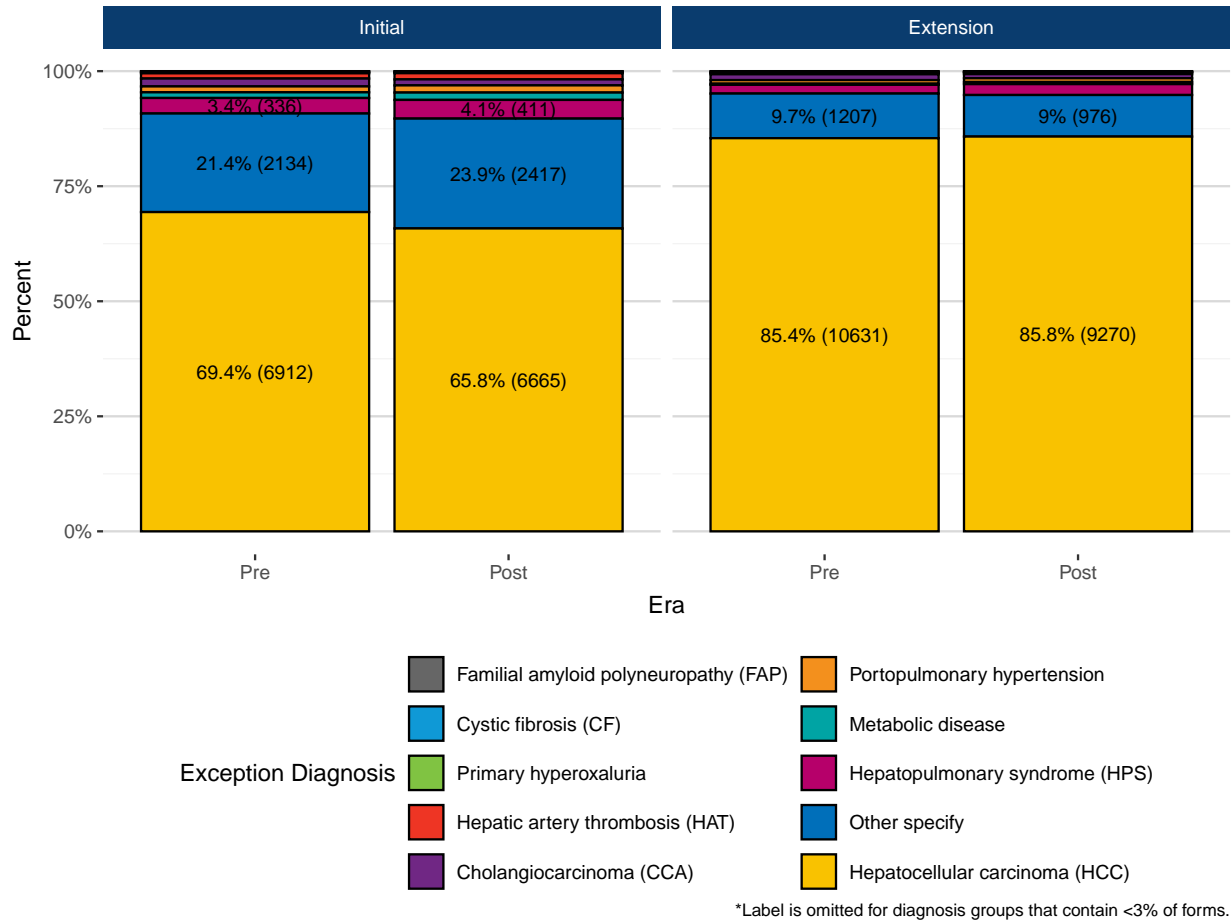
70 initial forms and 11 extension forms were withdrawn prior to review board assignment.

In the Post era, 3058 initial forms and 9085 extension forms were auto-approved;

63 initial forms and 4 extension forms were withdrawn prior to review board assignment.

**Figure 6** and **Table 6** show the number of initial and extension request forms submitted by diagnosis and era. In both the pre- and post-policy eras, the majority of initial and extension requests were submitted for Hepatocellular carcinoma (HCC) followed by “Other Specify”.

**Figure 6. Initial and Extension Request Forms Submitted by Diagnosis and Era**

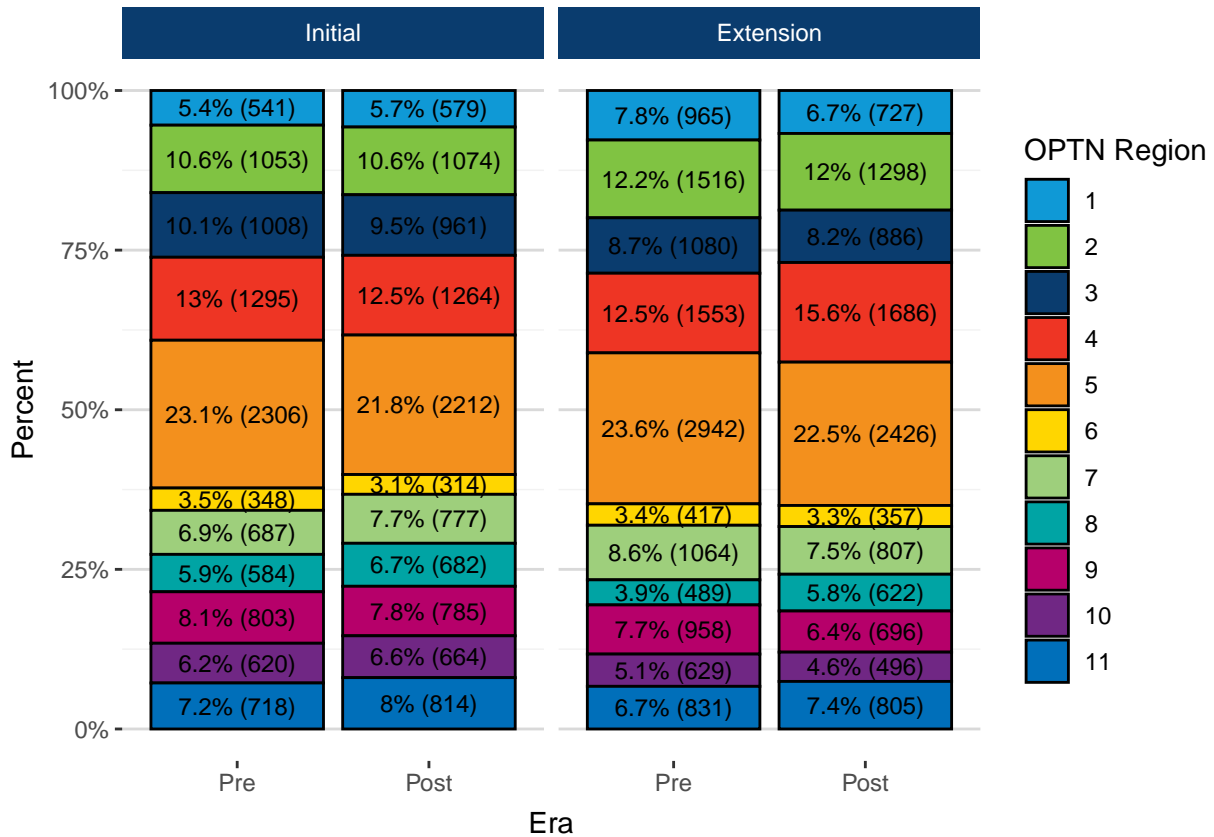


**Table 6. Initial and Extension Request Forms Submitted by Diagnosis and Era**

Exception Diagnosis	Application Type	Pre-Policy		Post-Policy	
		N	%	N	%
Familial amyloid polyneuropathy (FAP)	Initial	7	0.1%	9	0.1%
	Extension	19	0.2%	16	0.1%
Cystic fibrosis (CF)	Initial	18	0.2%	17	0.2%
	Extension	20	0.2%	2	0%
Primary hyperoxaluria	Initial	22	0.2%	19	0.2%
	Extension	9	0.1%	10	0.1%
Hepatic artery thrombosis (HAT)	Initial	113	1.1%	136	1.3%
	Extension	37	0.3%	42	0.4%
Cholangiocarcinoma (CCA)	Initial	171	1.7%	132	1.3%
	Extension	157	1.3%	97	0.9%
Portopulmonary hypertension	Initial	127	1.3%	158	1.6%
	Extension	97	0.8%	88	0.8%
Metabolic disease	Initial	123	1.2%	162	1.6%
	Extension	31	0.2%	50	0.5%
Hepatopulmonary syndrome (HPS)	Initial	336	3.4%	411	4.1%
	Extension	236	1.9%	255	2.4%
Other specify	Initial	2134	21.4%	2417	23.9%
	Extension	1207	9.7%	976	9%
Hepatocellular carcinoma (HCC)	Initial	6912	69.4%	6665	65.8%
	Extension	10631	85.4%	9270	85.8%

**Figure 7** and **Table 7** show the number of initial and extension request forms submitted by OPTN Region and era. In both the pre- and post-policy eras, Region 5 submitted the highest proportion of initial and extension requests, while Region 6 submitted the lowest proportion of initial and extension requests.

**Figure 7. Initial and Extension Request Forms Submitted by OPTN Region and Era**





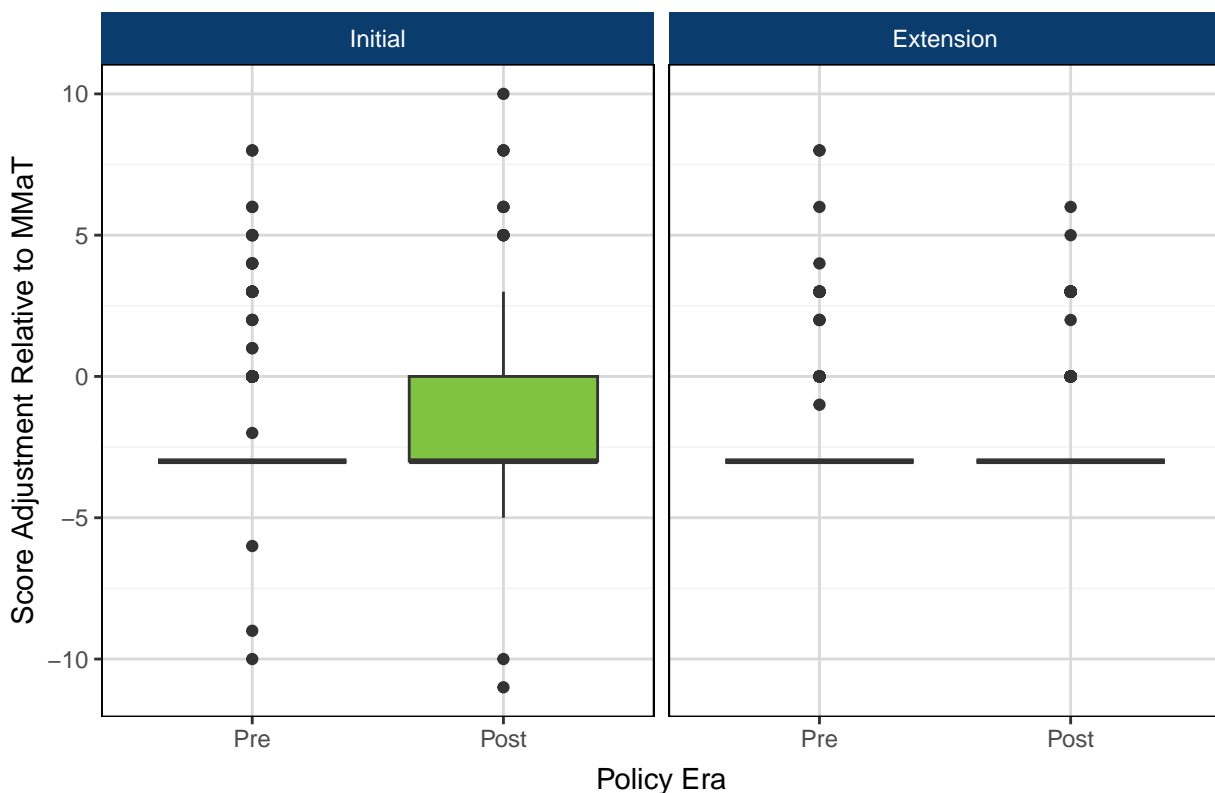
**Table 7. Initial and Extension Request Forms Submitted by OPTN Region and Era**

OPTN Region	Application Type	Pre-Policy		Post-Policy	
		N	%	N	%
1	Initial	541	5.4%	579	5.7%
	Extension	965	7.8%	727	6.7%
2	Initial	1053	10.6%	1074	10.6%
	Extension	1516	12.2%	1298	12%
3	Initial	1008	10.1%	961	9.5%
	Extension	1080	8.7%	886	8.2%
4	Initial	1295	13%	1264	12.5%
	Extension	1553	12.5%	1686	15.6%
5	Initial	2306	23.1%	2212	21.8%
	Extension	2942	23.6%	2426	22.5%
6	Initial	348	3.5%	314	3.1%
	Extension	417	3.4%	357	3.3%
7	Initial	687	6.9%	777	7.7%
	Extension	1064	8.6%	807	7.5%
8	Initial	584	5.9%	682	6.7%
	Extension	489	3.9%	622	5.8%
9	Initial	803	8.1%	785	7.8%
	Extension	958	7.7%	696	6.4%
10	Initial	620	6.2%	664	6.6%
	Extension	629	5.1%	496	4.6%
11	Initial	718	7.2%	814	8%
	Extension	831	6.7%	805	7.4%

**Figure 8** and **Table 8** show the distribution of score adjustment requested for standard initial and extension MELD or PELD exception requests by era. The median score adjustment requested for initial MELD or PELD exceptions remained the same before and after policy implementation (Pre: -3, Post: -3). The interquartile range, which captures the middle 50% of score adjustments requested, increased from pre- to post-policy, (i.e., it ranged from -3 to -3 pre-policy and from -3 to 0 post-policy for initial requests). For extension requests, the median score adjustment requested pre-policy (-3) was the same as the median score adjustment requested post-policy (-3). The interquartile range remained the same as well (Pre: -3 to -3, Post: -3 to -3).

When examined by OPTN Region, the median score adjustment requested for standard initial MELD or PELD exceptions decreased pre- to post-policy for OPTN Region 2, but remained about the same across policy eras for all other OPTN Regions (**Appendix Figure 7**). The variability in initial score adjustment requests may be due to small sample size in some OPTN Regions (**Appendix Table 7**). The distribution of score adjustment requested for standard extension MELD or PELD exceptions remained similar across all OPTN Regions pre- to post-policy (**Appendix Figure 8**).

**Figure 8. Distribution of Score Adjustment Requested for Standard Initial and Extension MELD or PELD Exception Requests by Era**



Initial and first extension HCC requests were excluded, since the policy-assigned score in these cases equals candidates' calculated MELD. In the Pre era, 1694 initial HCC requests and 699 first extension HCC requests were excluded from the plot. In the Post era, 1830 initial HCC requests and 548 first extension HCC requests were excluded from the plot.

**Table 8. Distribution of Score Adjustment Requested for Standard Initial and Extension MELD or PELD Exception Requests by Era**

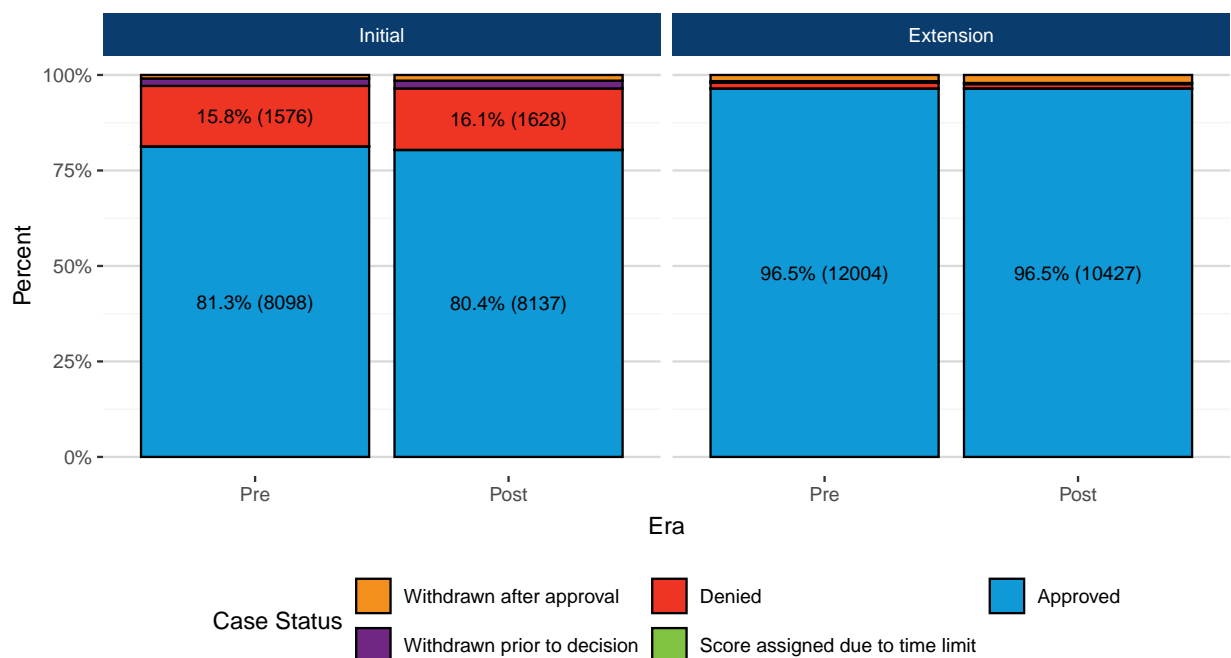
Application Type	Era	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range	Total Number of Forms
Initial	Pre	-10	-3	-3	-3	8	0	733
	Post	-11	-3	-3	0	10	3	931
Extension	Pre	-3	-3	-3	-3	8	0	6216
	Post	-3	-3	-3	-3	6	0	6020

Initial and first extension HCC requests were excluded, since the policy-assigned score in these cases equals candidates' calculated MELD. In the Pre era, 1694 initial HCC requests and 699 first extension HCC requests were excluded from the plot; in the Post era, 1830 initial HCC requests and 548 first extension HCC requests were excluded from the plot.

**Figure 9** and **Table 9** show the percentage of initial and extension request forms submitted by case outcome (approved, score assigned due to time limit, denied, withdrawn prior to decision, or withdrawn after approval) and era. The proportion of initial requests that were approved decreased slightly from 81.3% pre-policy to 80.4% post-policy, while the proportion of initial requests that were denied increased from 15.8% pre-policy to 16.1% post-policy. For extension requests, the majority of requests were approved and this percentage remained the same pre- and post-policy (96.5%). The proportion of extension requests that were denied also decreased from 1.5% pre-policy to 1.1% post-policy. For both initial and extension requests, the proportion of requests that were withdrawn after approval increased in the post-policy era compared to the pre-policy era, although withdrawals made up a small proportion of the overall number of forms submitted.

Similar results were obtained when examined by OPTN Region (**Appendix Figure 11**, **Appendix Figure 12**, and **Appendix Table 9**), with 6 regions experiencing a decrease in the proportion of approved initial requests post-policy compared to pre-policy and 3 regions experiencing a decrease in the proportion of approved extension requests post-policy compared to pre-policy.

**Figure 9. Initial and Extension Request Forms Submitted by Case Outcome and Era**



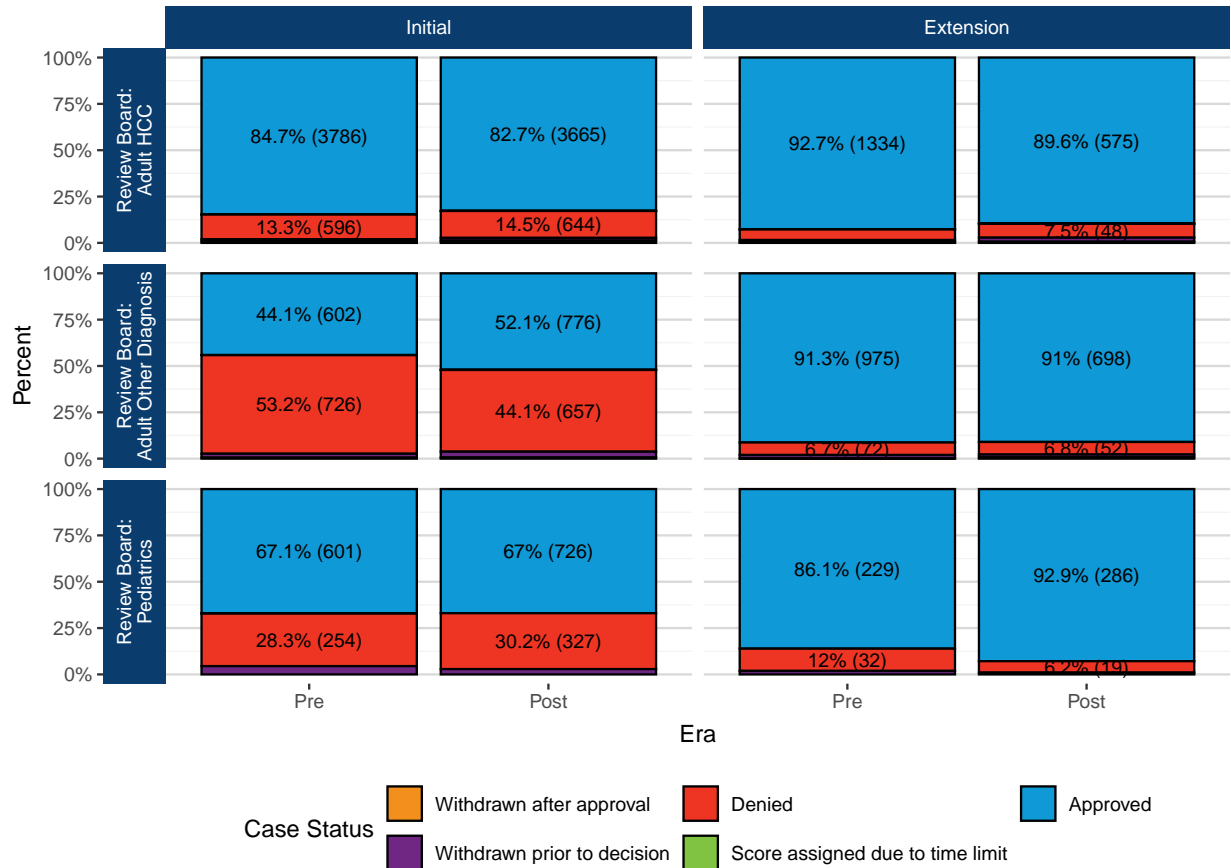
\*Label is omitted for outcome categories containing <3% of forms.

