

OPTN Data Advisory Committee

Descriptive Data Request

## Update to Refusal Codes Nine-Month Post-Implementation Monitoring Report

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## Background/Purpose

In response to feedback received from the transplant community, and at the recommendation of the OPTN Ad Hoc Systems Performance Committee, the OPTN Data Advisory Committee (DAC) updated the list of options under the primary refusal and secondary refusal reason code drop downs in the offer details form section of the OPTN Donor Data System. Last revised in 2004, the new proposed list of refusal codes has incorporated multiple rounds of feedback received from various stakeholder groups, OPTN committees, and the larger transplant community between 2019-2021. The updated list intends to further the strategic priority of increasing donor and recipient matching by improving the refusal reason data used for quality improvement, retrospective reviews, and real-time decision making. By providing more relevant and granular options, the insights gathered will be more actionable and improve upon the current list by reducing the over-utilization of the refusal code “donor age or quality”. That refusal code accounted for 66% of the primary refusal reasons entered between July 2019 and June 2020. These revisions did not change or add data collection, but provide a revised list of options that are more relevant, discrete, and mutually exclusive. A crosswalk between previously used and new refusal codes is provided in Figure 1.

## Strategic Plan Goal or Committee Project Addressed

Increase the number of transplants by efficient donor/recipient matching.

## Committee Request

The OPTN will analyze data beginning at three months after implementation of the new refusal codes, allowing for two months of data with the first review. In order to facilitate monthly updates, the results will be provided to the committee via a standard report or dashboard for two years, with a presentation of updated results to the committee quarterly for the first year and a final report presentation at the end of year two.

The first two items below will be provided overall, by match organ type, size of program (small, medium, large) as defined by transplant volume in calendar year 2020, and relative location on match run. Stratification of location on match run will be done by match organ type, and before or after the 90th percentile for rank of acceptances in calendar year 2020 for that organ type. The analysis will include:

- The percentage of patient-specific refusals by reason, to identify any code not being used or making up an unexpectedly high proportion of the total (suggesting that it has become a new, nonspecific catch-all code).
- Limited to range refusals (center refusing for multiple patients at same time), the percentage by reason to identify any code making up an unexpectedly high proportion of the total (suggesting that it has become a new, nonspecific catch-all code).
- A review of the cases (stratified only by match organ) where the “other, specify” text field was used, to identify any manually-entered reasons not currently in the list and making up a significant proportion of the total. This will potentially identify additional codes needing to be added to the updated list. Due to the manual effort required, this portion of the analysis will be updated quarterly during the first year, and once in year two of implementation.

Additionally, UNOS staff will provide feedback on questions received from members related to the new refusal codes.

Figure 1: A high-level overview of the changes to refusal codes that were approved by the OPTN Board of Directors in June 2021. This serves as a crosswalk between previously used and new refusal codes available to transplant hospitals

PREVIOUS REFUSAL CODE	NEW REFUSAL CODE
800 - Patient's condition improved, transplant not needed	722 - Candidate's condition improved, transplant not needed
801 - Patient ill, unavailable, refused, or temporarily unsuitable	720 - Candidate temporarily medically unsuitable 727 - Candidate unavailable 728 - Candidate refused
802 - Multiple organ transplant or different laterality is required	723 - Candidate requires different laterality 724 - Candidate requires multiple organ transplant
803 - Patient txed, tx in progress, or other offer being considered	721 - Candidate transplanted or pending transplant
810 - Positive crossmatch 813 - Unacceptable Antigens	732 - Positive physical crossmatch 733 - Positive virtual crossmatch/unacceptable antigens
811 - Number of HLA mismatches unacceptable	734 - Number of HLA mismatches unacceptable
812 - No serum for crossmatching	730 - No candidate serum for crossmatching 731 - No donor cells/specimen for crossmatching, or no time for crossmatch
814 - High PRA 815 - High CPRA	Removed
820 - Heavy workload 823 - Surgeon unavailable 825 - Operational – transplant center	760 - Resource time constraint (OPO, TXC, donor hospital, etc.) 762 - Recovery team availability 763 - Transplant team or transplant facility availability
822 - Exceeded one hour response time 826 - Exceeded 30 minute evaluation time	765 - Exceeded policy defined response time
824 - Distance to travel or ship	712 - Actual or projected cold ischemic time too long
830 - Donor age or quality	700 - Donor age 713 - Warm ischemic time too long 750 - Donor medical history, specify* 751 - Donor instability/high vasopressor usage 752 - Prolonged downtime/CPR 754 - VCA graft appearance or quality, specify**

831 - Donor size/weight	701 - Organ size, specify**
832 - Donor ABO	Removed
833 - Donor social history	740 - PHS risk criteria or social history
834 - Positive serological tests	742 - Donor infection or positive culture 741 - Positive infectious disease screening test: CMV, HBV, HCV, etc.
835 - Organ Preservation	710 - Organ preservation: Unacceptable method or findings
836 - Organ anatomical damage or defect	711 - Organ anatomical damage or defect 715 - Biopsy results unacceptable
837 - Organ-specific donor issue	714 - Biopsy not available 716 - Organ specific test results not available, specify** 717 - Unacceptable organ specific test results, specify* 743 - Malignancy or suspected malignancy
840 - COVID-19: candidate-related reason	725 - Epidemic/Pandemic - Candidate
841 - COVID-19: donor-related reason	744 - Epidemic/Pandemic - Donor
842 - COVID-19: OPO or transplant hospital operational issue	763 - Transplant team or transplant facility availability
860 - Medical urgency of another potential recipient	Removed
880 - Kidney placed with extra-renal	Removed
898 - Other Specify	798 - Other Specify* Note: 799 - Other Specify* is the replacement Other Specify for bypasses. 898 previously served as both the refusal and bypass code.
New Codes	726 - Candidate temporarily ineligible due to insurance or financial issue 753 - DCD donor neurological function/not expected to arrest 761 - Donor family time constraint 764 - Transportation availability 790 - Disaster Emergency Management

## Data and Methods

These analyses use OPTN potential transplant recipient (PTR) match run data and include roughly 274 days before and after implementation on December 2, 2021, at 7:59:53 AM. Transplant candidate organ offers between March 03, 2021 and December 02, 2021 (pre) or between December 02, 2021 and September 02, 2022 (post) on matches with at least one final acceptance were used.

Only offers prior to the final acceptor with a refusal were included, and organ offers that were bypassed or provisional yes at the close of the match were excluded. Note that offers for candidates on heart-alone organ matches and heart-lung organ matches were combined to heart-lung match organ type, since heart-alone matches are only run if no viable lungs are available from the donor.

Figures present top reasons for refusal of organ offers, and the associated tables are given either in the Results section or at the end of the report in the Appendix. Figure colors represent the broader category describing types of refusal reasons.

Analyses are based on OPTN data as of December 02, 2022 and are subject to change based on future data submission or correction.

## Results

### Pre-implementation Review

Prior to the policy change, the most frequently used reason for refusal of an organ offer across all organs, excluding intestine, was **'Donor age or quality'**. This refusal reason accounted for over 60% of refused offers for kidney and liver match runs, over 55% of refused offers for lung and kidney-pancreas, almost 50% of heart-lung, and 15% of intestine match runs. Effective March 25, 2020, three new refusal codes were established to document refusal of an organ offer for a transplant candidate for COVID-19-related reasons:

- 840: COVID-19 candidate-related reason
- 841: COVID-19 donor-related reason
- 842: COVID-19 OPO or transplant hospital operational issue

The second of these became one of the top 5 reasons for refusal for **kidney** match offers prior to implementation of the new list of refusal codes. Organ preservation, distance to ship, other organ-specific donor issues, donor size/weight, and patient ill, unavailable, refused, or temporarily unsuitable were among the other top reasons across organs prior to the policy change.

Table 1: Top five reasons for refusal of organ offers for transplant candidates prior to implementation by match organ type, March, 03, 2021 - December, 02, 2021