**Table 9. Initial and Extension Request Forms Submitted by Case Outcome and Era**

Case Outcome	Application Type	Pre-Policy		Post-Policy	
		N	%	N	%
Approved	Initial	8098	81.3%	8137	80.4%
	Extension	12004	96.5%	10427	96.5%
Score assigned due to time limit	Initial	4	0%	4	0%
	Extension	1	0%	1	0%
Denied	Initial	1576	15.8%	1628	16.1%
	Extension	186	1.5%	119	1.1%
Withdrawn prior to decision	Initial	194	1.9%	207	2%
	Extension	53	0.4%	33	0.3%
Withdrawn after approval	Initial	91	0.9%	150	1.5%
	Extension	200	1.6%	226	2.1%

**Figure 10** and **Table 10** show the proportion of initial and extension request forms submitted by Specialty Review Board, case outcome, and era. The proportion of initial exception requests that were approved remained stable post-policy compared to pre-policy for the Pediatrics Review Board (Pre: 67.1%, Post: 67%), but increased for the Adult Other Diagnosis Review Board (Pre: 44.1%, Post: 52.1%) and slightly decreased for the Adult HCC Review Board (Pre: 84.7%, Post: 82.7%). The proportion of extension requests that were approved decreased post-policy compared to pre-policy for the Adult HCC Review Board (Pre: 92.7%, Post: 89.6%), remained constant for the Adult Other Diagnosis Review Board (Pre: 91.3%, Post: 91%), but increased for the Pediatrics Review Board (Pre: 86.1%, Post: 92.9%).

**Figure 10. Initial and Extension Request Forms Submitted by Specialty Review Board, Case Outcome, and Era**



\*Label is omitted for outcome categories containing <6% of forms. Auto approved forms and forms withdrawn prior to review board assignment are excluded.

**Table 10. Initial and Extension Request Forms Submitted by Specialty Review Board, Case Outcome, and Era**

Specialty Review Board	Application Type	Case Outcome	Pre-Policy		Post-Policy	
			N	%	N	%
Review Board - Adult HCC	Initial	Approved	3786	84.7%	3665	82.7%
	Extension	Approved	1334	92.7%	575	89.6%
	Initial	Score assigned due to time limit	2	0%	3	0.1%
	Extension	Score assigned due to time limit	1	0.1%	1	0.2%
	Initial	Denied	596	13.3%	644	14.5%
	Extension	Denied	82	5.7%	48	7.5%
	Initial	Withdrawn prior to decision	55	1.2%	66	1.5%
	Extension	Withdrawn prior to decision	18	1.3%	14	2.2%
	Initial	Withdrawn after approval	31	0.7%	53	1.2%
	Extension	Withdrawn after approval	4	0.3%	4	0.6%
Review Board - Adult Other Diagnosis	Initial	Approved	602	44.1%	776	52.1%
	Extension	Approved	975	91.3%	698	91%
	Initial	Score assigned due to time limit	1	0.1%	1	0.1%
		Denied	726	53.2%	657	44.1%
	Extension	Denied	72	6.7%	52	6.8%
	Initial	Withdrawn prior to decision	29	2.1%	47	3.2%
	Extension	Withdrawn prior to decision	19	1.8%	12	1.6%
	Initial	Withdrawn after approval	7	0.5%	9	0.6%
	Extension	Withdrawn after approval	2	0.2%	5	0.7%
	Review Board - Pediatrics	Initial	Approved	601	67.1%	726
Extension		Approved	229	86.1%	286	92.9%
Initial		Score assigned due to time limit	1	0.1%	0	0.0%
		Denied	254	28.3%	327	30.2%
Extension		Denied	32	12%	19	6.2%
Initial		Withdrawn prior to decision	40	4.5%	31	2.9%
Extension		Withdrawn prior to decision	5	1.9%	3	1%

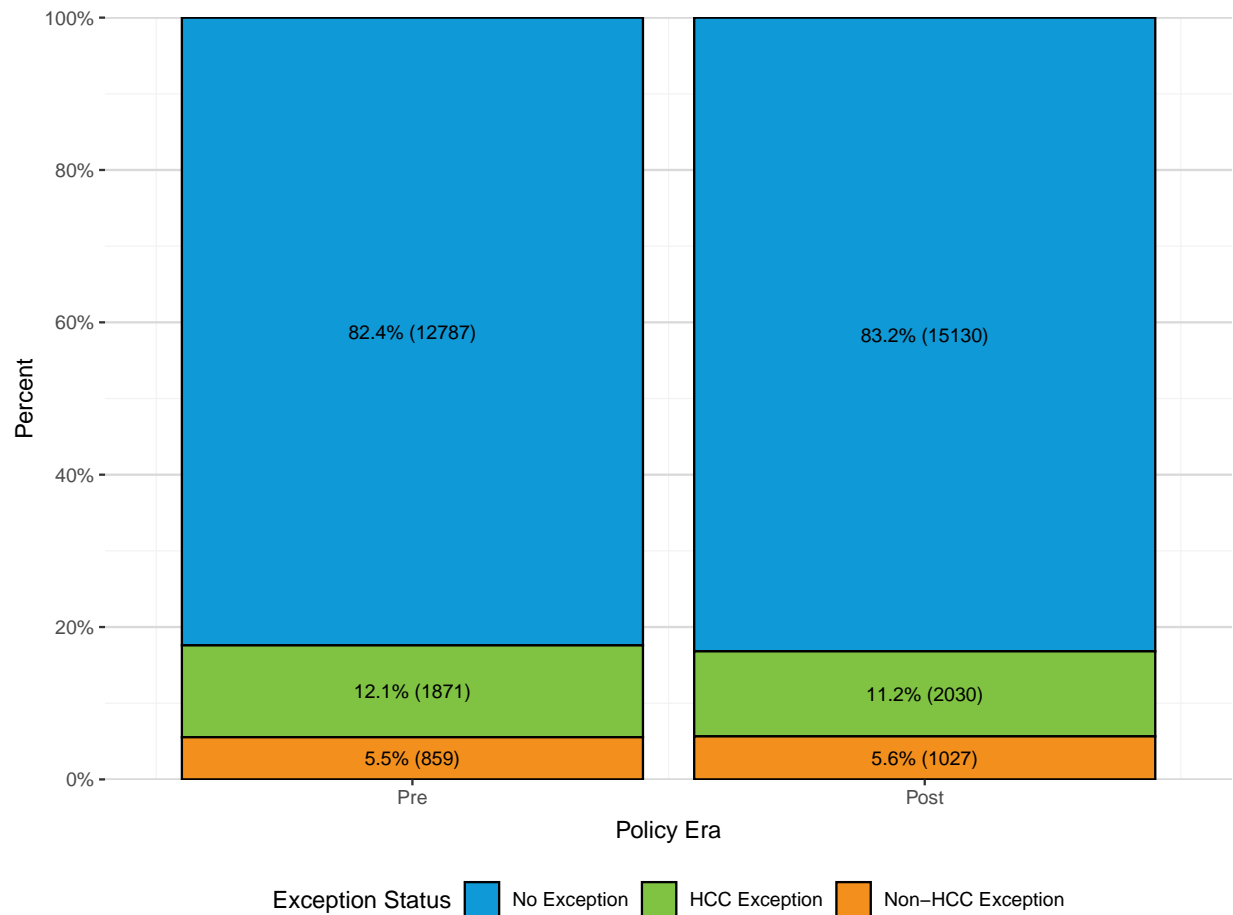
Auto approved forms and forms withdrawn prior to review board assignment are excluded.

## Transplants

This section of the report examines liver-alone deceased donor transplant recipients pre- and post-policy.

**Figure 11** and **Table 11** show the count and percent of deceased donor liver-alone transplant recipients by exception type (no exception, HCC exception, non-HCC exception) and era. The number of deceased donor liver-alone transplants increased from 15517 transplants during the pre-policy era to 18187 transplants in the post-policy era. In both policy eras, the majority of transplant recipients had no exceptions, followed by HCC exceptions and non-HCC exceptions. The proportion of transplant recipients with no exceptions increased from 82.4% pre-policy to 83.2% post-policy. Conversely, the proportion of transplant recipients with HCC exceptions decreased slightly from pre- to post-policy (Pre: 12.1%, Post: 11.2%), and the proportion of transplant recipients with non-HCC exceptions remained constant (Pre: 5.5%, Post: 5.6%).

**Figure 11. Count and Percent of Deceased Donor Liver-Alone Transplant Recipients by Exception Type and Era**



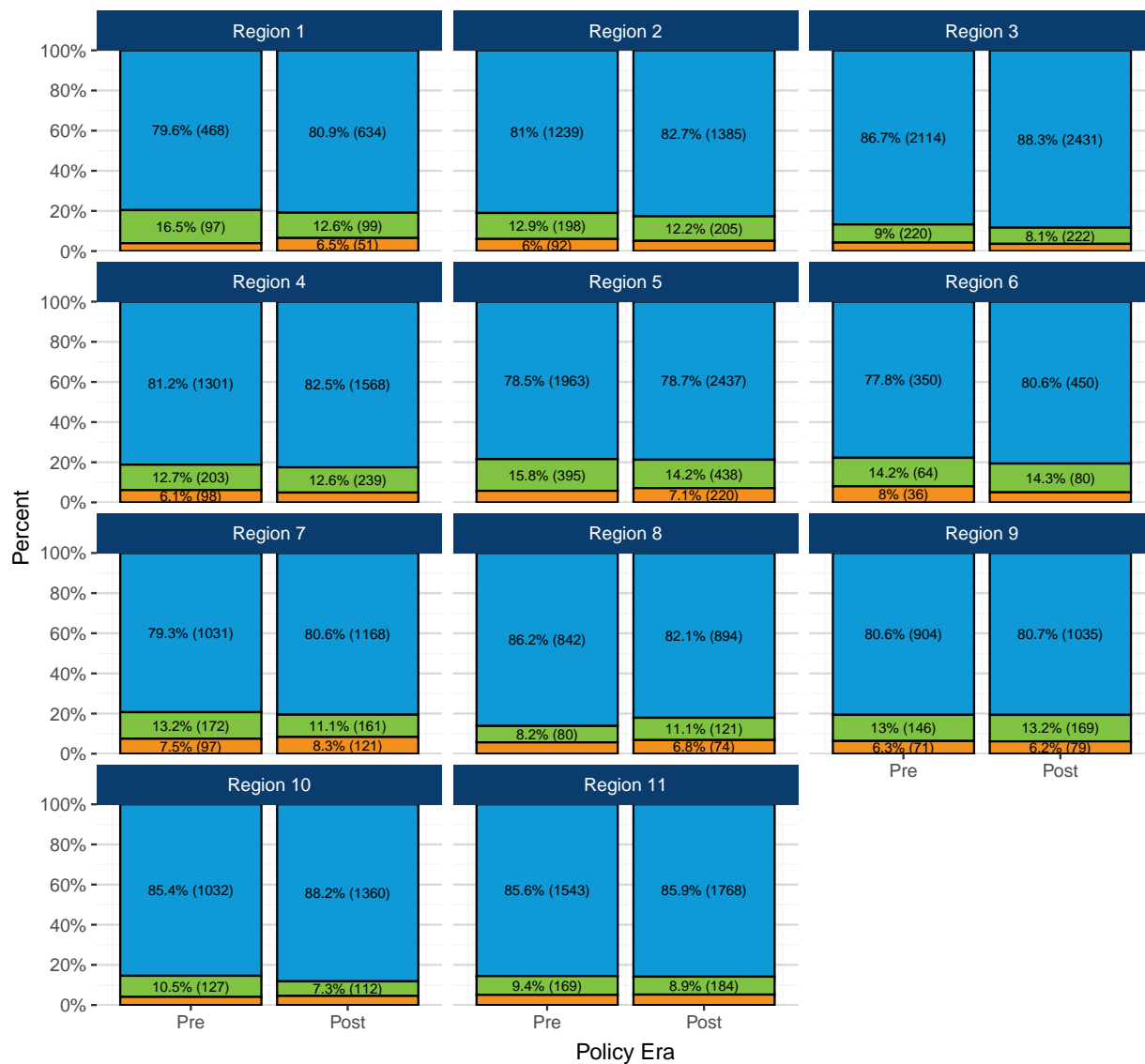


**Table 11. Count and Percent of Deceased Donor Liver-Alone Transplant Recipients by Exception Type and Era**

Exception Type	Pre-Policy		Post-Policy	
	N	%	N	%
No Exception	12787	82.4%	15130	83.2%
HCC Exception	1871	12.1%	2030	11.2%
Non-HCC Exception	859	5.5%	1027	5.6%

When deceased donor liver-alone transplant recipients were examined by OPTN Region, most regions experienced increases in the proportion of transplant recipients with no exceptions and decreases in the proportion of transplant recipients with HCC exceptions (**Figure 12** and **Table 12**). More variability was seen among regions for non-HCC exceptions, with 5 regions experiencing a decrease in the proportion of deceased donor liver-alone transplant recipients with non-HCC exceptions and 6 regions experiencing an increase in the proportion of deceased donor liver-alone transplant recipients with non-HCC exceptions.

**Figure 12. Count and Percent of Deceased Donor Liver-Alone Transplant Recipients by Exception Type, OPTN Region, and Era**



Exception Status ■ No Exception ■ HCC Exception ■ Non-HCC Exception

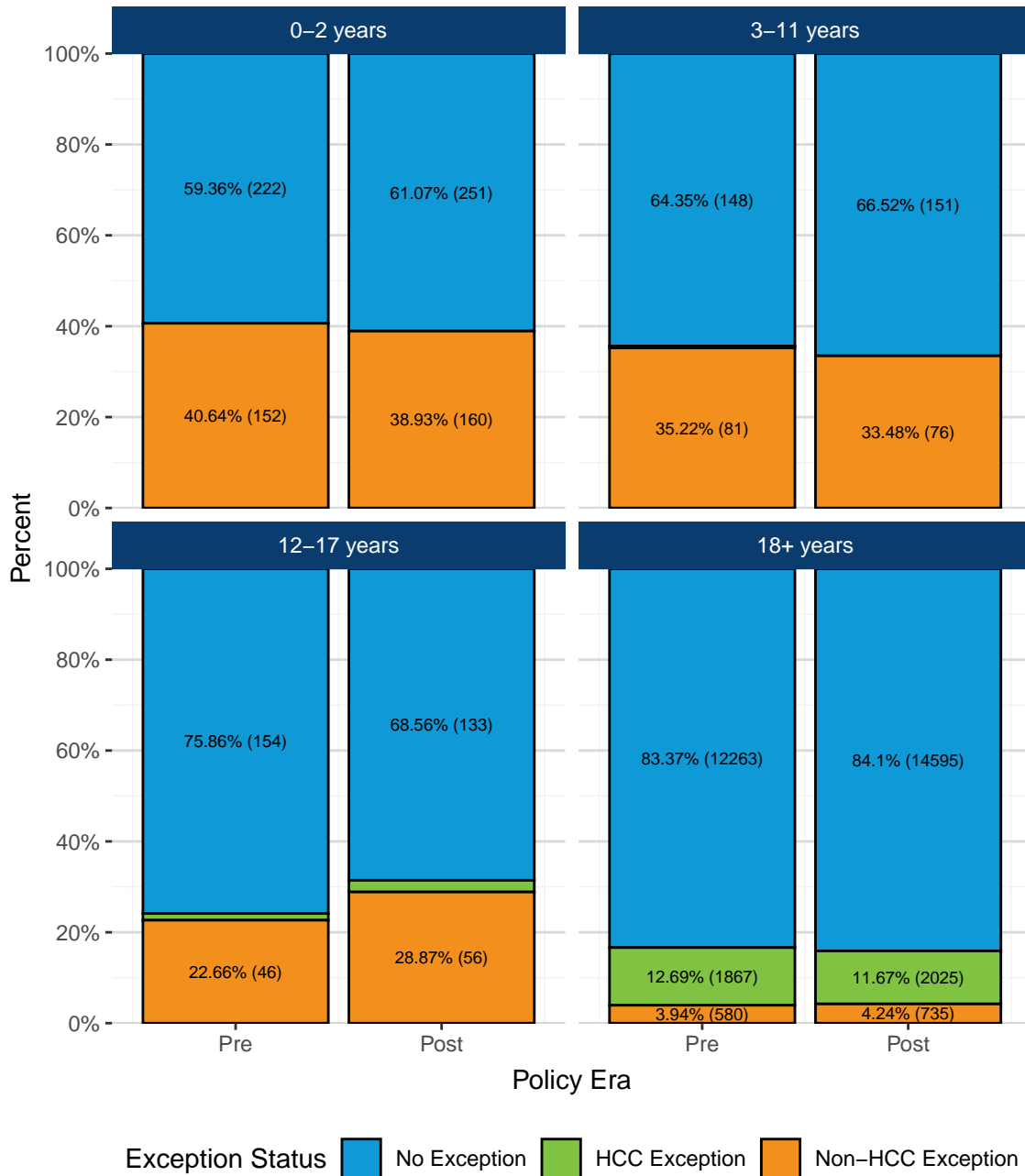
\*Label is omitted for categories containing <6% of forms.

**Table 12. Count and Percent of Deceased Donor Liver-Alone Transplant Recipients by Exception Type, OPTN Region, and Era**

Region	Exception Type	Pre-Policy		Post-Policy	
		N	%	N	%
1	No Exception	468	79.6%	634	80.9%
	HCC Exception	97	16.5%	99	12.6%
	Non-HCC Exception	23	3.9%	51	6.5%
2	No Exception	1239	81%	1385	82.7%
	HCC Exception	198	12.9%	205	12.2%
	Non-HCC Exception	92	6%	85	5.1%
3	No Exception	2114	86.7%	2431	88.3%
	HCC Exception	220	9%	222	8.1%
	Non-HCC Exception	103	4.2%	99	3.6%
4	No Exception	1301	81.2%	1568	82.5%
	HCC Exception	203	12.7%	239	12.6%
	Non-HCC Exception	98	6.1%	93	4.9%
5	No Exception	1963	78.5%	2437	78.7%
	HCC Exception	395	15.8%	438	14.2%
	Non-HCC Exception	144	5.8%	220	7.1%
6	No Exception	350	77.8%	450	80.6%
	HCC Exception	64	14.2%	80	14.3%
	Non-HCC Exception	36	8%	28	5%
7	No Exception	1031	79.3%	1168	80.6%
	HCC Exception	172	13.2%	161	11.1%
	Non-HCC Exception	97	7.5%	121	8.3%
8	No Exception	842	86.2%	894	82.1%
	HCC Exception	80	8.2%	121	11.1%
	Non-HCC Exception	55	5.6%	74	6.8%
9	No Exception	904	80.6%	1035	80.7%
	HCC Exception	146	13%	169	13.2%
	Non-HCC Exception	71	6.3%	79	6.2%
10	No Exception	1032	85.4%	1360	88.2%
	HCC Exception	127	10.5%	112	7.3%
	Non-HCC Exception	49	4.1%	70	4.5%
11	No Exception	1543	85.6%	1768	85.9%
	HCC Exception	169	9.4%	184	8.9%
	Non-HCC Exception	91	5%	107	5.2%

**Figure 13** and **Table 13** show the count and percent of deceased donor liver-alone transplant recipients by recipient age (0-2 years, 3-11, 12-17 years, or 18+ years). In all age categories, the majority of recipients did not have an exception at the time of transplant.

**Figure 13. Count and Percent of Deceased Donor Liver-Alone Transplant Recipients by Exception Type, Recipient Age, and Era**



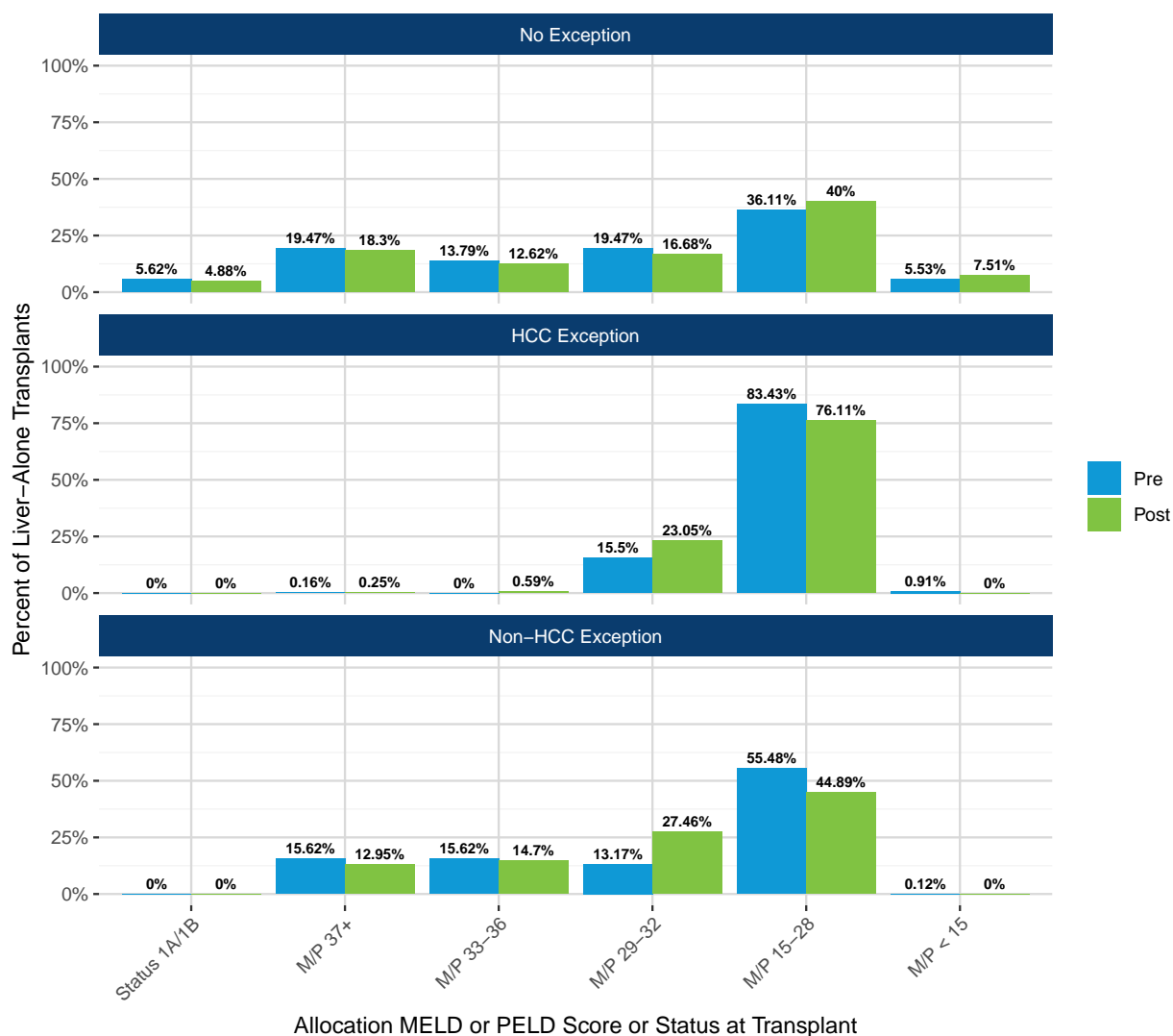
**Table 13. Count and Percent of Deceased Donor Liver-Alone Transplant Recipients by Exception Type, Recipient Age, and Era**

Recipient Age	Exception Type	Pre-Policy		Post-Policy	
		N	%	N	%
0-2 years	No Exception	222	59.4%	251	61.1%
	Non-HCC Exception	152	40.6%	160	38.9%
3-11 years	No Exception	148	64.3%	151	66.5%
	HCC Exception	1	0.4%	0	0.0%
	Non-HCC Exception	81	35.2%	76	33.5%
12-17 years	No Exception	154	75.9%	133	68.6%
	HCC Exception	3	1.5%	5	2.6%
	Non-HCC Exception	46	22.7%	56	28.9%
18+ years	No Exception	12263	83.4%	14595	84.1%
	HCC Exception	1867	12.7%	2025	11.7%
	Non-HCC Exception	580	3.9%	735	4.2%

**Figure 14** and **Table 14** show the distribution of allocation MELD or PELD score or status at transplant for liver-alone transplant recipients by exception type and era. The proportion of candidates in Status 1A/1B remained similar pre- to post-policy. After excluding Status 1A/1B candidates from the analysis (since they do not receive allocation MELD or PELD scores), the median allocation MELD or PELD score at transplant among liver-alone recipients with no exceptions was 29 pre-policy and 29 post-policy; the median allocation MELD or PELD score at transplant among liver-alone recipients with HCC exceptions was 26 pre-policy and 27 post-policy; and the median allocation MELD or PELD score at transplant among liver-alone recipients with non-HCC exceptions was 27 pre-policy and 29 post-policy. MELD 3.0/PELD-Cr was implemented midway through the post-policy period (July 13, 2023), after which PELD scores have a higher minimum value than under the previous PELD model (i.e., prior to July 13, 2023, allocation PELD scores could range from -99 to 99, but starting on July 13, 2023, allocation PELD scores range from 6 to 99).