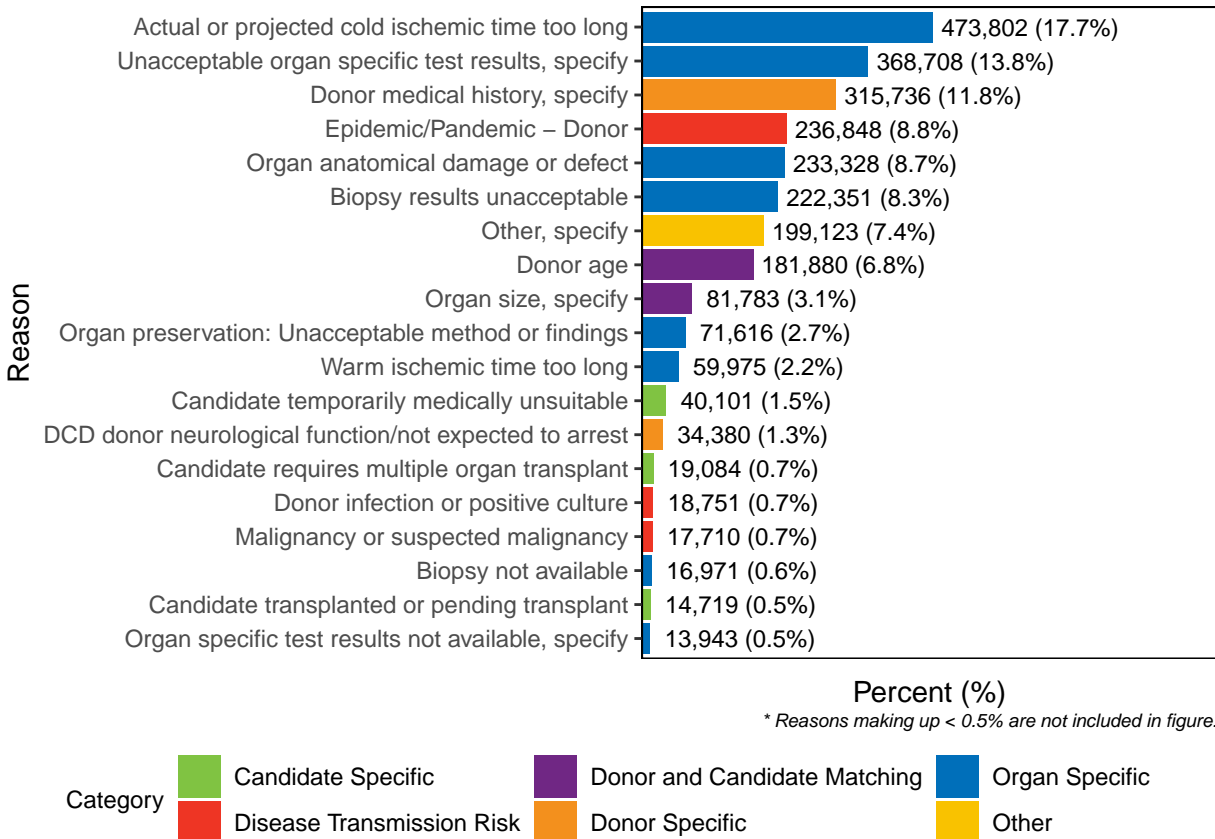
Refusal Reason	N Offers	% Offers per Organ
<b>Kidney match organ</b>		
Donor age or quality	1,337,013	67.2%
Organ Preservation	164,446	8.3%
Organ-specific donor issue	126,053	6.3%
COVID-19: donor-related reason	113,261	5.7%
Organ anatomical damage or defect	73,763	3.7%
<b>Liver match organ</b>		
Donor age or quality	159,533	65.6%
Donor size/weight	20,143	8.3%
Other Specify	9,684	4.0%
Distance to travel or ship	9,477	3.9%
Patient ill, unavailable, refused, or temporarily unsuitable	9,399	3.9%
<b>Heart-Lung match organ</b>		
Donor age or quality	23,912	45.5%
Donor size/weight	14,275	27.2%
Distance to travel or ship	2,768	5.3%
Patient txed, tx in progress, or other offer being considered	2,093	4.0%
Organ-specific donor issue	1,789	3.4%
<b>Lung match organ</b>		
Donor age or quality	22,517	59.2%
Donor size/weight	6,763	17.8%
Multiple organ transplant or different laterality is required	2,910	7.6%
Organ-specific donor issue	1,715	4.5%
Other Specify	1,384	3.6%
<b>Kidney-Pancreas match organ</b>		
Donor age or quality	5,201	56.5%
Multiple organ transplant or different laterality is required	1,242	13.5%
Distance to travel or ship	681	7.4%
Patient ill, unavailable, refused, or temporarily unsuitable	560	6.1%
Donor size/weight	279	3.0%
<b>Intestine match organ</b>		
Multiple organ transplant or different laterality is required	503	64.7%
Donor age or quality	147	18.9%
Number of HLA mismatches unacceptable	40	5.1%
Donor size/weight	38	4.9%
Patient ill, unavailable, refused, or temporarily unsuitable	20	2.6%

## Patient-specific Refusals by Reason

### Overall

Since the implementation of the new codes, the most frequently used reason for refusal of an organ offer for a transplant candidate has been 'Actual or projected cold ischemic time too long' (17.7%) followed by 'Unacceptable organ specific test results, specify' (13.8%). Interestingly, among COVID-19 related refusal reasons, 'Epidemic/Pandemic - Donor', 'Epidemic/Pandemic - Candidate' and 'Disaster Emergency Management Consideration' have been used for refusal of 236,848 (8.8%), 3,225 (0.1%) and 275 (0.01%) organ offers for a transplant candidate, respectively.

Figure 2: Reasons for refusal of an organ offer for a transplant candidate post-implementation, all match organs, December 02, 2021 - September 02, 2022



**By Organ**

Figure 3: Percentage of Covid-19 refusal codes among all codes December 02, 2021 - September 02, 2022, by organ.

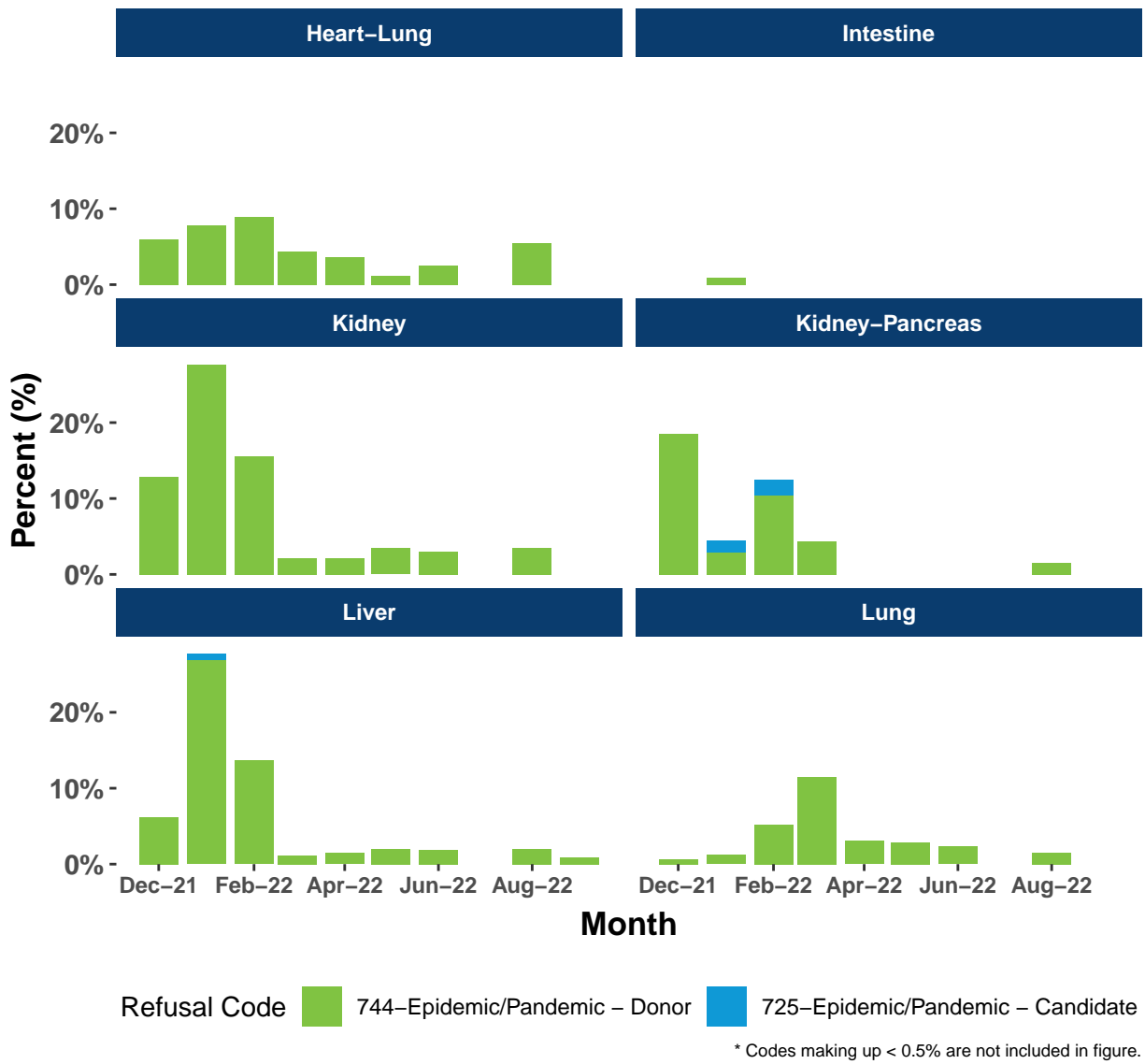




Figure 4: Top ten reasons for refusal of kidney match organ offers for transplant candidates post implementation, for kidney matches submitted December 02, 2021 - September 02, 2022.