Similar trends were seen when the distribution of allocation MELD or PELD score at transplant was examined by OPTN Region (**Appendix Figure 13**, **Appendix Figure 14**, **Appendix Figure 15**, and **Appendix Table 10**). However, the extent to which the median and interquartile range changed pre- to post-policy varied by OPTN region.

**Figure 14. Distribution of Allocation MELD or PELD Score or Status at Transplant for Liver-Alone Transplant Recipients by Exception Type and Era**



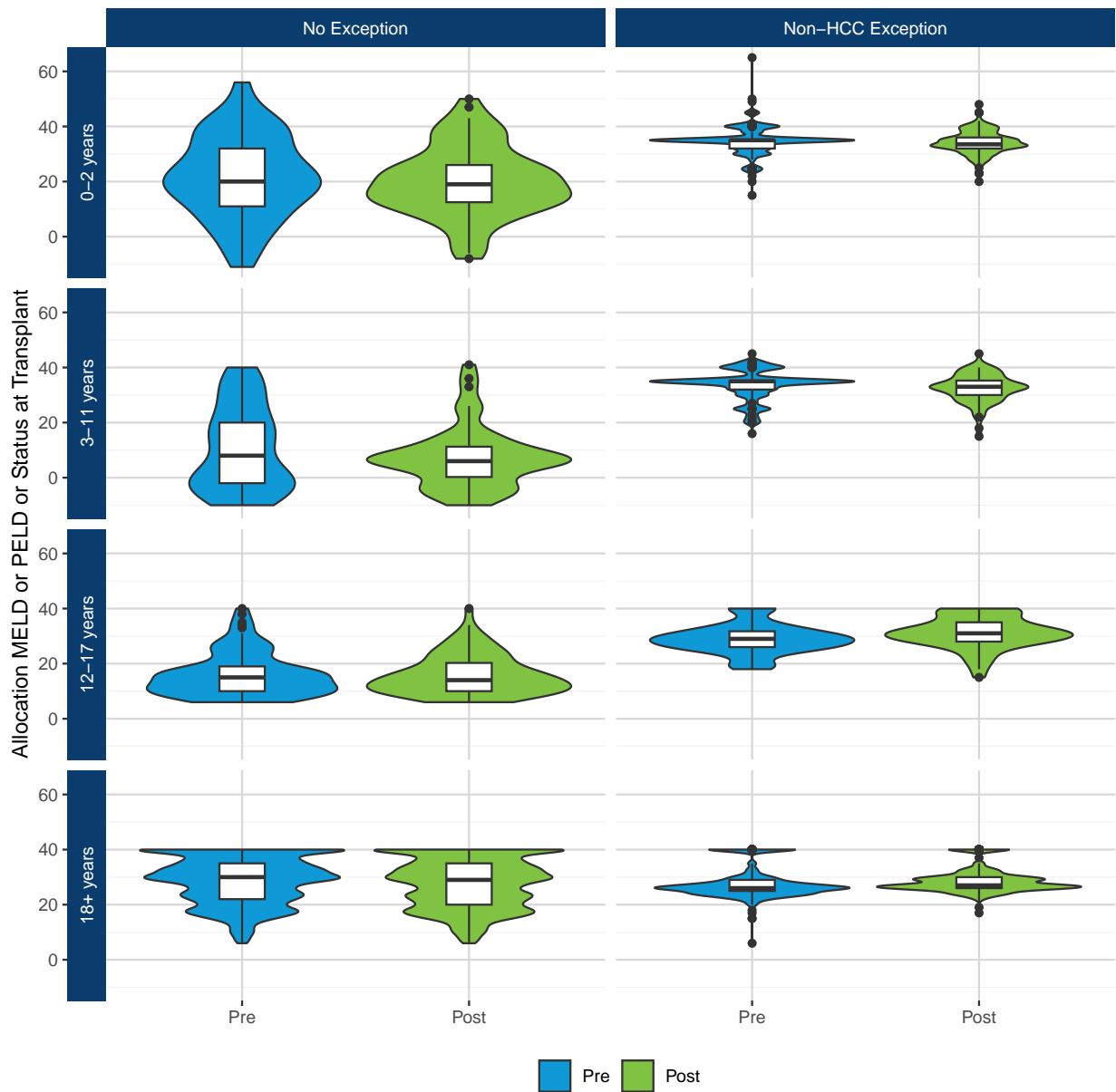
**Table 14. Distribution of Allocation MELD or PELD Score at Transplant by Exception Type and Era**

Exception Type	Policy Era	N	Minimum	25th Per-centile	Median	75th Per-centile	Maximum	Interquartile Range
No Exception	Pre	12069	-11	22	29	35	56	13
	Post	14391	-10	20	29	35	50	15
HCC Exception	Pre	1871	6	24	26	27	40	3
	Post	2030	15	26	27	28	40	2
Non-HCC Exception	Pre	858	6	25	27	35	65	10
	Post	1027	15	26	29	33	48	7

**Figure 15** and **Table 15** show the distribution of allocation MELD or PELD score at transplant for liver-alone transplant recipients by recipient age, exception type, and era. Due to the small number of HCC exceptions within some age groups, HCC exceptions are only shown in the table (not the figure). For pediatric age groups (<18 years), the median MELD or PELD score at transplant tended to be lower for recipients who were transplanted without exceptions compared to those who were transplanted with HCC or non-HCC exceptions; for adult age groups (18+ years), the median MELD or PELD score at transplant was slightly higher for recipients who were transplanted without exceptions compared to those who were transplanted with exceptions. Within each exception type and age group, the median MELD or PELD score tended to be similar pre- versus post-policy. Pediatric age groups exhibited more variability in scores, as indicated by the wider interquartile ranges. This variability is likely due to the small number of recipients in these age categories. MELD 3.0/PELD-Cr was implemented midway through the post-policy period (July 13, 2023), after which PELD scores have a higher minimum value than under the previous PELD model (i.e., prior to July 13, 2023, allocation PELD scores could range from -99 to 99, but starting on July 13, 2023, allocation PELD scores range from 6 to 99).



**Figure 15. Distribution of Allocation MELD or PELD Score or Status at Transplant for Liver-Along Transplant Recipients by Exception Type, Recipient Age, and Era**



\*Only 1 pediatric recipient had an HCC exception.

**Table 15. Summary of Allocation MELD or PELD Score at Transplant by Exception Type, Recipient Age, and Era**

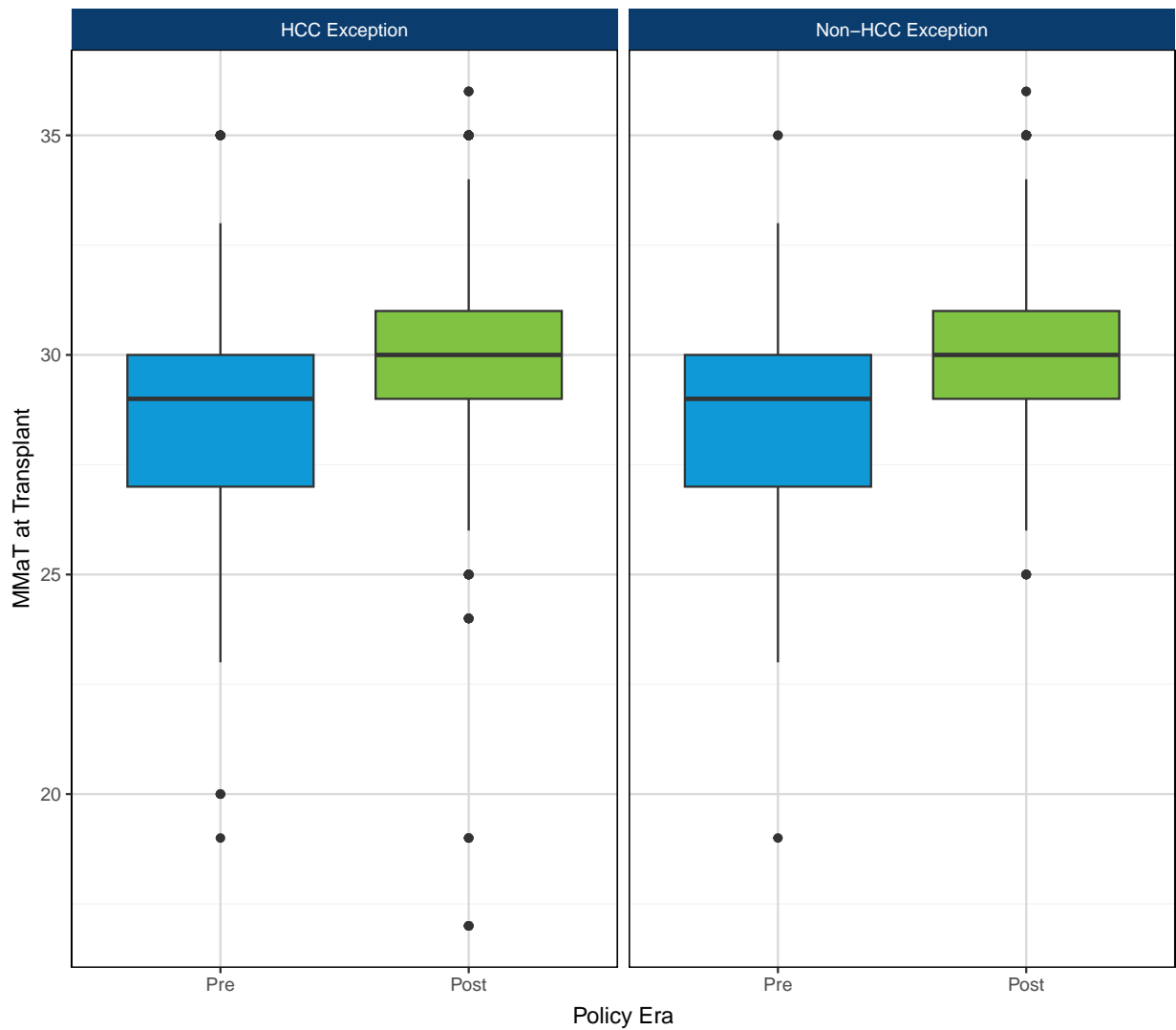
Exception Type	Recipient Age	Policy Era	N	Minimum	25th Per-centile	Median	75th Per-centile	Maximum	Interquartile Range	
No Exception	0-2 years	Pre	81	-11	11.0	20.0	32.0	56	21.0	
		Post	75	-8	12.5	19.0	26.0	50	13.5	
	3-11 years	Pre	58	-10	-2.0	8.0	20.0	40	22.0	
		Post	52	-10	0.2	6.0	11.2	41	11.0	
	12-17 years	Pre	89	6	10.0	15.0	19.0	40	9.0	
		Post	80	6	10.0	14.0	20.2	40	10.2	
	18+ years	Pre	11841	6	22.0	30.0	35.0	40	13.0	
		Post	14184	6	20.0	29.0	35.0	40	15.0	
	HCC Exception	0-2 years	Pre	0	0	0.0	0.0	0.0	0	0.0
			Post	0	0	0.0	0.0	0.0	0	0.0
3-11 years		Pre	1	32	32.0	32.0	32.0	32	0.0	
		Post	0	0	0.0	0.0	0.0	0	0.0	
12-17 years		Pre	3	40	40.0	40.0	40.0	40	0.0	
		Post	5	40	40.0	40.0	40.0	40	0.0	
18+ years		Pre	1867	6	24.0	26.0	27.0	32	3.0	
		Post	2025	15	26.0	27.0	28.0	35	2.0	
Non-HCC Exception		0-2 years	Pre	151	15	32.0	35.0	35.0	65	3.0
			Post	160	20	32.0	33.5	36.0	48	4.0
	3-11 years	Pre	81	16	32.0	35.0	35.0	45	3.0	
		Post	76	15	30.0	33.0	35.2	45	5.2	
	12-17 years	Pre	46	18	26.0	29.0	31.8	40	5.8	
		Post	56	15	28.0	31.0	35.0	40	7.0	
	18+ years	Pre	580	6	25.0	26.0	29.0	40	4.0	
		Post	735	17	26.0	27.0	30.0	40	4.0	

**Figure 16** and **Table 16** show the distribution of median MELD at transplant (MMaT) at time of transplant by exception type and policy era for adult liver-alone transplant recipients who were transplanted with exceptions. The median MMaT at transplant among adult liver-alone recipients with HCC exceptions increased slightly from 29 pre-policy to 30 post-policy. The interquartile range of MMaT scores became narrower across policy eras (Pre: 27 to 30; Post: 29 to 31). The median MMaT at transplant among adult liver-alone recipients with non-HCC exceptions increased slightly from 29 pre-policy to 30 post-policy. The interquartile range became narrower as well, ranging from 27 to 30 in the pre-policy era and from 29 to 31 in the post-policy era.

When examined by OPTN Region, the MMaT at transplant for liver-alone transplant recipients with HCC exceptions decreased pre- to post-policy for OPTN Region 10 and increased pre- to post-policy for all other OPTN Regions (**Appendix Figure 19**). The MMaT at transplant for liver-alone transplant recipients with non-HCC exceptions decreased pre- to post-policy for OPTN Regions 4, 6, and 9 and increased for all other OPTN Regions (**Appendix Figure 20**). The extent to which the median and interquartile range changed pre- to post-policy varied by region (**Appendix Table 12**).

The distribution of median PELD at transplant (MPaT) is not shown, as this policy did not impact how MPaT values are calculated; moreover, MPaT is a single, national value. MPaT was equal to 35 for the majority of the study period examined in this report, but decreased to 33 during the March 2023 update. Thus, MPaT was lower during the second half of the post-policy era compared to the rest of the study period. In the September 2024 update, MPaT further decreased to 31.

**Figure 16. Distribution of Median MELD at Transplant (MMaT) at Time of Transplant by Exception Type and Era for Adult Liver-Alone Transplant Recipients who were Transplanted with Exceptions**

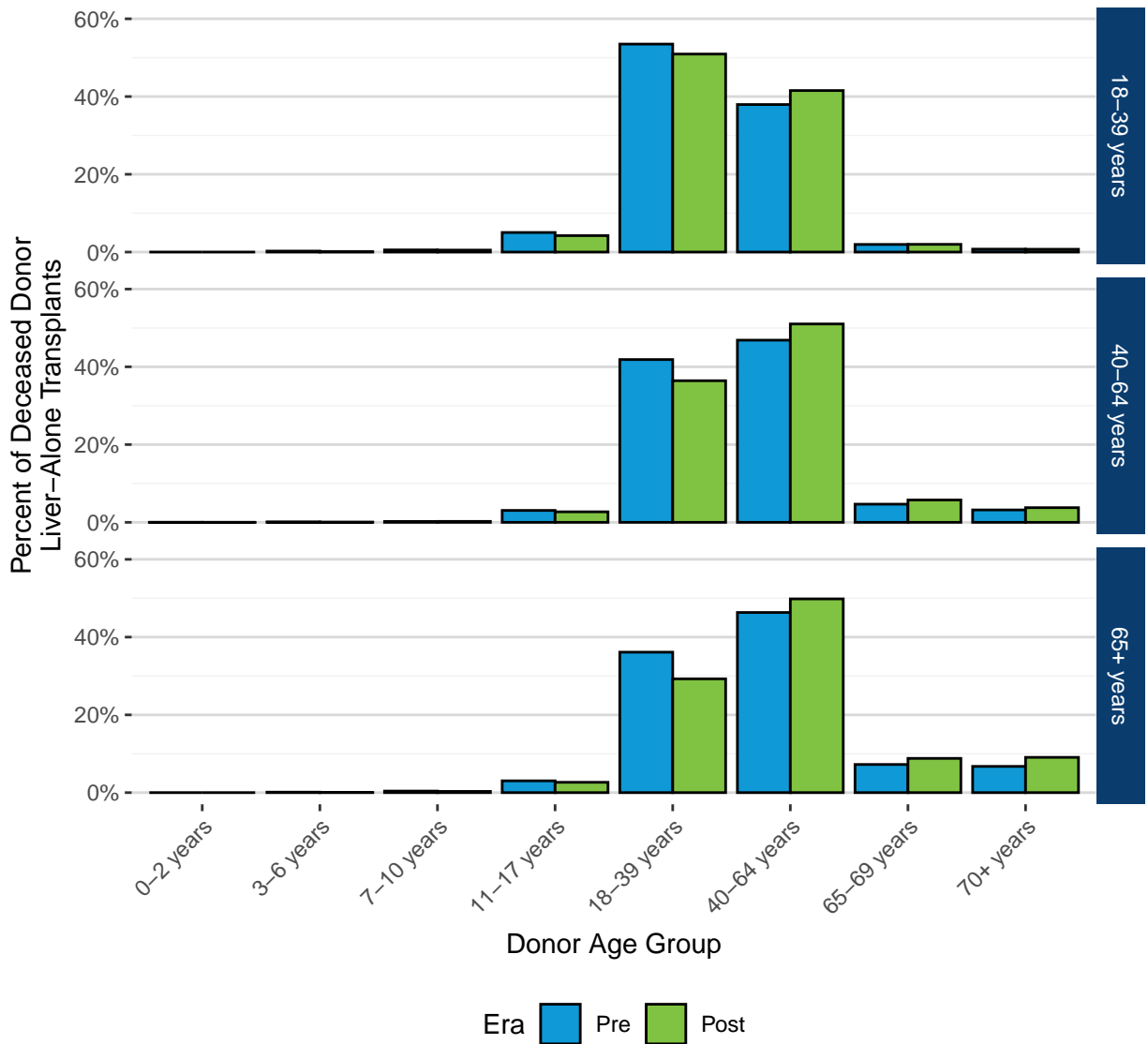


**Table 16. Distribution of Median MELD at Transplant (MMaT) at Time of Transplant by Exception Type and Era for Adult Liver-Along Transplant Recipients who were Transplanted with Exceptions**

Exception Type	Policy Era	N	Minimum	25th Per-centile	Median	75th Per-centile	Maximum	Interquartile Range
HCC Exception	Pre	1867	19	27	29	30	35	3
	Post	2025	17	29	30	31	36	2
Non-HCC Exception	Pre	580	19	27	29	30	35	3
	Post	735	25	29	30	31	36	2

**Figure 17** and **Table 17** show the number and percent of adult deceased donor liver-alone transplants by recipient age, donor age, and era. The donor age distributions of adult deceased donor liver-alone transplants remained fairly similar pre- and post-policy. The majority of adult deceased donor liver-alone transplant recipients received livers from adult donors.

**Figure 17. Number and Percent of Adult Deceased Donor Liver-Along Transplants by Recipient Age, Donor Age, and Era**

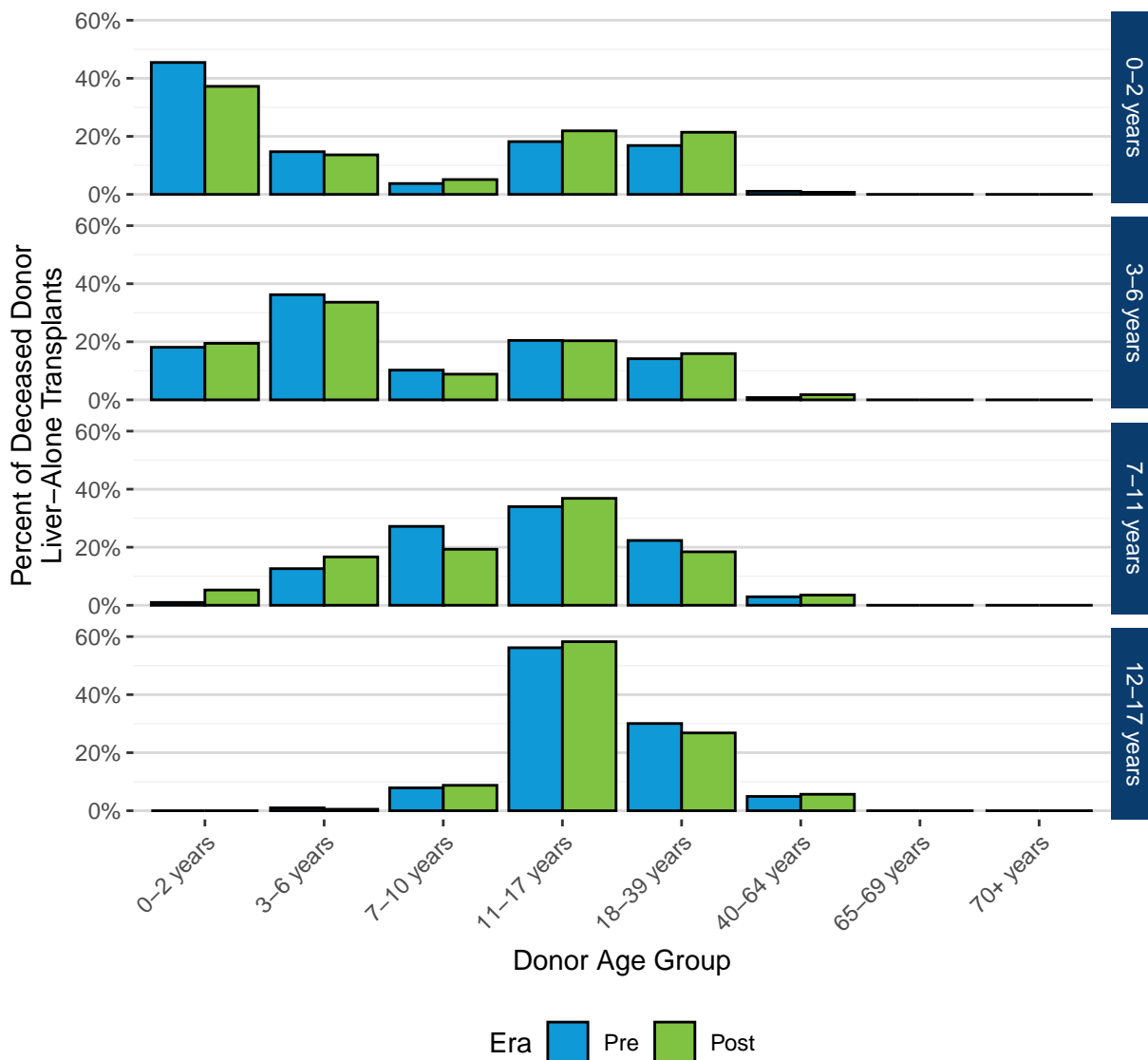


**Table 17. Number and Percent of Adult Deceased Donor Liver-Alone Transplants by Recipient Age, Donor Age, and Era**

Recipient Age	Donor Age	Pre-Policy	Post-Policy
18-39 years	0-2 years	0 (0.0%)	0 (0.0%)
	3-6 years	5 (0.3%)	2 (0.1%)
	7-10 years	11 (0.6%)	12 (0.5%)
	11-17 years	100 (5.0%)	100 (4.2%)
	18-39 years	1,063 (53.5%)	1,205 (50.9%)
	40-64 years	754 (37.9%)	983 (41.5%)
	65-69 years	39 (2.0%)	47 (2.0%)
	70+ years	15 (0.8%)	17 (0.7%)
	Total	1,987 (100.0%)	2,366 (100.0%)
40-64 years	0-2 years	1 (0.0%)	1 (0.0%)
	3-6 years	11 (0.1%)	7 (0.1%)
	7-10 years	20 (0.2%)	27 (0.2%)
	11-17 years	290 (3.1%)	303 (2.7%)
	18-39 years	3,962 (41.9%)	4,075 (36.4%)
	40-64 years	4,434 (46.9%)	5,708 (51.0%)
	65-69 years	442 (4.7%)	643 (5.7%)
	70+ years	302 (3.2%)	422 (3.8%)
	Total	9,462 (100.0%)	11,186 (100.0%)
65+ years	0-2 years	0 (0.0%)	0 (0.0%)
	3-6 years	4 (0.1%)	2 (0.1%)
	7-10 years	13 (0.4%)	12 (0.3%)
	11-17 years	99 (3.0%)	101 (2.7%)
	18-39 years	1,178 (36.1%)	1,113 (29.3%)
	40-64 years	1,511 (46.3%)	1,895 (49.8%)
	65-69 years	236 (7.2%)	335 (8.8%)
	70+ years	220 (6.7%)	345 (9.1%)
	Total	3,261 (100.0%)	3,803 (100.0%)

**Figure 18** and **Table 18** show the number and percent of pediatric deceased donor liver-alone transplants by recipient age, donor age, and era. The distribution of pediatric transplants by donor age remained fairly similar pre- and post-policy, although the distribution did shift slightly for recipients aged 0-2 years and 7-11 years. Compared to the pre-policy period, pediatric recipients aged 0-2 years received a lower proportion of livers from donors aged 0-2 years post-policy, and a higher proportion of livers from donors aged 11-17 years post-policy. Pediatric recipients aged 7-11 years received a higher proportion of livers from donors aged 0-2, and 3-6 years post-policy compared to pre-policy, and a lower proportion of livers from donors aged 7-10 years post-policy compared to pre-policy.