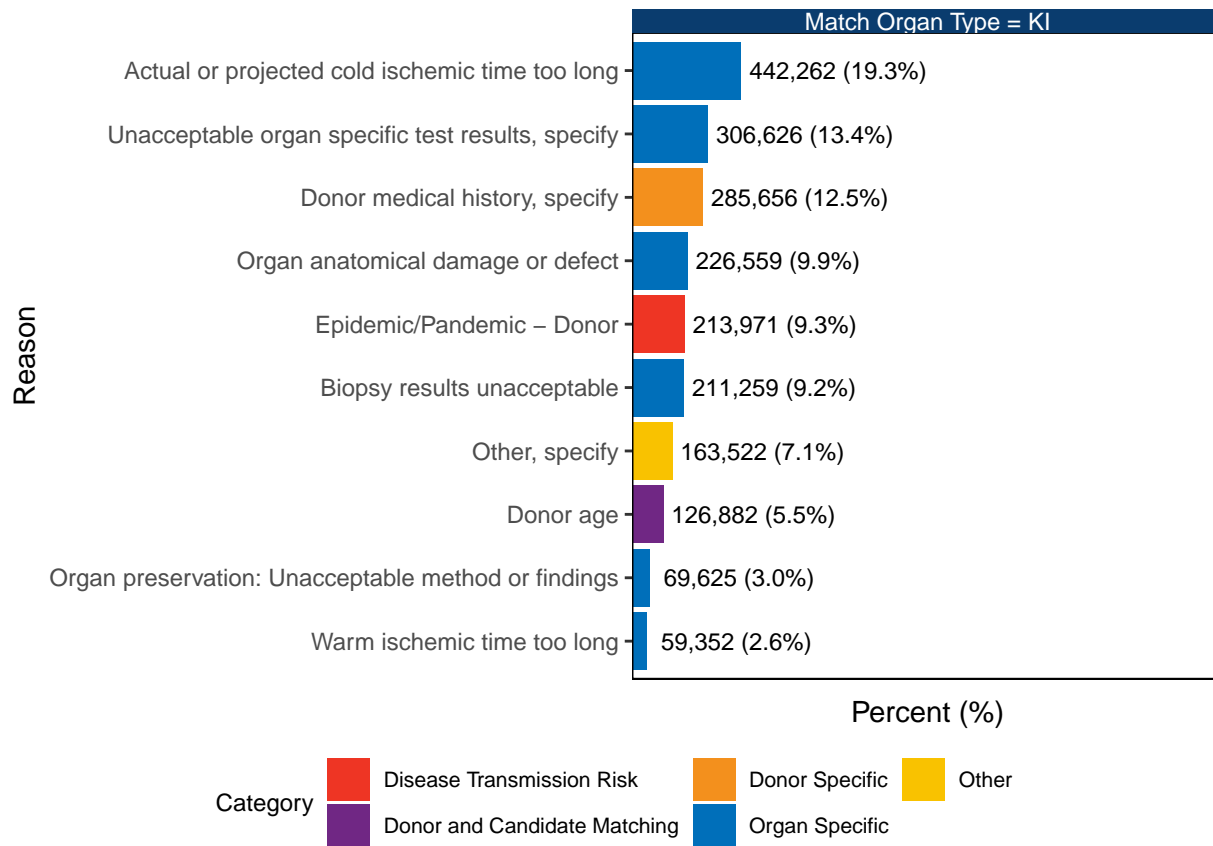


Table 2: Count and percent of reasons for refusal of kidney match organ offers post implementation, for kidney matches submitted December 02, 2021 - September 02, 2022

Category	Description	N	%
<b>Kidney</b>			
Organ Specific	Actual or projected cold ischemic time too long	442,262	19.29%
Organ Specific	Unacceptable organ specific test results, specify	306,626	13.37%
Donor Specific	Donor medical history, specify	285,656	12.46%
Organ Specific	Organ anatomical damage or defect	226,559	9.88%
Disease Transmission Risk	Epidemic/Pandemic - Donor	213,971	9.33%
Organ Specific	Biopsy results unacceptable	211,259	9.21%
Other	Other, specify	163,522	7.13%
Donor and Candidate Matching	Donor age	126,882	5.53%
Organ Specific	Organ preservation: Unacceptable method or findings	69,625	3.04%
Organ Specific	Warm ischemic time too long	59,352	2.59%
Donor and Candidate Matching	Organ size, specify	33,096	1.44%
Candidate Specific	Candidate temporarily medically unsuitable	28,894	1.26%
Disease Transmission Risk	Donor infection or positive culture	16,888	0.74%
Organ Specific	Biopsy not available	16,136	0.70%
Disease Transmission Risk	Malignancy or suspected malignancy	15,234	0.66%
Candidate Specific	Candidate requires multiple organ transplant	11,857	0.52%
Donor Specific	DCD donor neurological function/not expected to arrest	11,737	0.51%
Organ Specific	Organ specific test results not available, specify	11,562	0.50%
Disease Transmission Risk	Positive infectious disease screening test: CMV, HBV, HCV, etc.	6,937	0.30%
Disease Transmission Risk	PHS risk criteria or social history	5,277	0.23%
Histocompatibility Related	Positive virtual crossmatch/unacceptable antigens	4,080	0.18%
Histocompatibility Related	No candidate serum for crossmatching	4,020	0.18%
Candidate Specific	Candidate transplanted or pending transplant	3,887	0.17%
Candidate Specific	Candidate refused	2,759	0.12%
Candidate Specific	Epidemic/Pandemic - Candidate	2,455	0.11%
Donor Specific	Donor instability/high vasopressor usage	2,201	0.10%
Candidate Specific	Candidate unavailable	1,858	0.08%
Donor Specific	Prolonged downtime/CPR	1,765	0.08%
Logistics	Transplant team or transplant facility availability	1,604	0.07%
Histocompatibility Related	Positive physical crossmatch	1,431	0.06%
Candidate Specific	Candidate temporarily ineligible due to insurance or financial issue	900	0.04%
Logistics	Resource time constraint (OPO, TXC, donor hospital, etc.)	794	0.03%
Histocompatibility Related	Number of HLA mismatches unacceptable	776	0.03%
Logistics	Exceeded policy defined response time	307	0.01%
Histocompatibility Related	No donor cells/specimen for crossmatching, or no time for crossmatch	284	0.01%
Other	Disaster Emergency Management Consideration	240	0.01%
Candidate Specific	Candidate requires different laterality	186	0.01%
Logistics	Transportation availability	144	0.01%
Candidate Specific	Candidate's condition improved, transplant not needed	51	0.00%
Logistics	Recovery team availability	42	0.00%
Logistics	Donor family time constraint	1	0.00%

Figure 5: Top ten reasons for refusal of liver match organ offers for transplant candidates post implementation, for liver matches submitted December 02, 2021 - September 02, 2022.

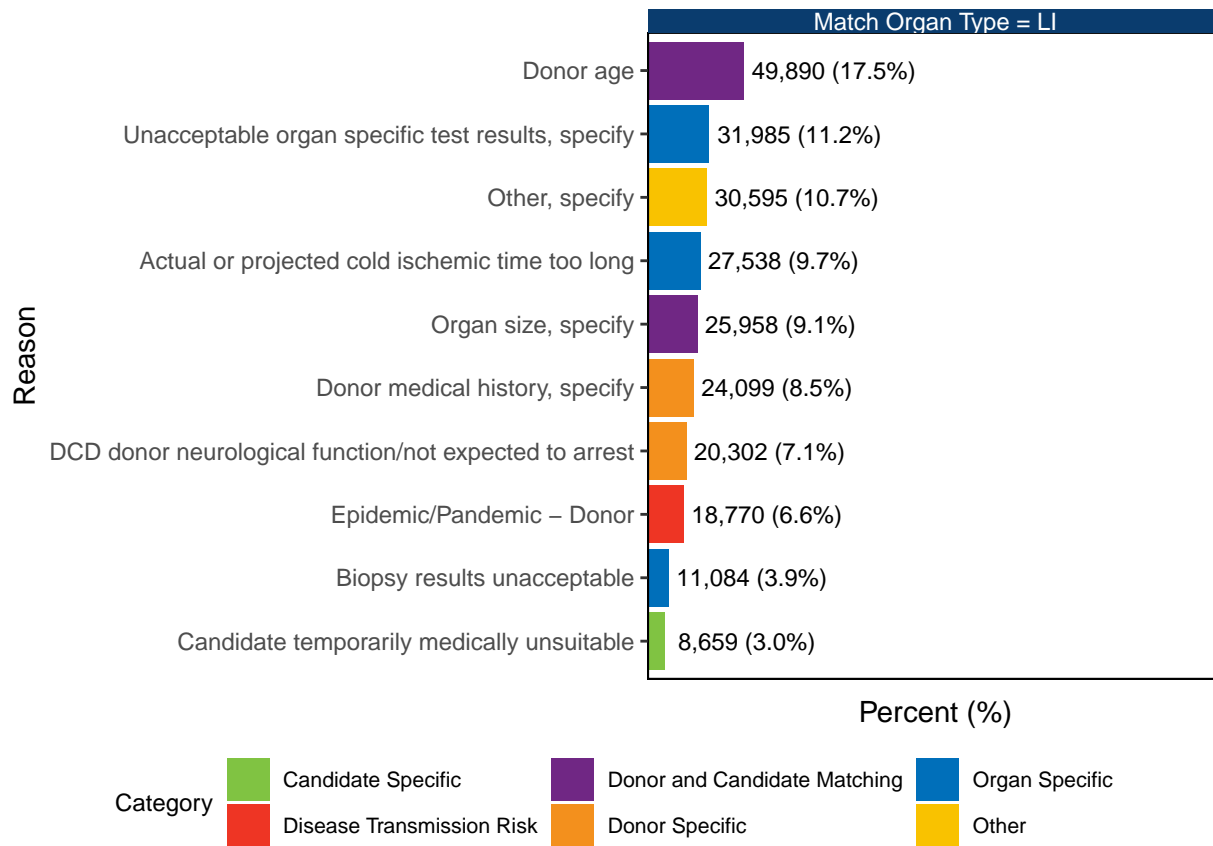


Table 3: Count and percent of reasons for refusal of liver match organ offers post implementation, for liver matches submitted December 02, 2021 - September 02, 2022