**Figure 18. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age, Donor Age, and Era**





**Table 18. Number and Percent of Pediatric Deceased Donor Liver-Alone Transplants by Recipient Age, Donor Age, and Era**

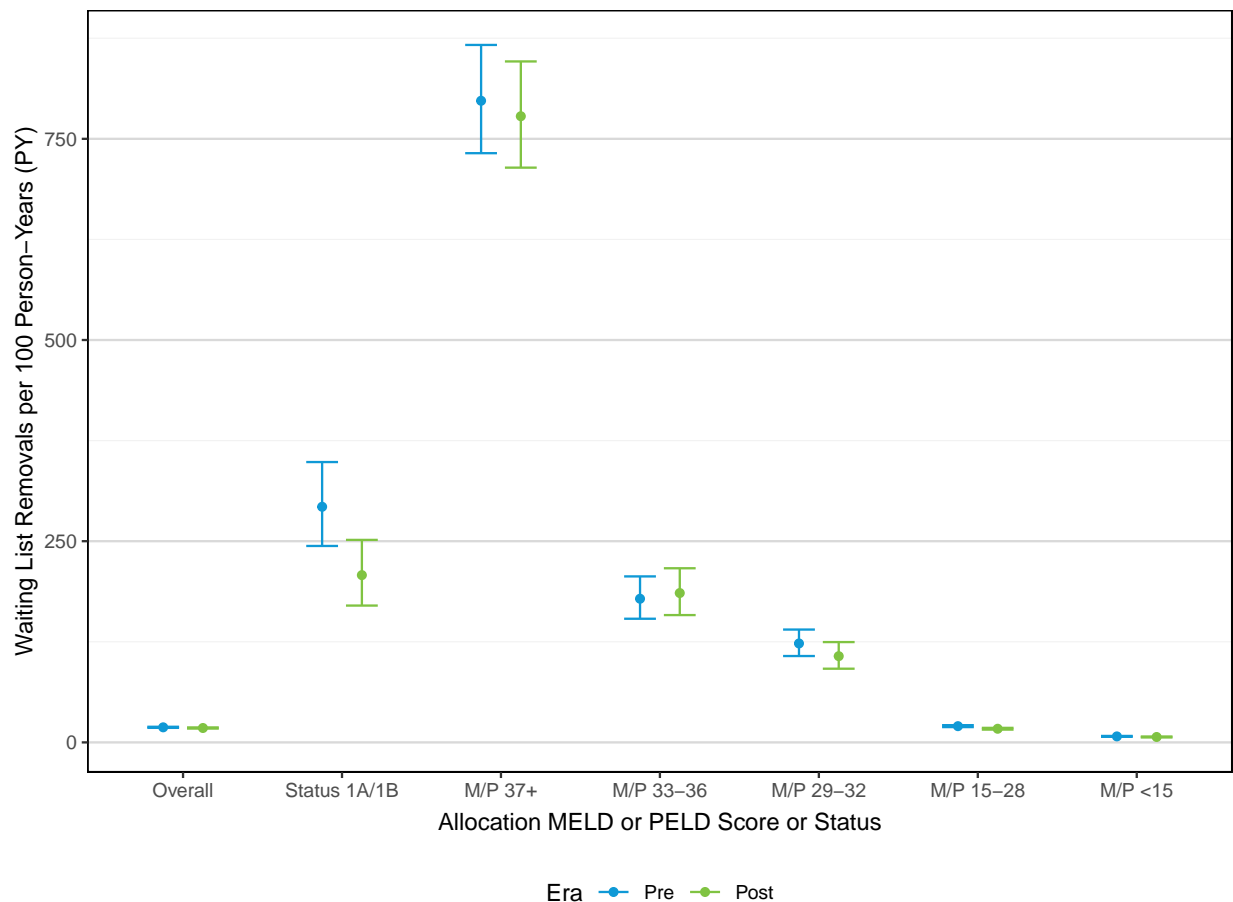
Recipient Age	Donor Age	Pre-Policy	Post-Policy
0-2 years	0-2 years	170 (45.5%)	153 (37.2%)
	3-6 years	55 (14.7%)	56 (13.6%)
	7-10 years	14 (3.7%)	21 (5.1%)
	11-17 years	68 (18.2%)	90 (21.9%)
	18-39 years	63 (16.8%)	88 (21.4%)
	40-64 years	4 (1.1%)	3 (0.7%)
	65-69 years	0 (0.0%)	0 (0.0%)
	70+ years	0 (0.0%)	0 (0.0%)
	Total	374 (100.0%)	411 (100.0%)
3-6 years	0-2 years	23 (18.1%)	22 (19.5%)
	3-6 years	46 (36.2%)	38 (33.6%)
	7-10 years	13 (10.2%)	10 (8.8%)
	11-17 years	26 (20.5%)	23 (20.4%)
	18-39 years	18 (14.2%)	18 (15.9%)
	40-64 years	1 (0.8%)	2 (1.8%)
	65-69 years	0 (0.0%)	0 (0.0%)
	70+ years	0 (0.0%)	0 (0.0%)
	Total	127 (100.0%)	113 (100.0%)
7-11 years	0-2 years	1 (1.0%)	6 (5.3%)
	3-6 years	13 (12.6%)	19 (16.7%)
	7-10 years	28 (27.2%)	22 (19.3%)
	11-17 years	35 (34.0%)	42 (36.8%)
	18-39 years	23 (22.3%)	21 (18.4%)
	40-64 years	3 (2.9%)	4 (3.5%)
	65-69 years	0 (0.0%)	0 (0.0%)
	70+ years	0 (0.0%)	0 (0.0%)
	Total	103 (100.0%)	114 (100.0%)
12-17 years	0-2 years	0 (0.0%)	0 (0.0%)
	3-6 years	2 (1.0%)	1 (0.5%)
	7-10 years	16 (7.9%)	17 (8.8%)
	11-17 years	114 (56.2%)	113 (58.2%)
	18-39 years	61 (30.0%)	52 (26.8%)
	40-64 years	10 (4.9%)	11 (5.7%)
	65-69 years	0 (0.0%)	0 (0.0%)
	70+ years	0 (0.0%)	0 (0.0%)
	Total	203 (100.0%)	194 (100.0%)

## Comparison with Non-Exception Candidates and Recipients

The above results suggest that the spread of allocation scores for recipients transplanted with HCC or non-HCC exceptions became tighter around the median post-policy compared to pre-policy. The following analyses stratify waiting list removal rates and transplant rates for *non-exception* candidates by their allocation MELD or PELD score or status to help determine whether this convergence toward intermediate scores for exception candidates might have negatively impacted waiting list removal rates or transplant rates for non-exception candidates. Note that while the data changes incurred by this policy change preclude stratification of rates by allocation score for candidates with exceptions, rates for non-exception candidates can still be stratified by allocation score.

**Figure 19** and **Table 19** show liver-alone waiting list removals for death or too sick to transplant per 100 person-years waiting for non-exception candidates by allocation score and era. Waiting list removal rates for non-exception candidates decreased slightly overall (Pre: 18.73 [ 18.06, 19.41] per 100 person-years, Post: 17.88 [ 17.18, 18.60] per 100 person-years). When stratified by allocation score, waiting list removal rates increased for candidates with allocation MELD or PELD 33 - 36 and decreased or remained steady for all other allocation score and status groups, although none of these differences were statistically significant.

**Figure 19. Liver-Alone Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting for Non-Exception Candidates by Allocation MELD or PELD Score or Status and Era**

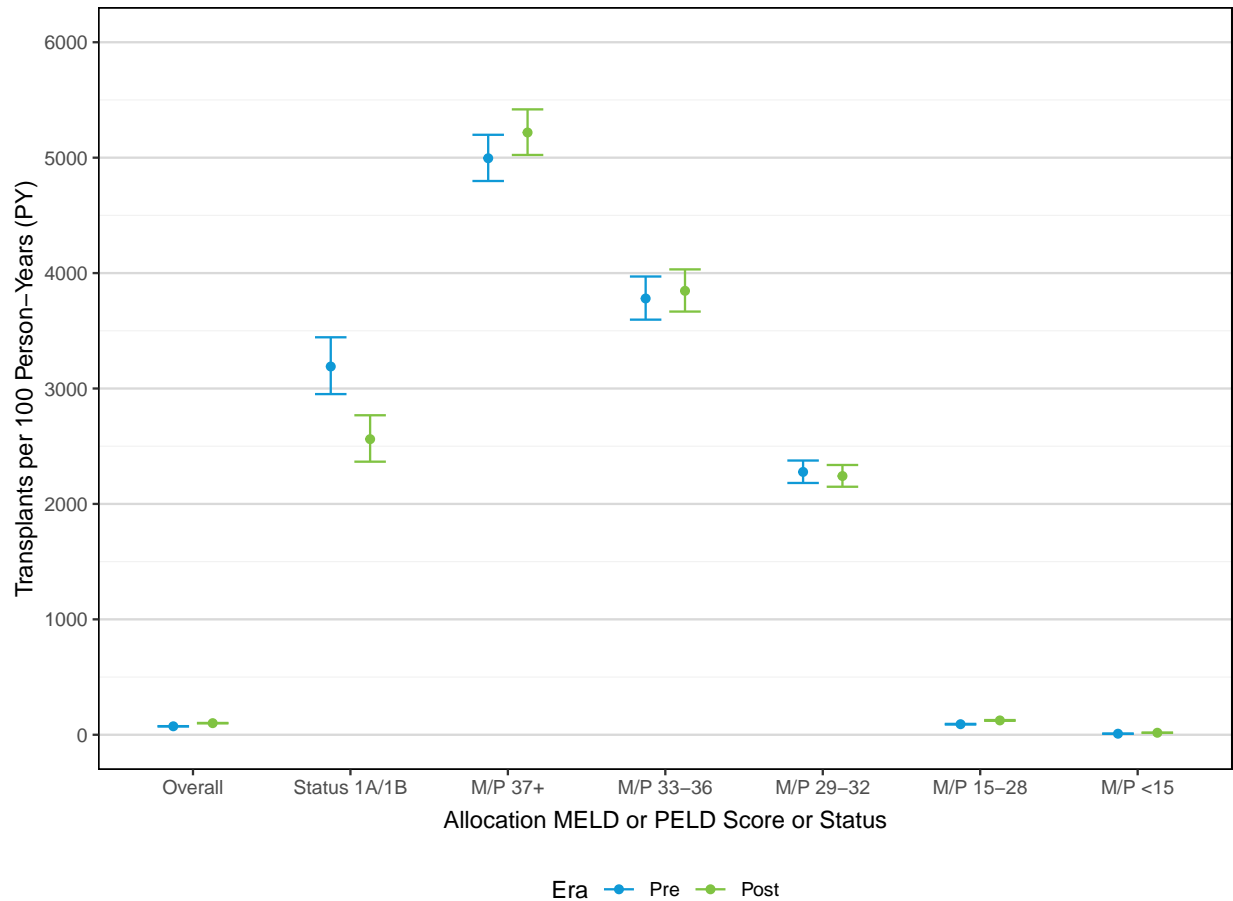


**Table 19. Liver-Along Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting for Non-Exception Candidates by Allocation MELD or PELD Score or Status and Era**

Allocation MELD or PELD Score or Status	Era	Ever Waiting	Death/Too Sick Events	Person-Years	Removals per 100 PY	
		N	N	PY	Estimate	95% CI
Overall	Pre	26550	2949	15747.7	18.73	(18.06, 19.41)
	Post	27402	2466	13789.3	17.88	(17.18, 18.60)
Status 1A/1B	Pre	996	127	43.4	292.77	(244.07, 348.35)
	Post	967	105	50.5	207.86	(170.01, 251.63)
M/P 37+	Pre	3254	552	69.2	797.28	(732.15, 866.65)
	Post	3582	546	70.2	778.08	(714.18, 846.17)
M/P 33-36	Pre	2968	184	103.1	178.51	(153.65, 206.25)
	Post	3161	163	87.8	185.60	(158.20, 216.38)
M/P 29-32	Pre	4475	222	180.6	122.95	(107.30, 140.23)
	Post	4615	168	156.8	107.17	(91.57, 124.65)
M/P 15-28	Pre	14383	1117	5533.7	20.19	(19.02, 21.40)
	Post	15420	937	5529.8	16.94	(15.88, 18.07)
M/P <15	Pre	13311	712	9549.3	7.46	(6.92, 8.02)
	Post	12681	514	7648.4	6.72	(6.15, 7.33)

**Figure 20** and **Table 20** show liver-alone transplant rates per 100 active person-years waiting for *non-exception* candidates by allocation score and era. There was a statistically significant increase in the overall transplant rate for non-exception candidates (Pre: 73.31 [ 71.98, 74.66] per 100 person-years, Post: 100.46 [ 98.80, 102.15] per 100 person-years). When stratified by allocation score, transplant rates decreased for Status 1A/1B candidates, and increased for non-exception candidates in all other allocation score groups (stayed constant in M/P 29 - 32 group). The decrease in the Status 1A/1B group was statistically significant.

**Figure 20. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting for Non-Exception Candidates by Allocation MELD or PELD Score or Status and Era**



**Table 20. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting for Non-Exception Candidates by Allocation MELD or PELD Score or Status and Era**

Allocation MELD or PELD Score or Status	Era	Ever Waiting	Transplant Events	Active Person-Years	Transplants per 100 Active PY	
		N	N	PY	Estimate	95% CI
Overall	Pre	26550	11545	15747.7	73.31	(71.98, 74.66)
	Post	27402	13853	13789.3	100.46	(98.80, 102.15)
Status 1A/1B	Pre	976	659	20.7	3190.54	(2951.56, 3443.72)
	Post	954	636	24.8	2561.12	(2365.92, 2768.13)
M/P 37+	Pre	3217	2418	48.4	4995.02	(4797.89, 5198.17)
	Post	3549	2711	52.0	5218.14	(5023.54, 5418.34)
M/P 33-36	Pre	2902	1591	42.1	3779.96	(3596.48, 3970.37)
	Post	3130	1722	44.8	3846.10	(3666.57, 4032.15)
M/P 29-32	Pre	4402	2131	93.6	2277.11	(2181.44, 2375.89)
	Post	4562	2199	98.1	2241.62	(2148.90, 2337.31)
M/P 15-28	Pre	13868	4077	4461.7	91.38	(88.59, 94.23)
	Post	14986	5581	4496.0	124.13	(120.90, 127.43)
M/P <15	Pre	12251	669	7489.8	8.93	(8.27, 9.64)
	Post	11804	1004	5816.8	17.26	(16.21, 18.36)

## Ongoing review of National Liver Review Board (NLRB) Diagnoses (January 2022 PC)

This section of the report examines the impact of the ischemic cholangiopathy (IC) and polycystic liver disease (PLD) guidance documents that were implemented on July 26, 2022.

### Ischemic Cholangiopathy Guidance

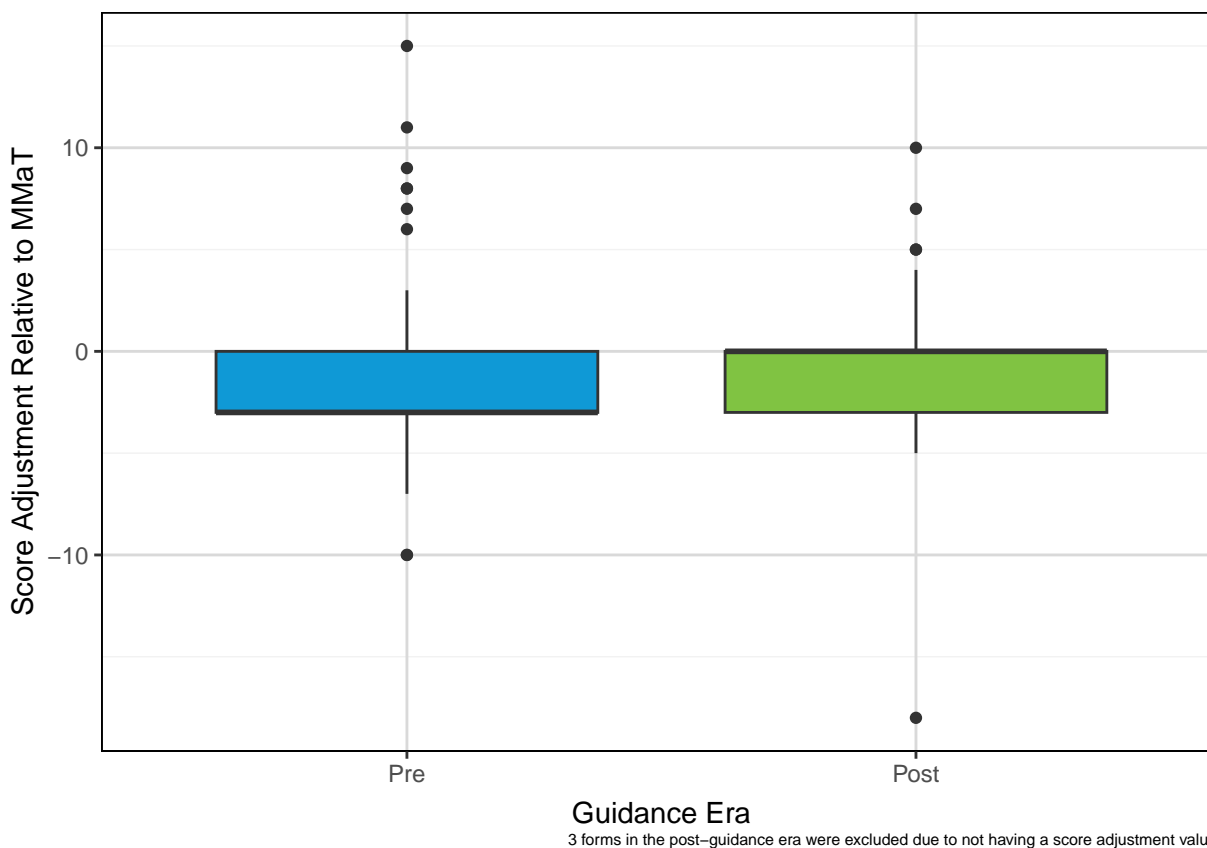
This guidance recommends that candidates meeting criteria for an exception be assigned a score equal to MMaT. Prior to this guidance, there was no score recommendation for IC. IC is a complication associated with livers from donation after cardiac death (DCD) donors, and this change will allow these candidates to access re-transplant more quickly. For more detailed information regarding the changes, see the policy notice document.

This guidance was implemented on July 26, 2022. The guidance is evaluated one year post implementation, with the pre-guidance era spanning from 07/26/2020 to 07/25/2022 and post-guidance era spanning from 07/26/2022 to 07/25/2024. Initial and extension requests are included in these analyses, but results are not stratified by application type due to small sample sizes. The following metrics were evaluated:

- Count of exception forms submitted with an ischemic cholangiopathy diagnosis and distribution of score adjustment requested
- Count of transplants with an ischemic cholangiopathy diagnosis and distribution of MELD or PELD score at transplant

**Figure 21** and **Table 21** show the distribution of score adjustment requested for initial and extension ischemic cholangiopathy exception requests by guidance era. There were 182 ischemic cholangiopathy exception requests pre-guidance and 196 ischemic cholangiopathy exception requests post-guidance. The median score adjustment requested for ischemic cholangiopathy exceptions increased from -3 pre-guidance to 0 post-guidance. The interquartile range, which captures the middle 50% of score adjustments requested, remained the same in both guidance eras (Pre: 3, Post: 3).

**Figure 21. Distribution of MELD or PELD Score Adjustment Requested for Ischemic Cholangiopathy Exceptions**



**Table 21. Distribution of MELD or PELD Score Adjustment Requested for Ischemic Cholangiopathy Exceptions**

Era	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range	Number of Forms	Forms Missing Score Adjustment
Pre	-10	-3	-3	0	15	3	182	0
Post	-18	-3	0	0	10	3	196	3

3 forms in the post-guidance era were excluded due to not having a score adjustment value.

Based on OPTN data as of 2025-01-03

Data subject to change based on future data submission or correction

**Table 22** shows the distribution of MELD or PELD score at transplant for ischemic cholangiopathy transplant recipients by guidance era. There were 9 ischemic cholangiopathy transplants pre-guidance. 7 of these recipients were transplanted with an exception (77.78%). For comparison, 20 ischemic cholangiopathy transplants occurred post-guidance, and 16 of these recipients were transplanted with an exception (80%). The median MELD or PELD score at transplant for ischemic cholangiopathy transplant recipients decreased from 30 pre-guidance to 29 post-guidance. The interquartile range, which captures the middle 50% of score adjustments requested, decreased from 4 pre-guidance to 1 post-guidance. Given the small number of ischemic cholangiopathy transplants that occurred in both guidance eras, these results should be interpreted cautiously.

**Table 22. Distribution of MELD or PELD Score at Transplant for Ischemic Cholangiopathy Transplant Recipients**

Era	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range	Number of Transplants	Number of Exceptions
Pre	26	27	30	31	33	4	9	7
Post	25	29	29	30	31	1	20	16

Based on OPTN data as of 2025-01-03

Data subject to change based on future data submission or correction



## Polycystic Liver Disease (PLD) Guidance

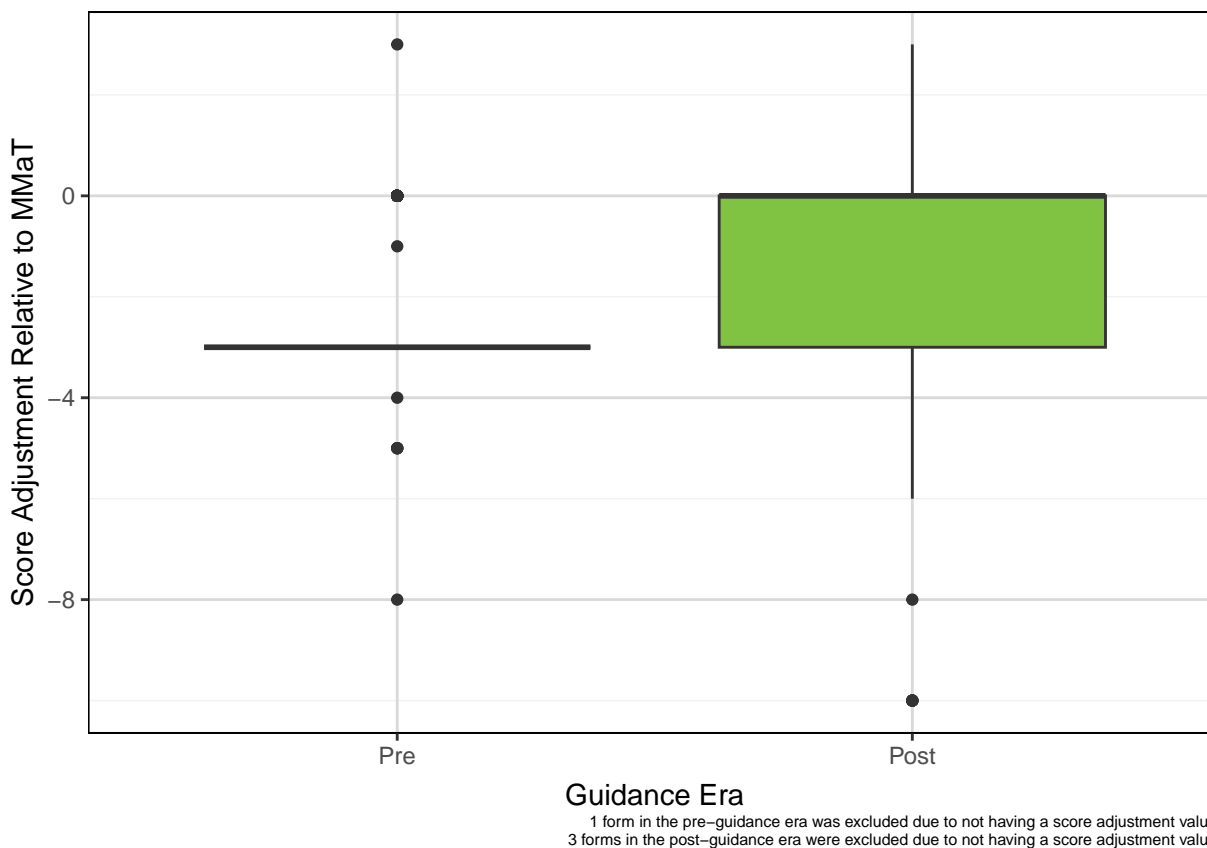
This guidance includes a more objective definition for moderate to severe protein calorie malnutrition, adds sarcopenia as a qualifying comorbidity, removes unnecessary language, and recommends all candidates meeting criteria be considered for MMaT. Prior to this guidance, there was no score recommendation for PLD. For more detailed information regarding the changes see the policy notice document.

This guidance was implemented on July 26, 2022. The guidance is evaluated one year post implementation, with the pre-guidance era spanning from 07/26/2020 to 07/25/2022 and post-guidance era spanning from 07/26/2022 to 07/25/2024. Initial and extension requests are included in these analyses, but results are not stratified by application type due to small sample sizes. The following metrics were evaluated:

- Count of exception forms submitted with a PLD diagnosis and distribution of MELD or PELD score requested
- Count of transplants with a PLD diagnosis and distribution of MELD or PELD score at transplant

**Figure 22** and **Table 23** show the distribution of score adjustment requested for initial and extension polycystic liver disease exception requests by guidance era. There were 356 polycystic liver disease exception requests pre-guidance and 323 polycystic liver disease exception requests post-guidance. The median score adjustment requested for polycystic liver disease exceptions increased from -3 pre-guidance to 0 post-guidance.

**Figure 22. Distribution of MELD or PELD Score Adjustment Requested for Polycystic Liver Disease Exceptions**



**Table 23. Distribution of MELD or PELD Score Adjustment Requested for Polycystic Liver Disease Exceptions**

Era	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range	Number of Forms	Forms Missing Score Adjustment
Pre	-8	-3	-3	-3	3	0	356	1
Post	-10	-3	0	0	3	3	323	3

1 form in the pre-guidance era was excluded due to not having a score adjustment value.

3 forms in the post-guidance era were excluded due to not having a score adjustment value.

Based on OPTN data as of 2025-01-03

Data subject to change based on future data submission or correction

**Table 24** shows the distribution of MELD or PELD score at transplant for polycystic liver disease transplant recipients by guidance era. There were 39 polycystic liver disease transplants pre-guidance. 23 of these recipients were transplanted with an exception (58.97%). For comparison, 71 polycystic liver disease transplants occurred post-guidance. 59 of these recipients were transplanted with an exception (83.1%). The median MELD or PELD score at transplant for polycystic liver disease transplant recipients increased from 26 pre-guidance to 30 post-guidance. The interquartile range, which captures the middle 50% of score adjustments requested, decreased from 5 pre-guidance to 3 post-guidance.

**Table 24. Distribution of MELD or PELD Score at Transplant for Polycystic Liver Disease Transplant Recipients**

Era	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range	Number of Transplants	Number of Exceptions
Pre	7	24	26	29	35	5	39	23
Post	6	28	30	31	40	3	71	59

Based on OPTN data as of 2025-01-03

Data subject to change based on future data submission or correction

## Conclusion

After implementation of the MMaT around the donor hospital policy, waiting list removal rates due to death or too sick tended to decrease while transplant rates tended to increase, regardless of exception type. The median score adjustment requested for standard initial and extension MELD or PELD exceptions remained similar across policy eras. The median allocation MELD or PELD score at transplant remained the same or increased slightly pre- to post-policy. The median MMaT at transplant for adult liver-alone transplant recipients who were transplanted with exceptions increased slightly pre- to post-policy as well. For all exception types, the interquartile range of requested score adjustments, allocation MELD or PELD at transplant, and MMaT at transplant were similar under the new MMaT around the donor hospital policy. Similar results were obtained when examined by OPTN Region.

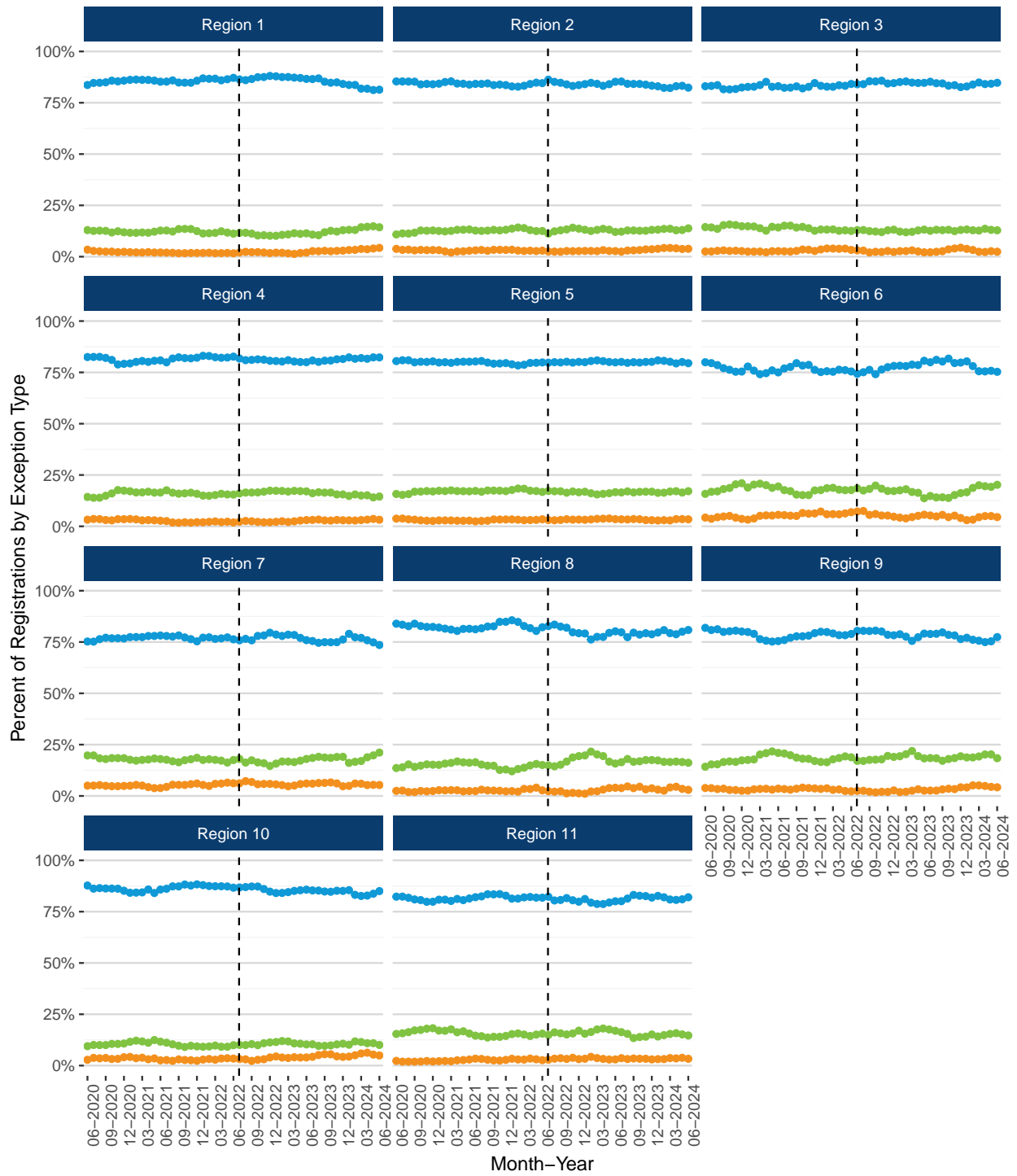
In terms of the ischemic cholangiopathy and polycystic liver disease guidances, the median score adjustment requested for exception candidates with these diagnoses tended to increase pre- versus post-guidance, as intended. Similarly, for transplant recipients with these diagnoses, the median allocation MELD or PELD score at transplant increased pre- to post-guidance (larger increase in polycystic liver disease than in ischemic cholangiopathy).

## Appendix

This section contains supplementary tables and figures to support the key results shown in the main report.

### Waiting List

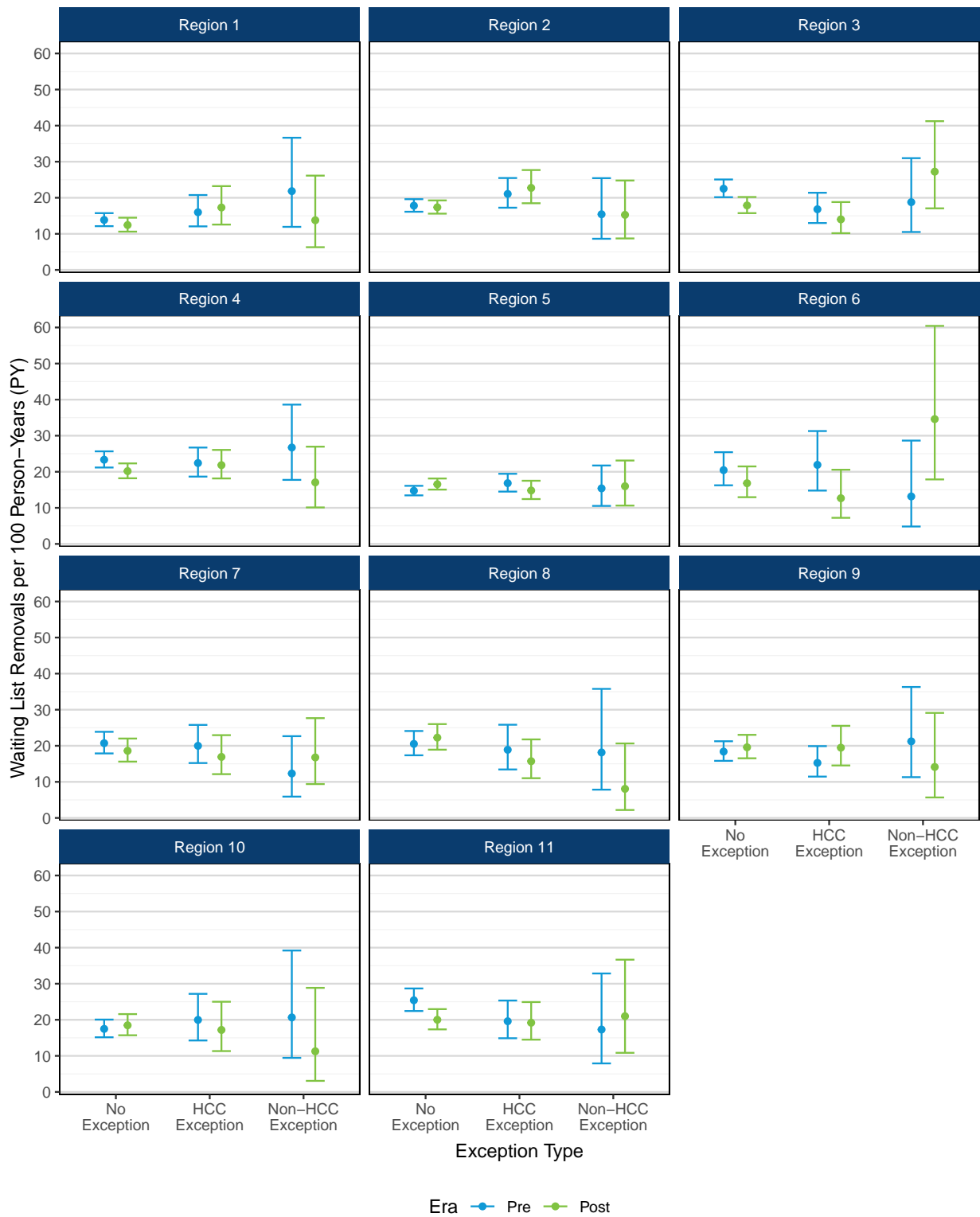
**Appendix Figure 1. Percent of Liver Waiting List Registrations at the End of each Month by Exception Type and OPTN Region**



Exception Type — No Exception — HCC Exception — Non-HCC Exception

Dotted line represents implementation of MMaT around the donor hospital on June 28, 2022.

**Appendix Figure 2. Liver-Alone Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting by OPTN Region, Exception Type, and Era**



**Appendix Table 1. Liver-Along Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting by OPTN Region, Exception Type, and Era**

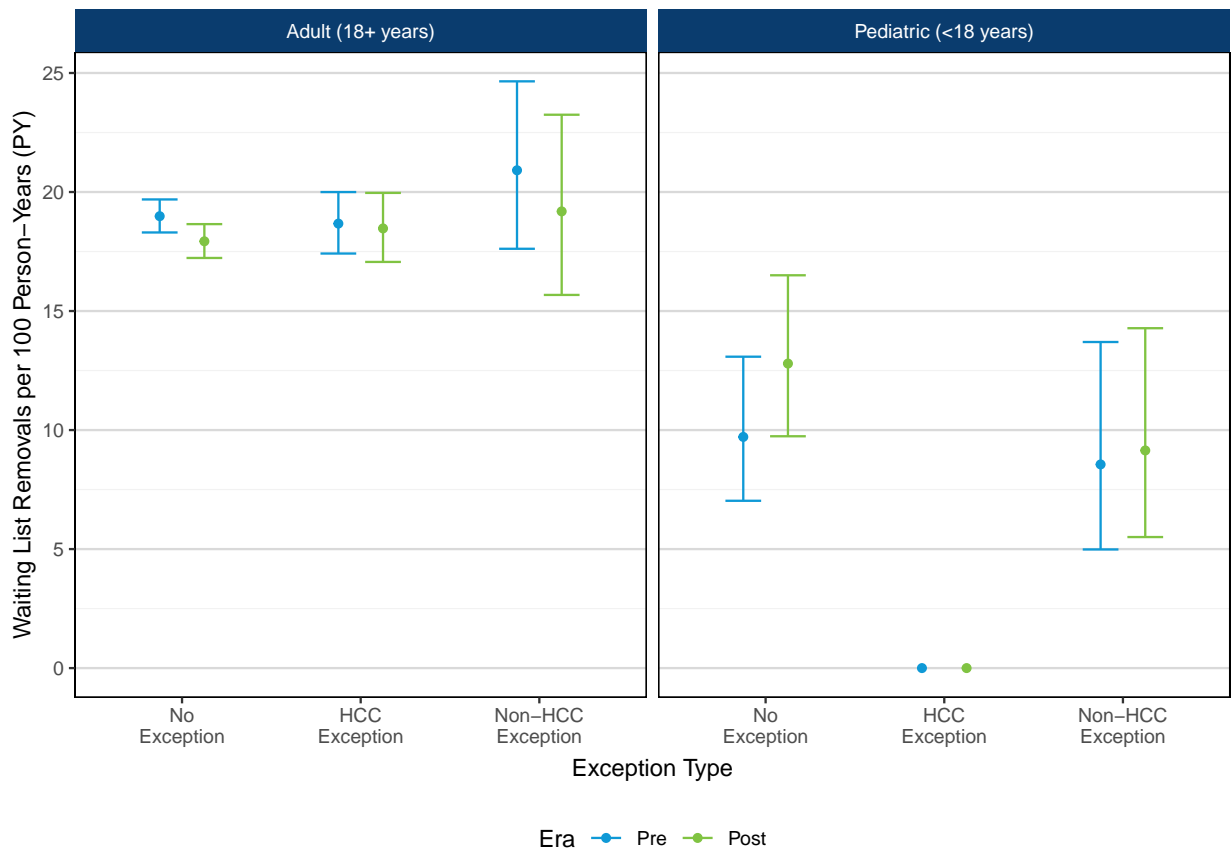
OPTN Region	Exception Type	Era	Ever Waiting	Death/Too Sick Events	Person-Years	Removals per 100 PY	
			N	N	PY	Estimate	95% CI
1	No Exception	Pre	1728	234	1690.3	13.84	(12.13, 15.74)
		Post	1639	166	1335.2	12.43	(10.61, 14.47)
	HCC Exception	Pre	365	56	350.4	15.98	(12.07, 20.75)
		Post	328	44	254.3	17.30	(12.57, 23.22)
	Non-HCC Exception	Pre	77	14	64.1	21.84	(11.94, 36.64)
		Post	106	9	65.4	13.77	(6.30, 26.14)
2	No Exception	Pre	3308	412	2314.1	17.80	(16.13, 19.61)
		Post	3318	353	2033.3	17.36	(15.60, 19.27)
	HCC Exception	Pre	688	106	503.3	21.06	(17.24, 25.47)
		Post	642	99	435.4	22.74	(18.48, 27.68)
	Non-HCC Exception	Pre	199	15	97.2	15.42	(8.63, 25.44)
		Post	200	16	104.8	15.26	(8.72, 24.79)
3	No Exception	Pre	3420	333	1479.0	22.51	(20.16, 25.07)
		Post	3669	254	1421.5	17.87	(15.74, 20.21)
	HCC Exception	Pre	669	66	392.6	16.81	(13.00, 21.39)
		Post	585	44	314.1	14.01	(10.18, 18.81)
	Non-HCC Exception	Pre	187	15	79.9	18.78	(10.51, 30.98)
		Post	184	22	80.8	27.23	(17.07, 41.23)
4	No Exception	Pre	3121	428	1833.6	23.34	(21.18, 25.66)
		Post	3371	378	1873.0	20.18	(18.20, 22.32)
	HCC Exception	Pre	736	125	557.5	22.42	(18.66, 26.71)
		Post	754	123	563.2	21.84	(18.15, 26.06)
	Non-HCC Exception	Pre	191	28	104.8	26.72	(17.75, 38.62)
		Post	194	18	105.5	17.06	(10.11, 26.96)
5	No Exception	Pre	4629	487	3304.6	14.74	(13.46, 16.11)
		Post	4709	457	2762.7	16.54	(15.06, 18.13)
	HCC Exception	Pre	1325	186	1104.7	16.84	(14.50, 19.44)
		Post	1246	137	925.0	14.81	(12.43, 17.51)
	Non-HCC Exception	Pre	336	32	207.8	15.40	(10.53, 21.74)
		Post	375	28	175.1	15.99	(10.63, 23.12)
	No Exception	Pre	732	81	395.9	20.46	(16.25, 25.43)
		Post	811	64	380.4	16.82	(12.96, 21.48)
		Pre	208	30	136.9	21.92	(14.79, 31.29)



*(continued)*

OPTN Region	Exception Type	Era	N	N	PY	Estimate	95% CI
6	HCC Exception	Post	204	16	126.3	12.67	(7.24, 20.57)
		Pre	81	6	45.6	13.16	(4.83, 28.64)
	Non-HCC Exception	Post	70	12	34.7	34.60	(17.88, 60.43)
		Pre	1866	191	921.9	20.72	(17.88, 23.87)
7	HCC Exception	Post	1937	136	730.9	18.61	(15.61, 22.01)
		Pre	471	59	295.1	19.99	(15.22, 25.79)
	Non-HCC Exception	Post	434	41	242.4	16.91	(12.14, 22.95)
		Pre	182	10	81.2	12.32	(5.91, 22.66)
8	HCC Exception	Post	217	15	89.4	16.77	(9.39, 27.66)
		Pre	1529	149	726.0	20.52	(17.36, 24.10)
	Non-HCC Exception	Post	1579	158	709.9	22.26	(18.92, 26.01)
		Pre	301	39	206.4	18.90	(13.44, 25.83)
9	HCC Exception	Post	348	36	228.9	15.72	(11.01, 21.77)
		Pre	107	8	44.1	18.15	(7.84, 35.77)
	Non-HCC Exception	Post	137	4	49.6	8.06	(2.20, 20.64)
		Pre	1872	183	995.1	18.39	(15.82, 21.26)
10	HCC Exception	Post	1792	146	745.5	19.58	(16.54, 23.03)
		Pre	464	54	354.0	15.25	(11.46, 19.90)
	Non-HCC Exception	Post	422	52	267.0	19.47	(14.54, 25.54)
		Pre	124	13	61.2	21.22	(11.30, 36.29)
11	HCC Exception	Post	138	7	49.5	14.13	(5.68, 29.11)
		Pre	2326	202	1155.8	17.48	(15.15, 20.06)
	Non-HCC Exception	Post	2407	159	860.7	18.47	(15.71, 21.58)
		Pre	345	40	200.3	19.97	(14.27, 27.19)
11	HCC Exception	Post	324	27	157.1	17.19	(11.33, 25.01)
		Pre	124	9	43.6	20.65	(9.44, 39.20)
	Non-HCC Exception	Post	139	4	35.5	11.27	(3.07, 28.85)
		Pre	2295	262	1030.9	25.42	(22.43, 28.69)
11	HCC Exception	Post	2399	202	1009.7	20.01	(17.34, 22.96)
		Pre	452	58	295.9	19.60	(14.88, 25.34)
	Non-HCC Exception	Post	493	56	291.8	19.19	(14.49, 24.92)
		Pre	121	9	52.0	17.30	(7.91, 32.84)
11	Non-HCC Exception	Post	153	12	57.2	20.99	(10.85, 36.67)