Category	Description	N	%
<b>Liver</b>			
Donor and Candidate Matching	Donor age	49,890	17.50%
Organ Specific	Unacceptable organ specific test results, specify	31,985	11.22%
Other	Other, specify	30,595	10.73%
Organ Specific	Actual or projected cold ischemic time too long	27,538	9.66%
Donor and Candidate Matching	Organ size, specify	25,958	9.10%
Donor Specific	Donor medical history, specify	24,099	8.45%
Donor Specific	DCD donor neurological function/not expected to arrest	20,302	7.12%
Disease Transmission Risk	Epidemic/Pandemic - Donor	18,770	6.58%
Organ Specific	Biopsy results unacceptable	11,084	3.89%
Candidate Specific	Candidate temporarily medically unsuitable	8,659	3.04%
Candidate Specific	Candidate transplanted or pending transplant	7,969	2.79%
Organ Specific	Organ anatomical damage or defect	4,207	1.48%
Candidate Specific	Candidate requires multiple organ transplant	3,714	1.30%
Disease Transmission Risk	Malignancy or suspected malignancy	2,331	0.82%
Disease Transmission Risk	Positive infectious disease screening test: CMV, HBV, HCV, etc.	2,246	0.79%
Logistics	Resource time constraint (OPO, TXC, donor hospital, etc.)	2,039	0.72%
Organ Specific	Organ preservation: Unacceptable method or findings	1,655	0.58%
Organ Specific	Organ specific test results not available, specify	1,523	0.53%
Donor Specific	Donor instability/high vasopressor usage	1,469	0.52%
Disease Transmission Risk	Donor infection or positive culture	1,368	0.48%
Candidate Specific	Candidate unavailable	1,209	0.42%
Disease Transmission Risk	PHS risk criteria or social history	1,092	0.38%
Donor Specific	Prolonged downtime/CPR	847	0.30%
Organ Specific	Biopsy not available	828	0.29%
Logistics	Donor family time constraint	599	0.21%
Candidate Specific	Epidemic/Pandemic - Candidate	577	0.20%
Organ Specific	Warm ischemic time too long	486	0.17%
Candidate Specific	Candidate's condition improved, transplant not needed	479	0.17%
Logistics	Transplant team or transplant facility availability	412	0.14%
Candidate Specific	Candidate refused	363	0.13%
Logistics	Exceeded policy defined response time	340	0.12%
Candidate Specific	Candidate temporarily ineligible due to insurance or financial issue	117	0.04%
Histocompatibility Related	Positive virtual crossmatch/unacceptable antigens	113	0.04%
Logistics	Transportation availability	103	0.04%
Histocompatibility Related	Number of HLA mismatches unacceptable	77	0.03%
Logistics	Recovery team availability	68	0.02%
Other	Disaster Emergency Management Consideration	32	0.01%
Histocompatibility Related	No donor cells/specimen for crossmatching, or no time for crossmatch	10	0.00%
Histocompatibility Related	Positive physical crossmatch	8	0.00%

Figure 6: Top ten reasons for refusal of heart and heart-lung match organ offers for transplant candidates post implementation, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022.