**Appendix Figure 3. Liver-Alone Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting by Age, Exception Type, and Era**



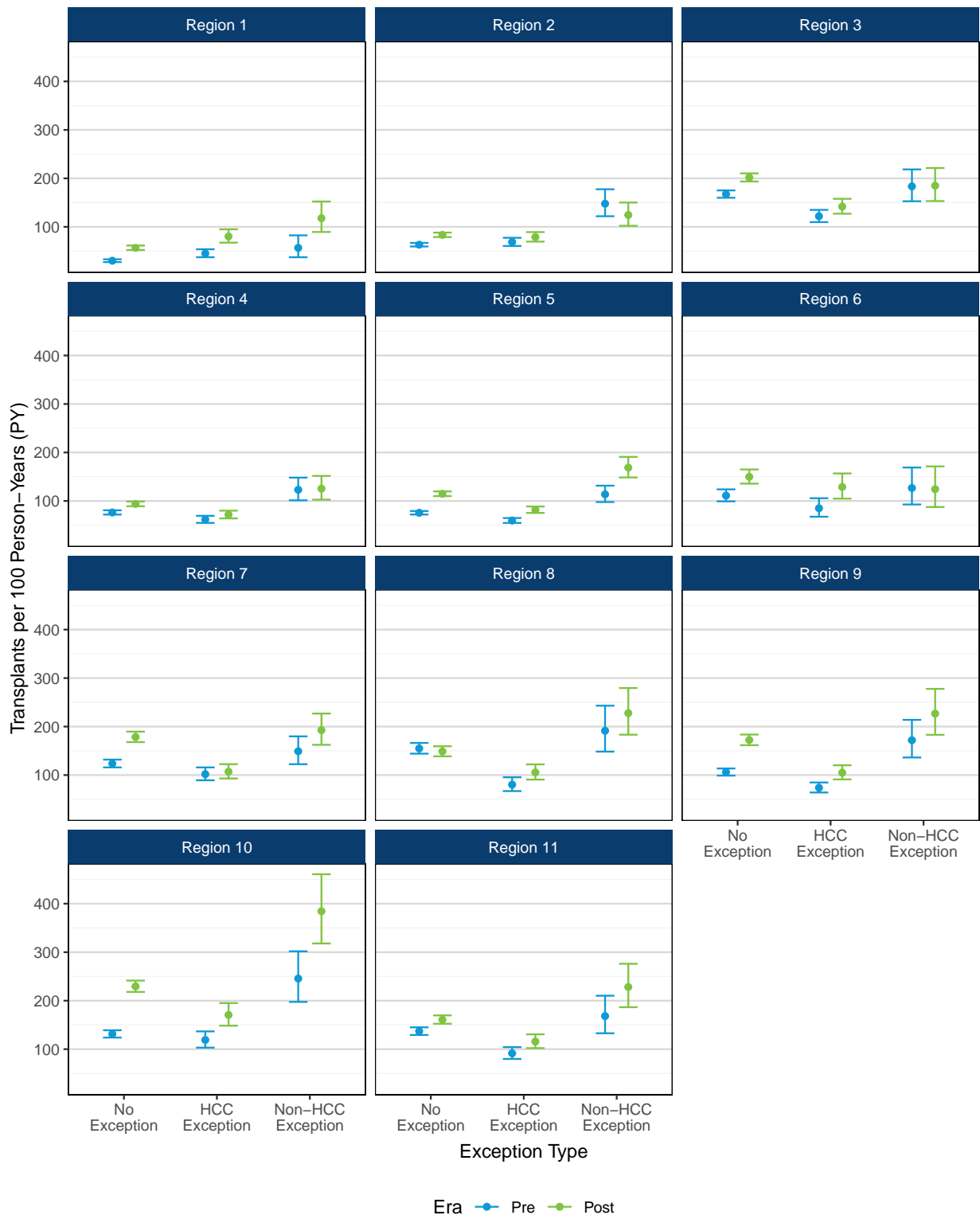
Small sample size and the absence of any Death/Too Sick events occurring for pediatric HCC exception candidates during the study period precludes estimation of confidence intervals for these candidates.

**Appendix Table 2. Liver-Along Waiting List Deaths or Removals for Too Sick Per 100 Person-Years Waiting by Age, Exception Type, and Era**

Recipient Age	Exception Type	Era	Ever Waiting	Death/Too Sick Events	Person-Years	Removals per 100 PY		
			N	N	PY	Estimate	95% CI	
Adult (18+ years)	No Exception	Pre	25575	2906	15307.0	18.98	(18.30, 19.69)	
		Post	27868	2469	13770.3	17.93	(17.23, 18.65)	
	HCC Exception	Pre	5967	818	4380.5	18.67	(17.42, 20.00)	
		Post	4570	636	3443.3	18.47	(17.06, 19.96)	
	Non-HCC Exception	Pre	1153	142	679.0	20.91	(17.62, 24.65)	
		Post	948	104	542.1	19.19	(15.68, 23.25)	
	Pediatric (<18 years)	No Exception	Pre	985	43	442.8	9.71	(7.03, 13.08)
			Post	1122	59	461.2	12.79	(9.74, 16.50)
HCC Exception		Pre	8	0	2.5	0.00	(0.00, 0.00)	
		Post	5	0	0.8	0.00	(0.00, 0.00)	
Non-HCC Exception		Pre	560	17	198.7	8.56	(4.98, 13.70)	
		Post	469	19	207.8	9.14	(5.50, 14.28)	

*Note.* Small sample size and the absence of any Death/Too Sick events occurring for pediatric HCC exception candidates during the study period precludes estimation of confidence intervals for these candidates.

**Appendix Figure 4. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by OPTN Region, Exception Type, and Era**



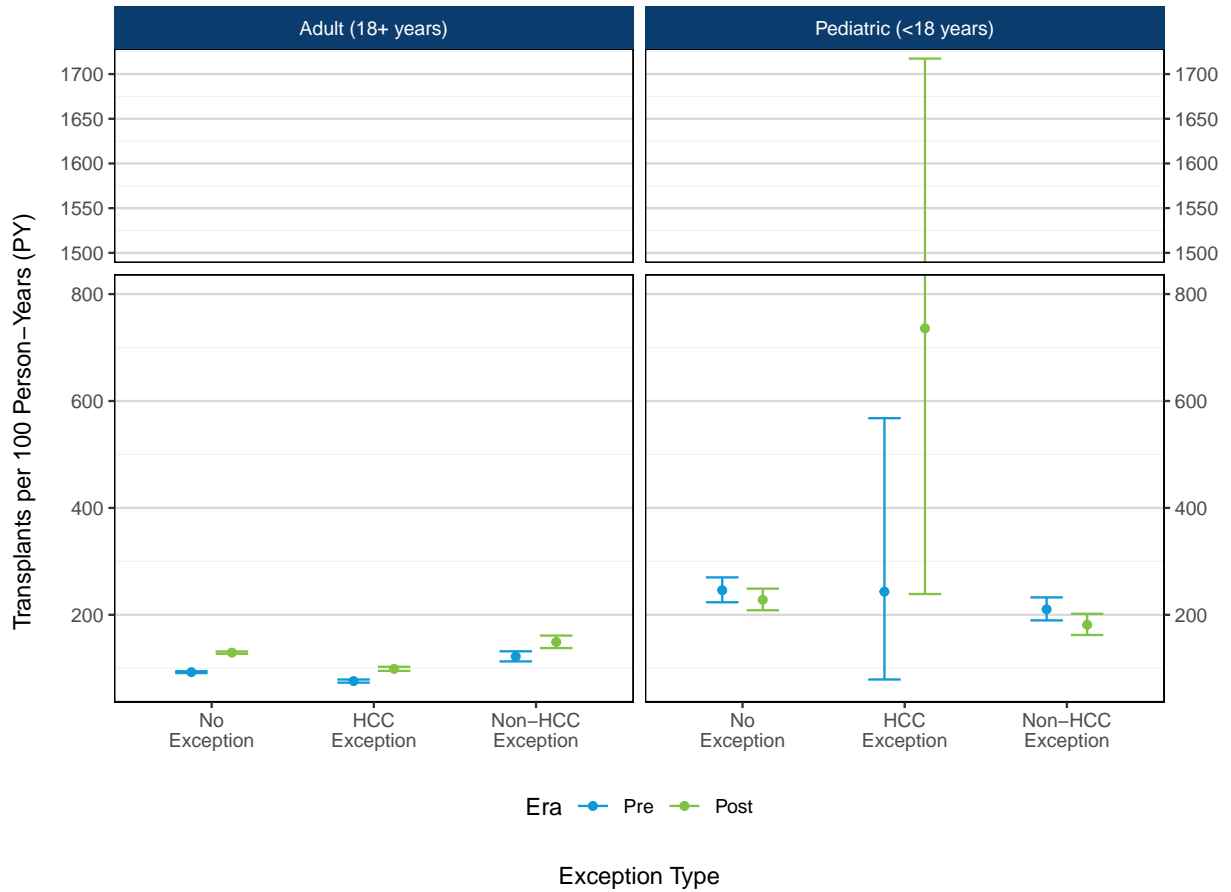
**Appendix Table 3. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by OPTN Region, Exception Type, and Era**

OPTN Region	Exception Type	Era	Ever Waiting	Transplant Events	Active Person-Years	Transplants per 100 Active PY	
			N	N	PY	Estimate	95% CI
1	No Exception	Pre	1615	429	1423.1	30.15	(27.36, 33.14)
		Post	1517	579	1021.2	56.70	(52.18, 61.51)
	HCC Exception	Pre	346	121	268.6	45.06	(37.39, 53.84)
		Post	302	137	170.6	80.32	(67.43, 94.95)
	Non-HCC Exception	Pre	74	27	47.6	56.69	(37.36, 82.49)
		Post	102	58	49.2	117.77	(89.43, 152.25)
2	No Exception	Pre	3103	1124	1779.7	63.16	(59.52, 66.96)
		Post	3048	1289	1544.3	83.47	(78.98, 88.15)
	HCC Exception	Pre	647	263	383.2	68.64	(60.60, 77.46)
		Post	594	255	323.1	78.92	(69.53, 89.22)
	Non-HCC Exception	Pre	194	114	77.1	147.78	(121.90, 177.53)
		Post	196	109	87.6	124.50	(102.23, 150.18)
3	No Exception	Pre	3251	1898	1133.4	167.47	(160.02, 175.17)
		Post	3542	2254	1116.9	201.81	(193.57, 210.32)
	HCC Exception	Pre	641	369	302.7	121.92	(109.79, 135.01)
		Post	565	336	236.9	141.86	(127.09, 157.87)
	Non-HCC Exception	Pre	185	126	68.7	183.51	(152.87, 218.49)
		Post	179	119	64.3	184.94	(153.21, 221.31)
4	No Exception	Pre	2985	1191	1561.8	76.26	(71.99, 80.72)
		Post	3240	1446	1540.7	93.85	(89.08, 98.82)
	HCC Exception	Pre	717	281	455.2	61.73	(54.73, 69.39)
		Post	739	322	449.2	71.69	(64.07, 79.96)
	Non-HCC Exception	Pre	189	112	91.0	123.07	(101.34, 148.09)
		Post	190	106	84.5	125.38	(102.65, 151.64)
5	No Exception	Pre	4034	1710	2262.8	75.57	(72.03, 79.24)
		Post	4233	2169	1889.8	114.77	(109.99, 119.71)
	HCC Exception	Pre	1290	534	896.3	59.58	(54.63, 64.85)
		Post	1194	600	734.0	81.75	(75.33, 88.56)
	Non-HCC Exception	Pre	327	181	159.2	113.70	(97.74, 131.53)
		Post	365	251	148.8	168.67	(148.45, 190.88)
6	No Exception	Pre	660	318	286.4	111.03	(99.16, 123.93)
		Post	757	414	276.3	149.81	(135.73, 164.96)
	HCC Exception	Pre	192	81	95.3	84.97	(67.48, 105.61)
		Post	185	100	77.6	128.83	(104.82, 156.69)
	Non-HCC Exception	Pre	81	46	36.3	126.68	(92.74, 168.97)
		Post	70	37	29.8	124.28	(87.50, 171.30)
No Exception	Pre	1775	926	748.9	123.64	(115.80, 131.87)	
	Post	1860	1071	600.0	178.50	(167.97, 189.52)	
No Exception	Pre	452	234	229.7	101.86	(89.22, 115.78)	

*(continued)*

OPTN Region	Exception Type	Era	N	N	PY	Estimate	95% CI
7	HCC Exception	Post	415	209	195.5	106.91	(92.91, 122.43)
		Pre	180	109	73.1	149.08	(122.41, 179.83)
	Non-HCC Exception	Post	214	143	74.2	192.62	(162.35, 226.91)
		Pre	1406	764	493.3	154.87	(144.09, 166.26)
	No Exception	Post	1508	805	541.1	148.78	(138.67, 159.42)
		Pre	286	128	159.5	80.27	(66.96, 95.44)
8	HCC Exception	Post	333	181	171.5	105.51	(90.70, 122.06)
		Pre	106	67	35.0	191.40	(148.33, 243.07)
	Non-HCC Exception	Post	135	91	40.0	227.61	(183.26, 279.45)
		Pre	1660	812	765.8	106.04	(98.87, 113.59)
	No Exception	Post	1709	961	557.8	172.28	(161.56, 183.53)
		Pre	446	204	276.4	73.82	(64.03, 84.67)
9	HCC Exception	Post	407	205	195.6	104.83	(90.97, 120.20)
		Pre	120	80	46.6	171.83	(136.25, 213.85)
	Non-HCC Exception	Post	136	93	41.0	226.74	(183.01, 277.77)
		Pre	2213	1196	911.1	131.27	(123.93, 138.92)
	No Exception	Post	2303	1506	656.1	229.53	(218.08, 241.42)
		Pre	342	201	168.8	119.04	(103.15, 136.68)
10	HCC Exception	Post	313	213	124.9	170.56	(148.42, 195.07)
		Pre	122	90	36.6	245.57	(197.47, 301.85)
	Non-HCC Exception	Post	138	117	30.4	384.49	(317.98, 460.80)
		Pre	2202	1177	859.1	137.01	(129.29, 145.07)
	No Exception	Post	2337	1359	844.9	160.84	(152.41, 169.63)
		Pre	436	224	245.0	91.42	(79.84, 104.21)
11	HCC Exception	Post	472	261	225.5	115.73	(102.11, 130.65)
		Pre	121	77	45.8	168.21	(132.75, 210.24)
	Non-HCC Exception	Post	152	105	46.0	228.11	(186.57, 276.14)
		Pre					

**Appendix Figure 5. Liver-Alone Transplant Rates Per 100 Active Person-Years Waiting by Age, Exception Type, and Era**



policy eras, respectively, thus making the confidence intervals very wide; please note the break in the y-axis enabling closer inspection of the remaining categories.

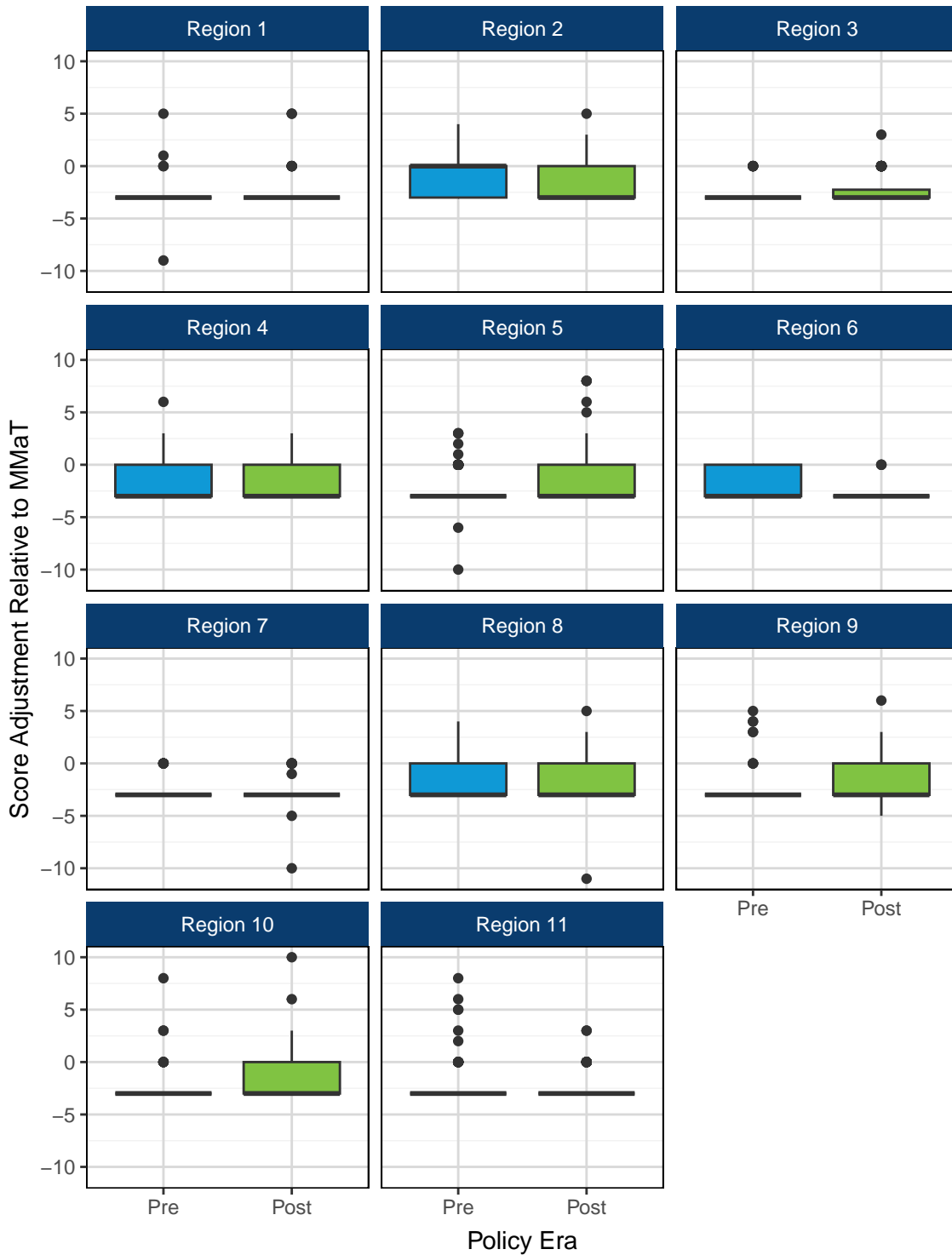
**Appendix Table 4. Liver-Along Transplant Rates Per 100 Active Person-Years Waiting by Age, Exception Type, and Era**

Recipient Age	Exception Type	Era	Ever Waiting	Transplant Events	Active Person-Years	Transplants per 100 Active PY		
			N	N	PY	Estimate	95% CI	
Adult (18+ years)	No Exception	Pre	23835	11105	11977.4	92.72	(91.00, 94.46)	
		Post	26369	13807	10677.0	129.32	(127.17, 131.49)	
	HCC Exception	Pre	5740	2635	3466.6	76.01	(73.14, 78.97)	
		Post	4393	2582	2611.3	98.88	(95.10, 102.77)	
	Non-HCC Exception	Pre	1123	652	534.4	122.01	(112.83, 131.75)	
		Post	920	641	429.8	149.15	(137.83, 161.16)	
	Pediatric (<18 years)	No Exception	Pre	837	440	178.9	245.93	(223.49, 270.02)
			Post	979	500	219.3	228.04	(208.48, 248.93)
HCC Exception		Pre	8	5	2.1	243.33	(79.01, 567.86)	
		Post	5	5	0.7	735.89	(238.94, 1717.32)	
Non-HCC Exception		Pre	560	377	179.3	210.27	(189.58, 232.61)	
		Post	469	331	182.6	181.29	(162.29, 201.91)	



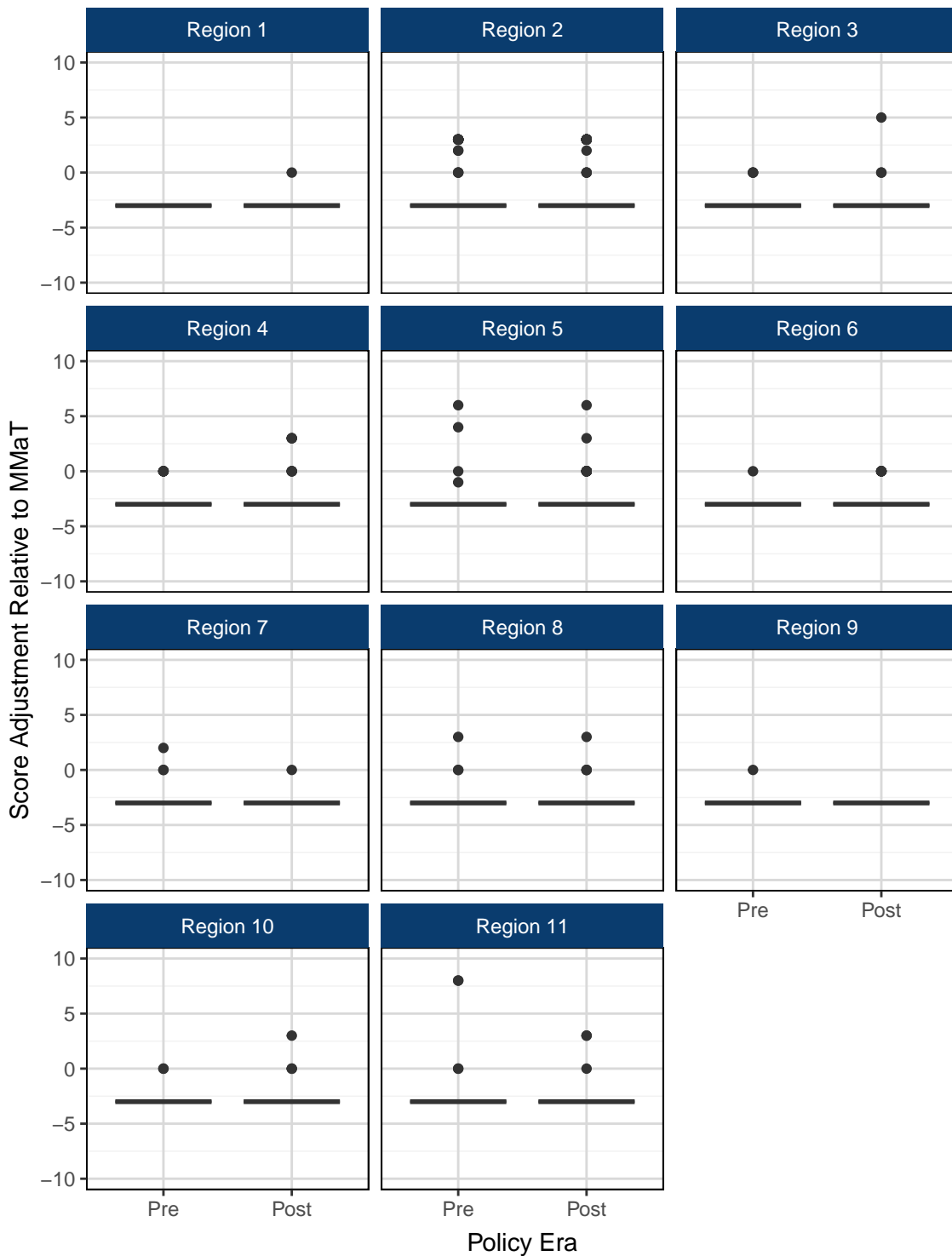
### Exception Requests

**Appendix Figure 6. Distribution of Score Adjustment Requested for Standard Initial MELD or PELD Exception Requests by OPTN Region and Era**



Initial and first extension HCC requests were excluded, since the policy-assigned score in these cases equals candidates' calculated MELD

**Appendix Figure 7. Distribution of Score Adjustment Requested for Standard Extension MELD or PELD Exception Requests by OPTN Region and Era**



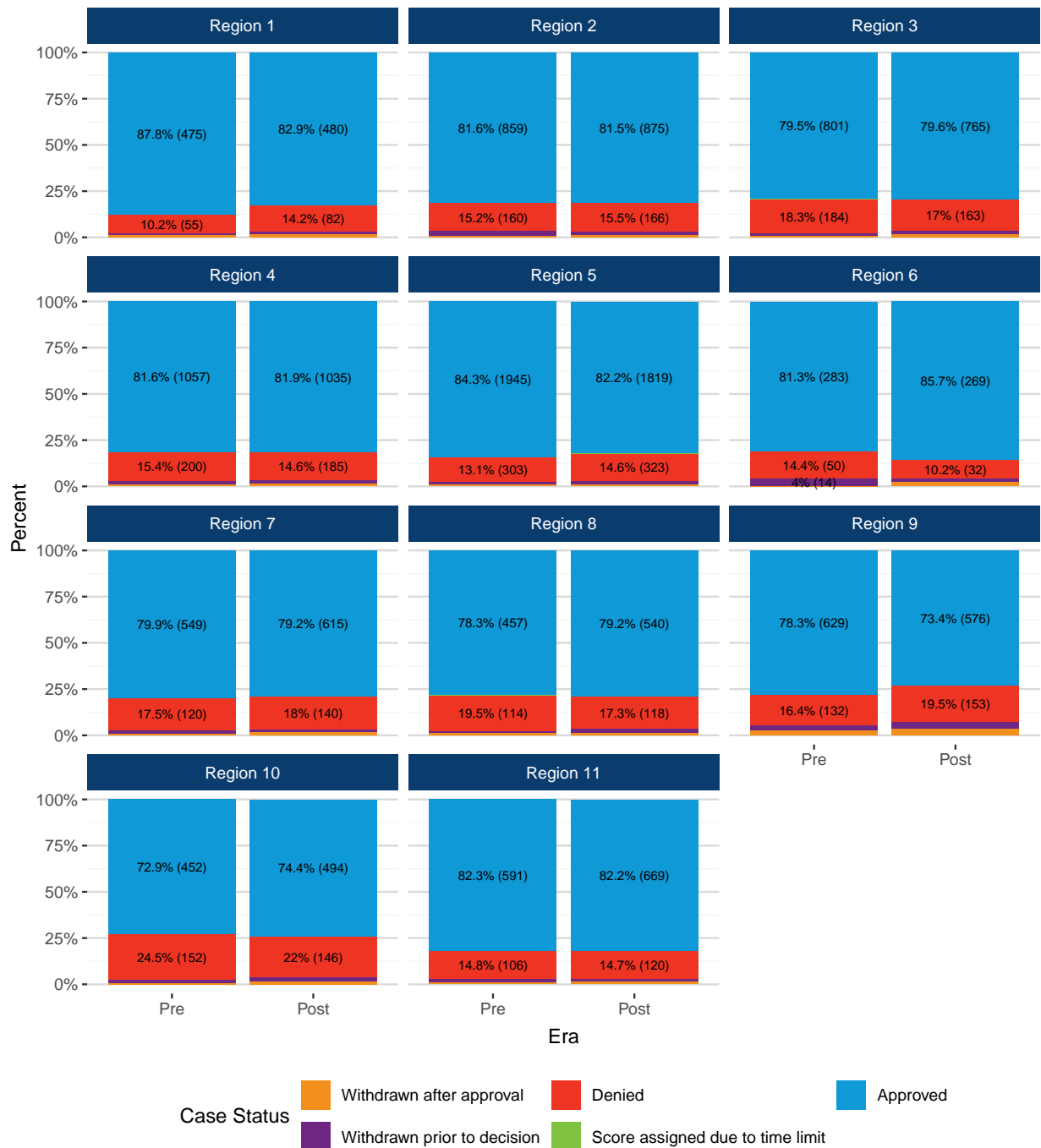
Initial and first extension HCC requests were excluded, since the policy-assigned score in these cases equals candidates' calculated MELD

**Appendix Table 5. Distribution of Score Adjustment Requested for Standard Initial and Extension MELD or PELD Exception Requests by OPTN Region and Era**

Era	Application Type	OPTN Region	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range	Total Number of Forms
Initial		1	-9	-3	-3	-3.00	5	0.00	31
		2	-3	-3	0	0.00	4	3.00	71
		3	-3	-3	-3	-3.00	0	0.00	79
		4	-3	-3	-3	0.00	6	3.00	76
		5	-10	-3	-3	-3.00	3	0.00	150
		6	-3	-3	-3	0.00	0	3.00	30
		7	-3	-3	-3	-3.00	0	0.00	81
		8	-3	-3	-3	0.00	4	3.00	41
		9	-3	-3	-3	-3.00	5	0.00	45
		10	-3	-3	-3	-3.00	8	0.00	56
		11	-3	-3	-3	-3.00	8	0.00	73
Pre		1	-3	-3	-3	-3.00	-3	0.00	524
		2	-3	-3	-3	-3.00	3	0.00	722
		3	-3	-3	-3	-3.00	0	0.00	500
		4	-3	-3	-3	-3.00	0	0.00	771
		5	-3	-3	-3	-3.00	6	0.00	1453
		6	-3	-3	-3	-3.00	0	0.00	199
		7	-3	-3	-3	-3.00	2	0.00	551
		8	-3	-3	-3	-3.00	3	0.00	234
		9	-3	-3	-3	-3.00	0	0.00	524
		10	-3	-3	-3	-3.00	0	0.00	305
		11	-3	-3	-3	-3.00	8	0.00	433
Initial		1	-3	-3	-3	-3.00	5	0.00	63
		2	-3	-3	-3	0.00	5	3.00	106
		3	-3	-3	-3	-2.25	3	0.75	104
		4	-3	-3	-3	0.00	3	3.00	114
		5	-3	-3	-3	0.00	8	3.00	168
		6	-3	-3	-3	-3.00	0	0.00	22
		7	-10	-3	-3	-3.00	0	0.00	81
		8	-11	-3	-3	0.00	5	3.00	55
		9	-5	-3	-3	0.00	6	3.00	61
		10	-3	-3	-3	0.00	10	3.00	76
		11	-3	-3	-3	-3.00	3	0.00	81
Post		1	-3	-3	-3	-3.00	0	0.00	435
		2	-3	-3	-3	-3.00	3	0.00	713
		3	-3	-3	-3	-3.00	5	0.00	477
		4	-3	-3	-3	-3.00	3	0.00	1030
		5	-3	-3	-3	-3.00	6	0.00	1386
		6	-3	-3	-3	-3.00	0	0.00	176
		7	-3	-3	-3	-3.00	0	0.00	431
		8	-3	-3	-3	-3.00	3	0.00	341
		9	-3	-3	-3	-3.00	-3	0.00	365
		10	-3	-3	-3	-3.00	3	0.00	232
		11	-3	-3	-3	-3.00	3	0.00	434

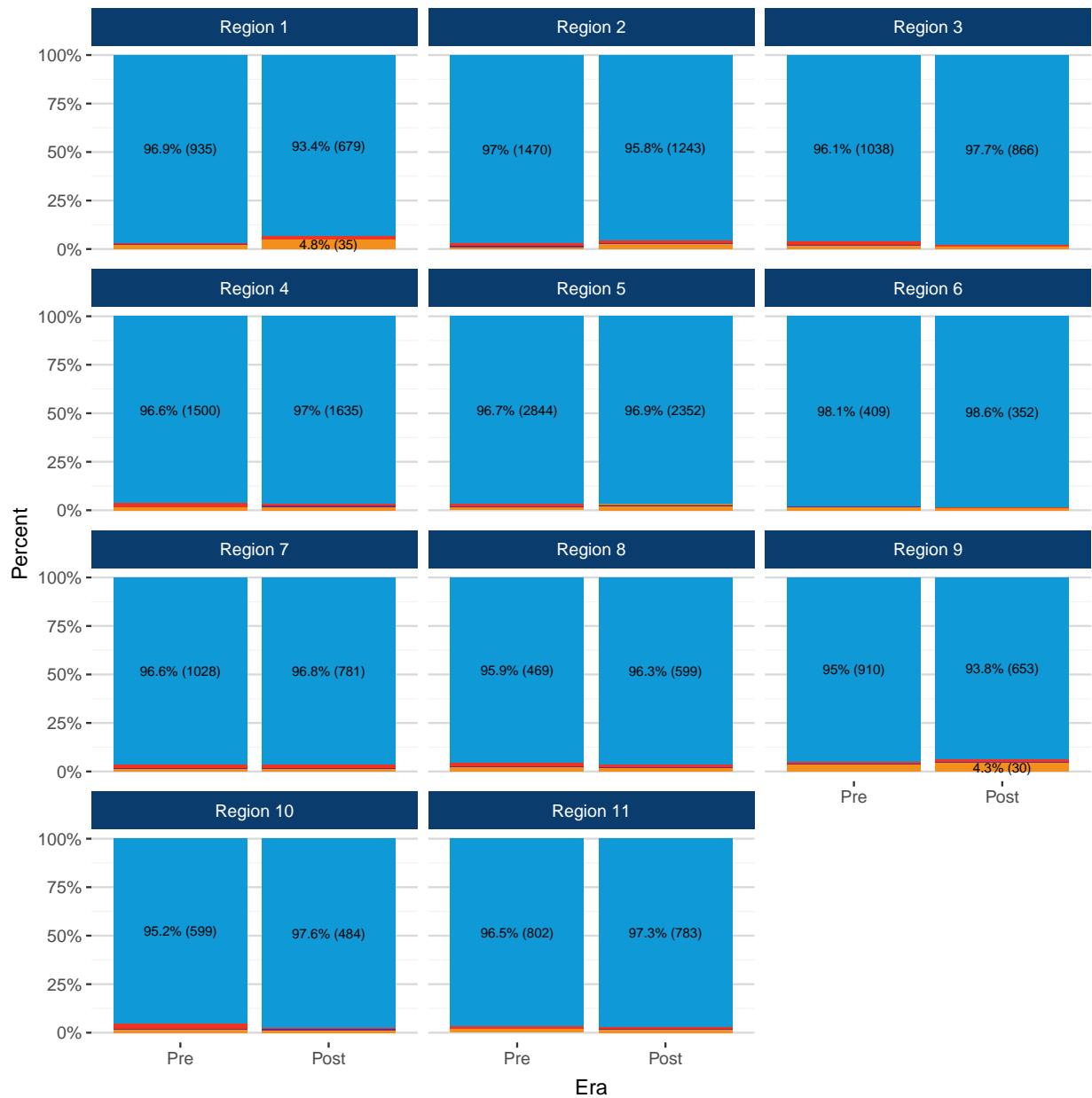
Initial and first extension HCC requests were excluded, since the policy-assigned score in these cases equals candidates' calculated MELD

**Appendix Figure 8. Initial Request Forms Submitted by OPTN Region, Case Outcome, and Era**



\*Label is omitted for outcome categories containing <4% of forms.

**Appendix Figure 9. Extension Request Forms Submitted by OPTN Region, Case Outcome, and Era**



Case Status

- Withdrawn after approval
- Denied
- Approved
- Withdrawn prior to decision
- Score assigned due to time limit

\*Label is omitted for outcome categories containing <4% of forms.

**Appendix Table 6. Initial and Extension Request Forms Submitted by OPTN Region, Case Outcome, and Era**

OPTN Region	Application Type	Case Outcome	Pre-Policy		Post-Policy	
			N	%	N	%
1	Initial	Approved	475	87.8%	480	82.9%
		Denied	55	10.2%	82	14.2%
		Withdrawn prior to decision	6	1.1%	8	1.4%
		Withdrawn after approval	5	0.9%	9	1.6%
	Extension	Approved	935	96.9%	679	93.4%
		Denied	4	0.4%	12	1.7%
		Withdrawn prior to decision	6	0.6%	1	0.1%
		Withdrawn after approval	20	2.1%	35	4.8%
		Approved	859	81.6%	875	81.5%
		Score assigned due to time limit	0	0.0%	1	0.1%
2	Initial	Denied	160	15.2%	166	15.5%
		Withdrawn prior to decision	26	2.5%	18	1.7%
		Withdrawn after approval	8	0.8%	14	1.3%
		Approved	1470	97%	1243	95.8%
	Extension	Score assigned due to time limit	1	0.1%	0	0.0%
		Denied	24	1.6%	19	1.5%
		Withdrawn prior to decision	8	0.5%	6	0.5%
		Withdrawn after approval	13	0.9%	30	2.3%
		Approved	801	79.5%	765	79.6%
		Score assigned due to time limit	1	0.1%	0	0.0%
3	Initial	Denied	184	18.3%	163	17%
		Withdrawn prior to decision	15	1.5%	17	1.8%
		Withdrawn after approval	7	0.7%	16	1.7%
		Approved	1038	96.1%	866	97.7%
	Extension	Denied	22	2%	8	0.9%
		Withdrawn prior to decision	2	0.2%	2	0.2%
		Withdrawn after approval	18	1.7%	10	1.1%
		Approved	1057	81.6%	1035	81.9%
		Denied	200	15.4%	185	14.6%
		Withdrawn prior to decision	28	2.2%	27	2.1%
4	Initial	Withdrawn after approval	10	0.8%	17	1.3%
		Approved	1500	96.6%	1635	97%
		Denied	29	1.9%	16	0.9%
		Withdrawn prior to decision	2	0.1%	8	0.5%
	Extension	Withdrawn after approval	22	1.4%	27	1.6%

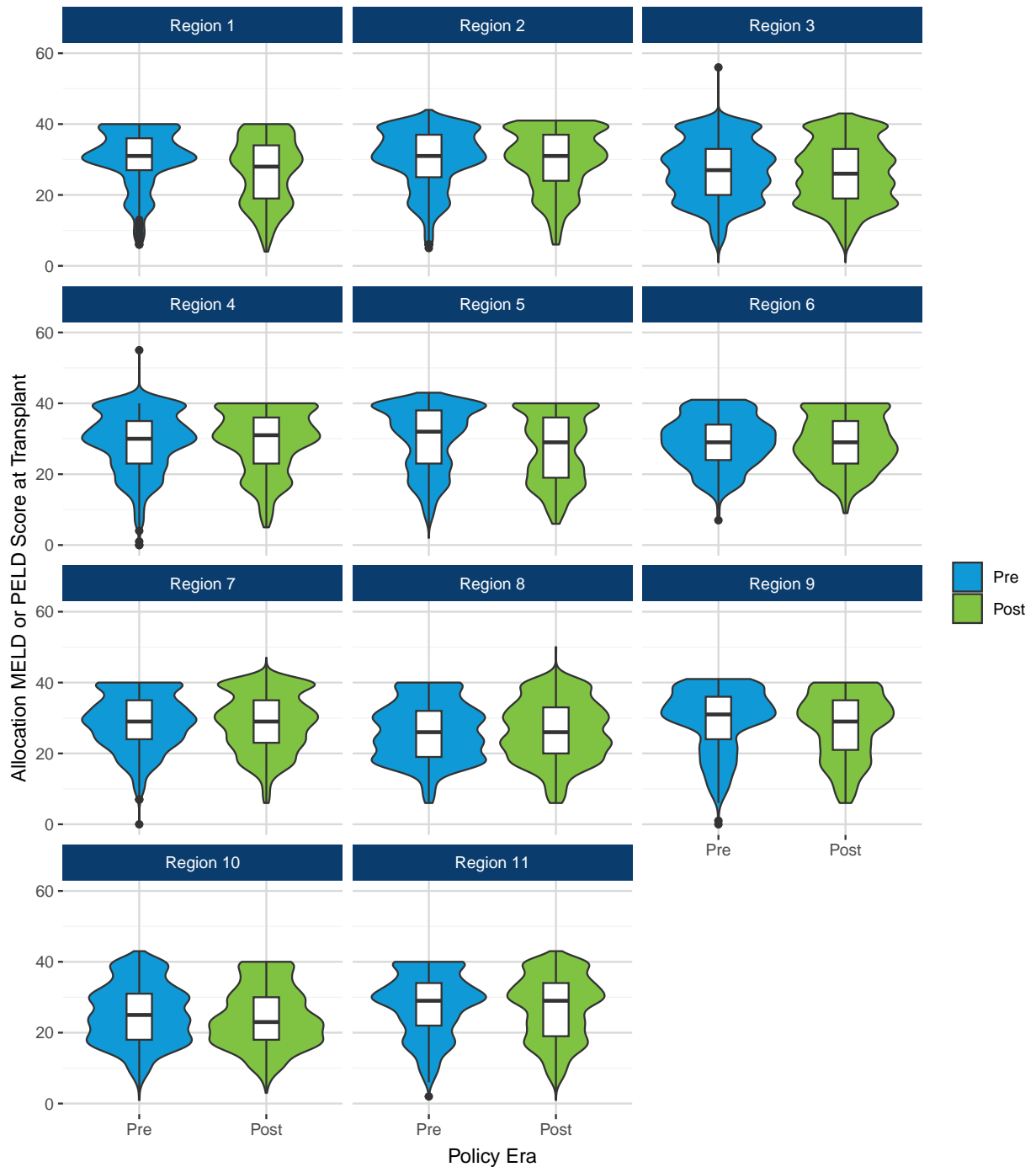
OPTN Region	Application Type	Case Outcome	Pre-Policy		Post-Policy	
			N	%	N	%
5	Initial	Approved	1945	84.3%	1819	82.2%
		Score assigned due to time limit	1	0%	3	0.1%
		Denied	303	13.1%	323	14.6%
		Withdrawn prior to decision	39	1.7%	48	2.2%
		Withdrawn after approval	18	0.8%	19	0.9%
	Extension	Approved	2844	96.7%	2352	96.9%
		Score assigned due to time limit	0	0.0%	1	0%
		Denied	43	1.5%	18	0.7%
		Withdrawn prior to decision	16	0.5%	4	0.2%
		Withdrawn after approval	39	1.3%	51	2.1%
6	Initial	Approved	283	81.3%	269	85.7%
		Denied	50	14.4%	32	10.2%
		Withdrawn prior to decision	14	4%	6	1.9%
		Withdrawn after approval	1	0.3%	7	2.2%
	Extension	Approved	409	98.1%	352	98.6%
		Denied	1	0.2%	1	0.3%
		Withdrawn prior to decision	1	0.2%	0	0.0%
		Withdrawn after approval	6	1.4%	4	1.1%
7	Initial	Approved	549	79.9%	615	79.2%
		Denied	120	17.5%	140	18%
		Withdrawn prior to decision	12	1.7%	11	1.4%
		Withdrawn after approval	6	0.9%	11	1.4%
	Extension	Approved	1028	96.6%	781	96.8%
		Denied	18	1.7%	12	1.5%
		Withdrawn prior to decision	4	0.4%	3	0.4%
		Withdrawn after approval	14	1.3%	11	1.4%
8	Initial	Approved	457	78.3%	540	79.2%
		Score assigned due to time limit	1	0.2%	0	0.0%
		Denied	114	19.5%	118	17.3%
		Withdrawn prior to decision	5	0.9%	16	2.3%
		Withdrawn after approval	7	1.2%	8	1.2%
	Extension	Approved	469	95.9%	599	96.3%
		Denied	7	1.4%	11	1.8%
		Withdrawn prior to decision	2	0.4%	1	0.2%
		Withdrawn after approval	11	2.2%	11	1.8%

OPTN Region	Application Type	Case Outcome	Pre-Policy		Post-Policy	
			N	%	N	%
9	Initial	Approved	629	78.3%	576	73.4%
		Denied	132	16.4%	153	19.5%
		Withdrawn prior to decision	23	2.9%	28	3.6%
		Withdrawn after approval	19	2.4%	28	3.6%
	Extension	Approved	910	95%	653	93.8%
		Denied	10	1%	9	1.3%
		Withdrawn prior to decision	5	0.5%	4	0.6%
		Withdrawn after approval	33	3.4%	30	4.3%
10	Initial	Approved	452	72.9%	494	74.4%
		Score assigned due to time limit	1	0.2%	0	0.0%
		Denied	152	24.5%	146	22%
		Withdrawn prior to decision	11	1.8%	14	2.1%
	Extension	Approved	599	95.2%	484	97.6%
		Denied	17	2.7%	4	0.8%
		Withdrawn prior to decision	4	0.6%	3	0.6%
		Withdrawn after approval	9	1.4%	5	1%
11	Initial	Approved	591	82.3%	669	82.2%
		Denied	106	14.8%	120	14.7%
		Withdrawn prior to decision	15	2.1%	14	1.7%
		Withdrawn after approval	6	0.8%	11	1.4%
	Extension	Approved	802	96.5%	783	97.3%
		Denied	11	1.3%	9	1.1%
		Withdrawn prior to decision	3	0.4%	1	0.1%
		Withdrawn after approval	15	1.8%	12	1.5%

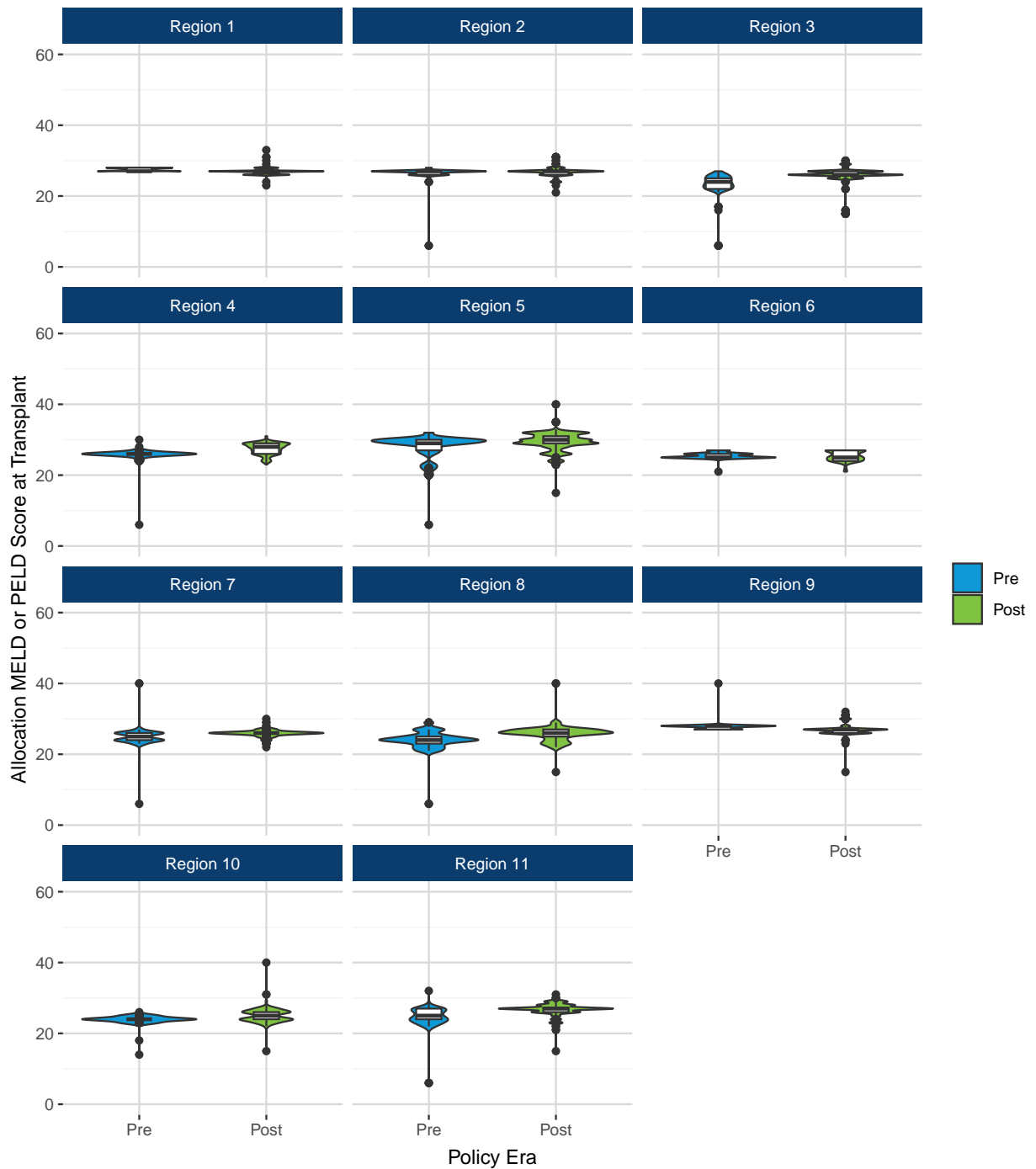


### Transplants

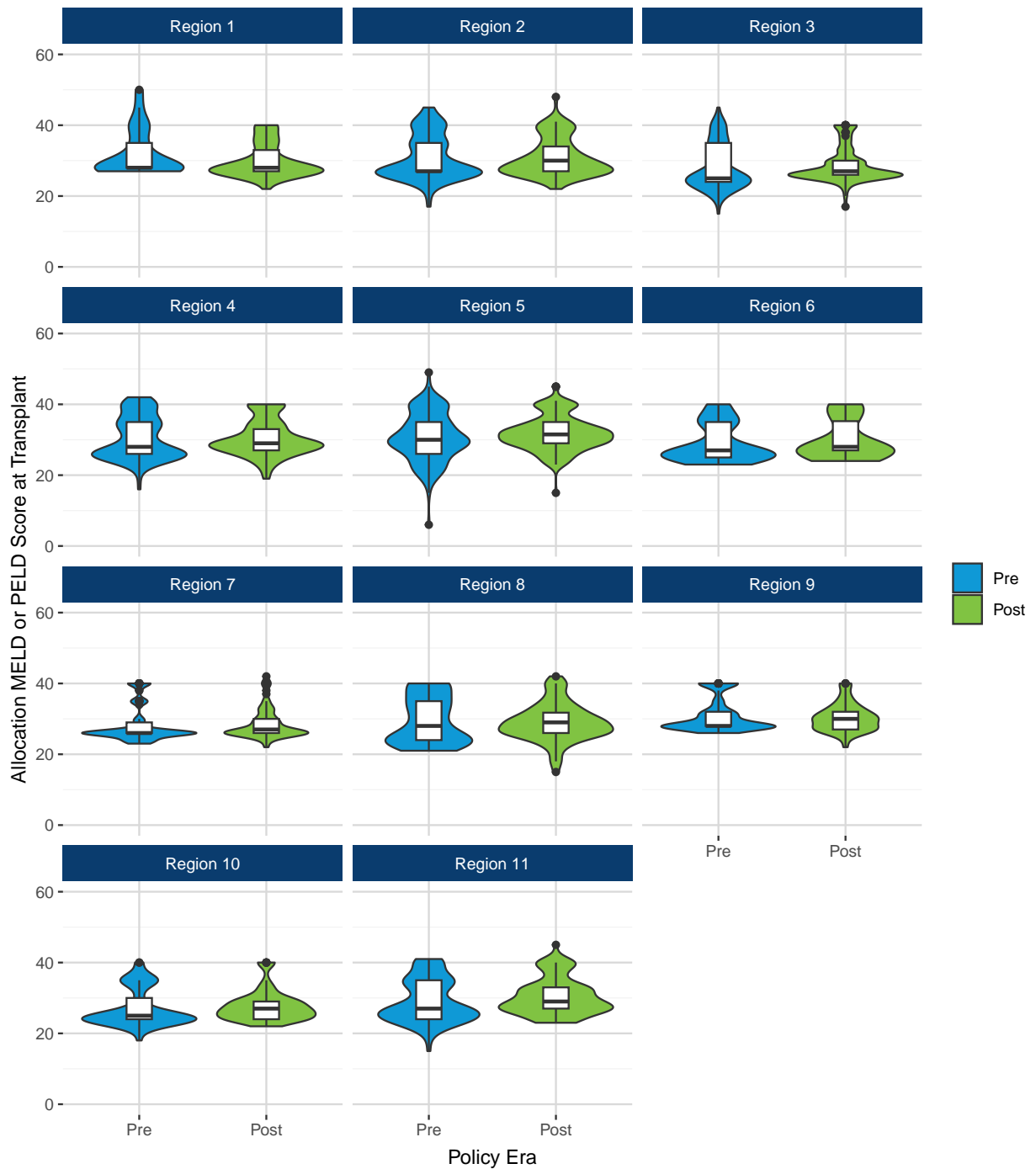
**Appendix Figure 10. Distribution of Allocation MELD or PELD Score or Status at Transplant for Liver-Alone Transplant Recipients with No Exceptions by OPTN Region and Era**



**Appendix Figure 11. Distribution of Allocation MELD or PELD Score or Status at Transplant for Liver-Alone Transplant Recipients with HCC Exceptions by OPTN Region and Era**



**Appendix Figure 12. Distribution of Allocation MELD or PELD Score or Status at Transplant for Liver-Alone Transplant Recipients with Non-HCC Exceptions by OPTN Region and Era**



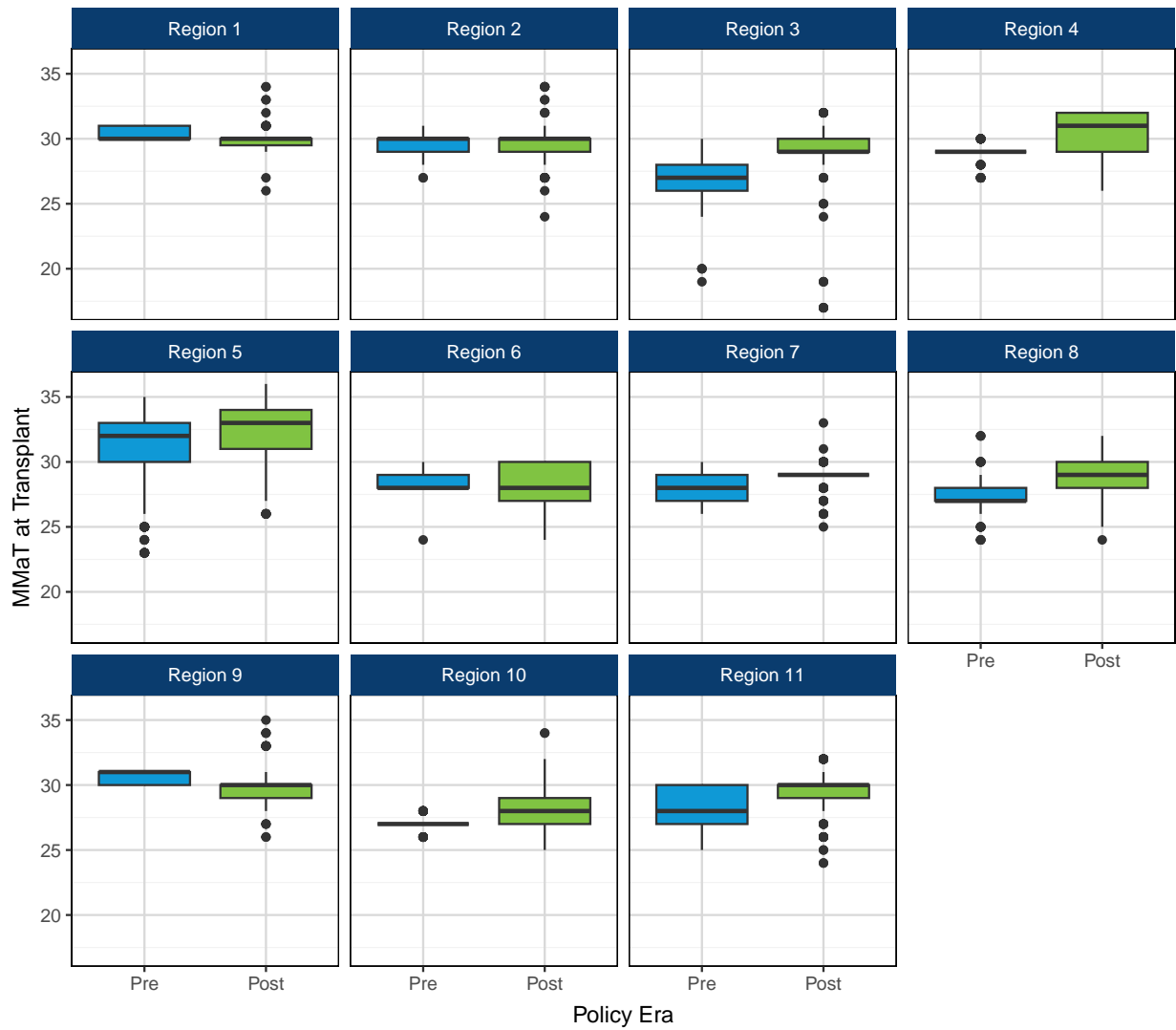
**Appendix Table 7. Distribution of Allocation MELD or PELD Score at Transplant by Exception Type, OPTN Region, and Era**

Exception Type	OPTN Region	Policy Era	N	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range
No Exception	1	Pre	441	-7	27.0	31.0	36.0	40	9.0
		Post	605	4	19.0	28.0	34.0	40	15.0
	2	Pre	1144	-9	25.0	31.0	37.0	44	12.0
		Post	1280	-6	24.0	31.0	37.0	41	13.0
	3	Pre	2042	-3	20.0	27.0	33.0	56	13.0
		Post	2342	-9	19.0	26.0	33.0	43	14.0
	4	Pre	1240	-9	23.0	30.0	35.0	55	12.0
		Post	1518	-4	23.0	31.0	36.0	40	13.0
	5	Pre	1820	-10	23.0	32.0	38.0	43	15.0
		Post	2299	-10	19.0	29.0	36.0	40	17.0
	6	Pre	333	7	24.0	29.0	34.0	41	10.0
		Post	426	-5	23.0	29.0	35.0	40	12.0
	7	Pre	966	-2	24.0	29.0	35.0	40	11.0
		Post	1114	-8	23.0	29.0	35.0	47	12.0
	8	Pre	783	6	19.0	26.0	32.0	40	13.0
		Post	830	-8	20.0	26.0	33.0	50	13.0
	9	Pre	838	-11	23.0	31.0	36.0	41	13.0
		Post	962	6	21.0	29.0	35.0	40	14.0
	10	Pre	989	-3	18.0	25.0	31.0	43	13.0
		Post	1316	-5	18.0	23.0	30.0	40	12.0
	11	Pre	1473	-9	22.0	29.0	34.0	40	12.0
		Post	1699	1	19.0	29.0	34.0	43	15.0
1	Pre	97	27	27.0	27.0	28.0	28	1.0	
	Post	99	23	26.5	27.0	27.0	33	0.5	
2	Pre	198	6	26.0	27.0	27.0	28	1.0	
	Post	205	21	26.0	27.0	27.0	31	1.0	
3	Pre	220	6	22.0	24.0	25.0	27	3.0	
	Post	222	15	26.0	26.0	27.0	30	1.0	
4	Pre	203	6	26.0	26.0	26.0	30	0.0	
	Post	239	23	26.0	28.0	29.0	31	3.0	
5	Pre	395	6	27.0	29.0	30.0	32	3.0	
	Post	438	15	29.0	30.0	31.0	40	2.0	
6	Pre	64	21	25.0	25.0	26.0	27	1.0	
	Post	80	21	24.0	25.0	27.0	27	3.0	
7	Pre	172	6	24.0	25.0	26.0	40	2.0	
	Post	161	22	26.0	26.0	26.0	30	0.0	
8	Pre	80	6	23.0	24.0	25.0	29	2.0	
	Post	121	15	25.0	26.0	27.0	40	2.0	
9	Pre	146	27	27.0	28.0	28.0	40	1.0	
	Post	169	15	26.0	27.0	27.0	32	1.0	
10	Pre	127	14	24.0	24.0	24.0	26	0.0	
	Post	112	15	24.0	25.0	26.0	40	2.0	
		Pre	169	6	24.0	25.0	27.0	32	3.0

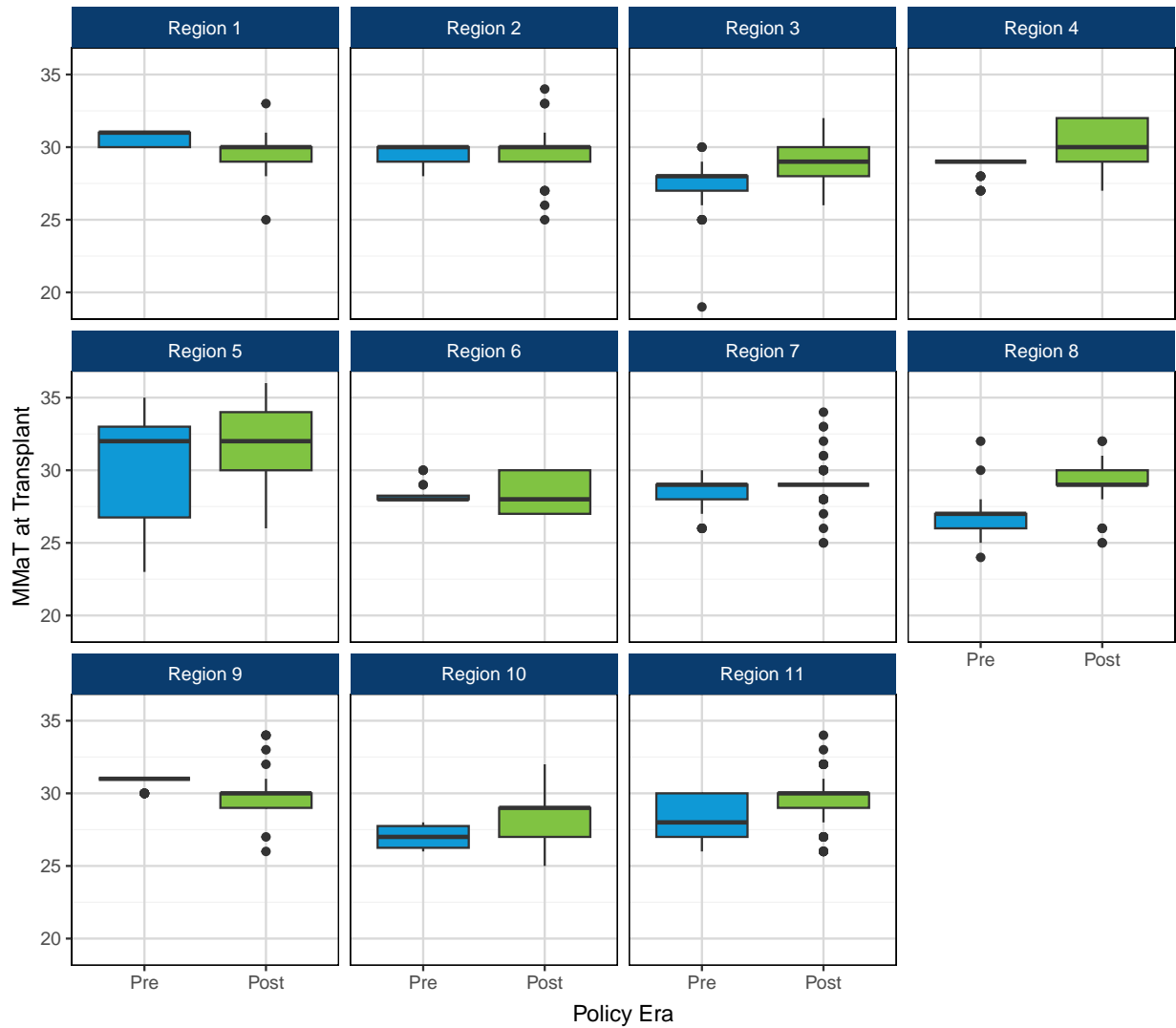
*(continued)*

Exception Type	OPTN Region	Policy Era	N	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range
Non-HCC Exception	11	Post	184	15	26.0	27.0	27.2	31	1.2
		Pre	23	27	28.0	28.0	35.0	50	7.0
	1	Post	51	22	27.0	28.0	33.0	40	6.0
		Pre	92	17	27.0	27.0	35.0	45	8.0
	2	Post	85	22	27.0	30.0	34.0	48	7.0
		Pre	103	15	24.0	25.0	35.0	45	11.0
	3	Post	99	17	26.0	27.0	30.0	40	4.0
		Pre	98	16	26.0	28.0	35.0	42	9.0
	4	Post	93	19	27.0	29.0	33.0	40	6.0
		Pre	144	6	26.0	30.0	35.0	49	9.0
	5	Post	220	15	29.0	31.5	35.0	45	6.0
		Pre	36	23	25.0	27.0	35.0	40	10.0
	6	Post	28	24	27.0	28.0	35.2	40	8.2
		Pre	97	23	26.0	26.0	29.0	40	3.0
	7	Post	121	22	26.0	27.0	30.0	42	4.0
		Pre	55	21	24.0	28.0	35.0	40	11.0
	8	Post	74	15	26.0	29.0	31.8	42	5.8
		Pre	70	26	28.0	28.0	32.8	65	4.8
	9	Post	79	22	27.0	30.0	32.0	40	5.0
		Pre	49	18	24.0	25.0	30.0	40	6.0
	10	Post	70	22	24.0	27.0	29.0	40	5.0
		Pre	91	15	24.0	27.0	35.0	41	11.0
11	Post	107	23	27.0	29.0	33.0	45	6.0	

**Appendix Figure 13. Distribution of Median MELD at Transplant (MMaT) at Time of Transplant for Adult Liver-Alone Transplant Recipients who were Transplanted with HCC Exceptions by OPTN Region and Era.**



**Appendix Figure 14. Distribution of Median MELD at Transplant (MMaT) at Time of Transplant for Adult Liver-Alone Transplant Recipients who were Transplanted with Non-HCC Exceptions by OPTN Region and Era.**



**Appendix Table 8. Distribution of Median MELD at Transplant (MMaT) at Time of Transplant for Adult Liver-Along Transplant Recipients Transplanted with Exceptions by OPTN Region and Era.**

Exception Type	OPTN Region	Policy Era	N	Minimum	25th Percentile	Median	75th Percentile	Maximum	Interquartile Range
HCC Exception	1	Pre	97	30	30.0	30	31.0	31	1.0
		Post	99	26	29.5	30	30.0	34	0.5
	2	Pre	198	27	29.0	30	30.0	31	1.0
		Post	205	24	29.0	30	30.0	34	1.0
	3	Pre	220	19	26.0	27	28.0	30	2.0
		Post	222	17	29.0	29	30.0	32	1.0
	4	Pre	203	27	29.0	29	29.0	30	0.0
		Post	239	26	29.0	31	32.0	32	3.0
	5	Pre	395	23	30.0	32	33.0	35	3.0
		Post	436	26	31.0	33	34.0	36	3.0
	6	Pre	64	24	28.0	28	29.0	30	1.0
		Post	80	24	27.0	28	30.0	30	3.0
	7	Pre	170	26	27.0	28	29.0	30	2.0
		Post	161	25	29.0	29	29.0	33	0.0
	8	Pre	80	24	27.0	27	28.0	32	1.0
		Post	119	24	28.0	29	30.0	32	2.0
	9	Pre	145	30	30.0	31	31.0	31	1.0
		Post	169	26	29.0	30	30.0	35	1.0
	10	Pre	127	26	27.0	27	27.0	28	0.0
		Post	111	25	27.0	28	29.0	34	2.0
	11	Pre	168	25	27.0	28	30.0	30	3.0
		Post	184	24	29.0	30	30.0	32	1.0
Non-HCC Exception	1	Pre	16	30	30.0	31	31.0	31	1.0
		Post	40	25	29.0	30	30.0	33	1.0
	2	Pre	55	28	29.0	30	30.0	30	1.0
		Post	65	25	29.0	30	30.0	34	1.0
	3	Pre	76	19	27.0	28	28.0	30	1.0
		Post	80	26	28.0	29	30.0	32	2.0
	4	Pre	57	27	29.0	29	29.0	29	0.0
		Post	55	27	29.0	30	32.0	32	3.0
	5	Pre	99	23	26.8	32	33.0	35	6.2
		Post	160	26	30.0	32	34.0	36	4.0
	6	Pre	25	28	28.0	28	28.2	30	0.2
		Post	19	27	27.0	28	30.0	30	3.0
	7	Pre	77	26	28.0	29	29.0	30	1.0
		Post	97	25	29.0	29	29.0	34	0.0
	8	Pre	32	24	26.0	27	27.0	32	1.0
		Post	41	25	29.0	29	30.0	32	1.0
	9	Pre	54	30	31.0	31	31.0	31	0.0
		Post	53	26	29.0	30	30.0	34	1.0
	10	Pre	34	26	26.2	27	27.8	28	1.5
		Post	59	25	27.0	29	29.0	32	2.0
	11	Pre	55	26	27.0	28	30.0	30	3.0
		Post	66	26	29.0	30	30.0	34	1.0