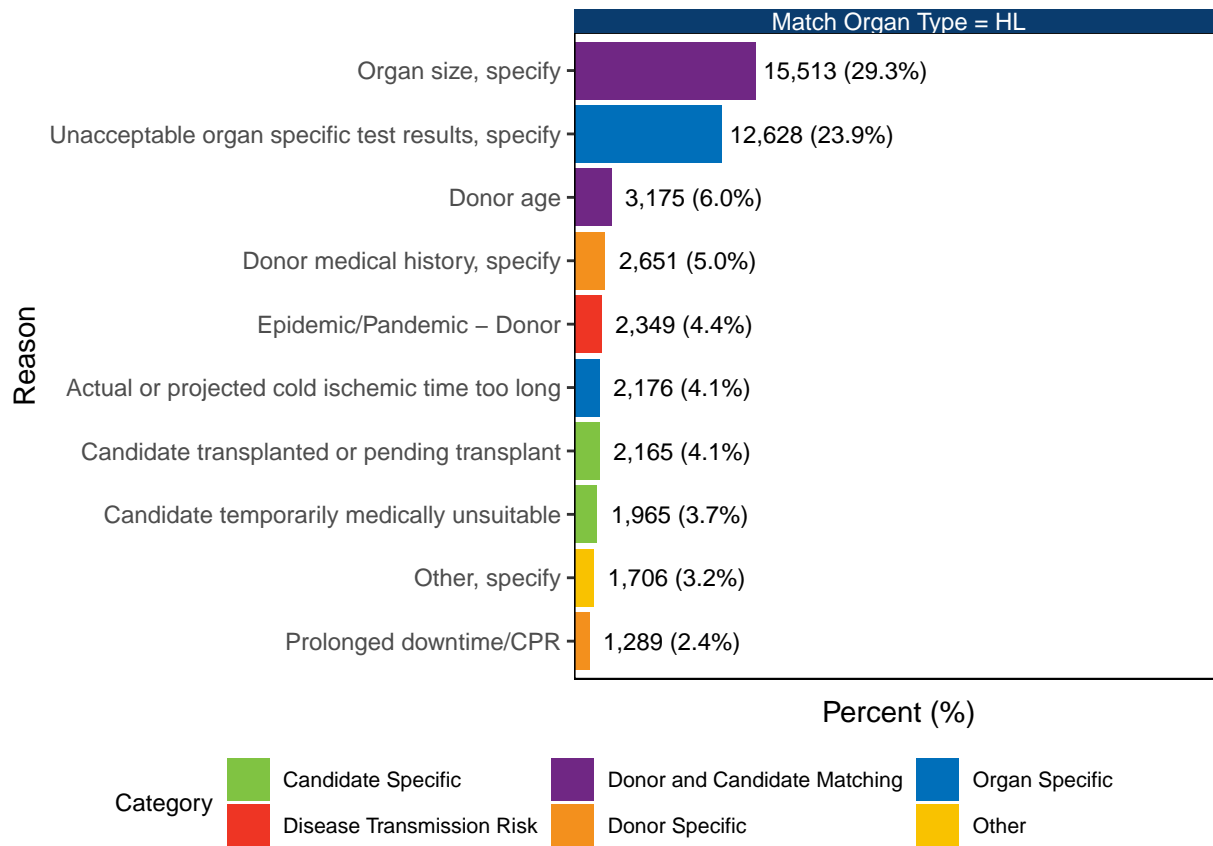


Table 4: Count and percent of reasons for refusal of heart and heart-lung match organ offers post implementation, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022

Category	Description	N	%
<b>Heart-Lung</b>			
Donor and Candidate Matching	Organ size, specify	15,513	29.30%
Organ Specific	Unacceptable organ specific test results, specify	12,628	23.85%
Donor and Candidate Matching	Donor age	3,175	6.00%
Donor Specific	Donor medical history, specify	2,651	5.01%
Disease Transmission Risk	Epidemic/Pandemic - Donor	2,349	4.44%
Organ Specific	Actual or projected cold ischemic time too long	2,176	4.11%
Candidate Specific	Candidate transplanted or pending transplant	2,165	4.09%
Candidate Specific	Candidate temporarily medically unsuitable	1,965	3.71%
Other	Other, specify	1,706	3.22%
Donor Specific	Prolonged downtime/CPR	1,289	2.43%
Organ Specific	Organ anatomical damage or defect	1,261	2.38%
Candidate Specific	Candidate requires multiple organ transplant	1,132	2.14%
Donor Specific	DCD donor neurological function/not expected to arrest	1,023	1.93%
Histocompatibility Related	Positive virtual crossmatch/unacceptable antigens	661	1.25%
Disease Transmission Risk	PHS risk criteria or social history	545	1.03%
Organ Specific	Organ specific test results not available, specify	432	0.82%
Disease Transmission Risk	Positive infectious disease screening test: CMV, HBV, HCV, etc.	279	0.53%
Disease Transmission Risk	Donor infection or positive culture	268	0.51%
Logistics	Resource time constraint (OPO, TXC, donor hospital, etc.)	233	0.44%
Donor Specific	Donor instability/high vasopressor usage	208	0.39%
Organ Specific	Organ preservation: Unacceptable method or findings	163	0.31%
Disease Transmission Risk	Malignancy or suspected malignancy	129	0.24%
Histocompatibility Related	Number of HLA mismatches unacceptable	129	0.24%
Histocompatibility Related	No candidate serum for crossmatching	128	0.24%
Histocompatibility Related	No donor cells/specimen for crossmatching, or no time for crossmatch	107	0.20%
Candidate Specific	Candidate temporarily ineligible due to insurance or financial issue	104	0.20%
Organ Specific	Warm ischemic time too long	97	0.18%
Candidate Specific	Epidemic/Pandemic - Candidate	87	0.16%
Histocompatibility Related	Positive physical crossmatch	75	0.14%
Candidate Specific	Candidate's condition improved, transplant not needed	61	0.12%
Logistics	Transplant team or transplant facility availability	60	0.11%
Logistics	Donor family time constraint	39	0.07%
Candidate Specific	Candidate unavailable	28	0.05%
Candidate Specific	Candidate refused	20	0.04%
Logistics	Exceeded policy defined response time	20	0.04%
Logistics	Recovery team availability	19	0.04%
Logistics	Transportation availability	7	0.01%
Organ Specific	Biopsy results unacceptable	6	0.01%
Organ Specific	Biopsy not available	3	0.01%

Figure 7: Top ten reasons for refusal of lung match organ offers for transplant candidates post implementation, for lung matches submitted December 02, 2021 - September 02, 2022.

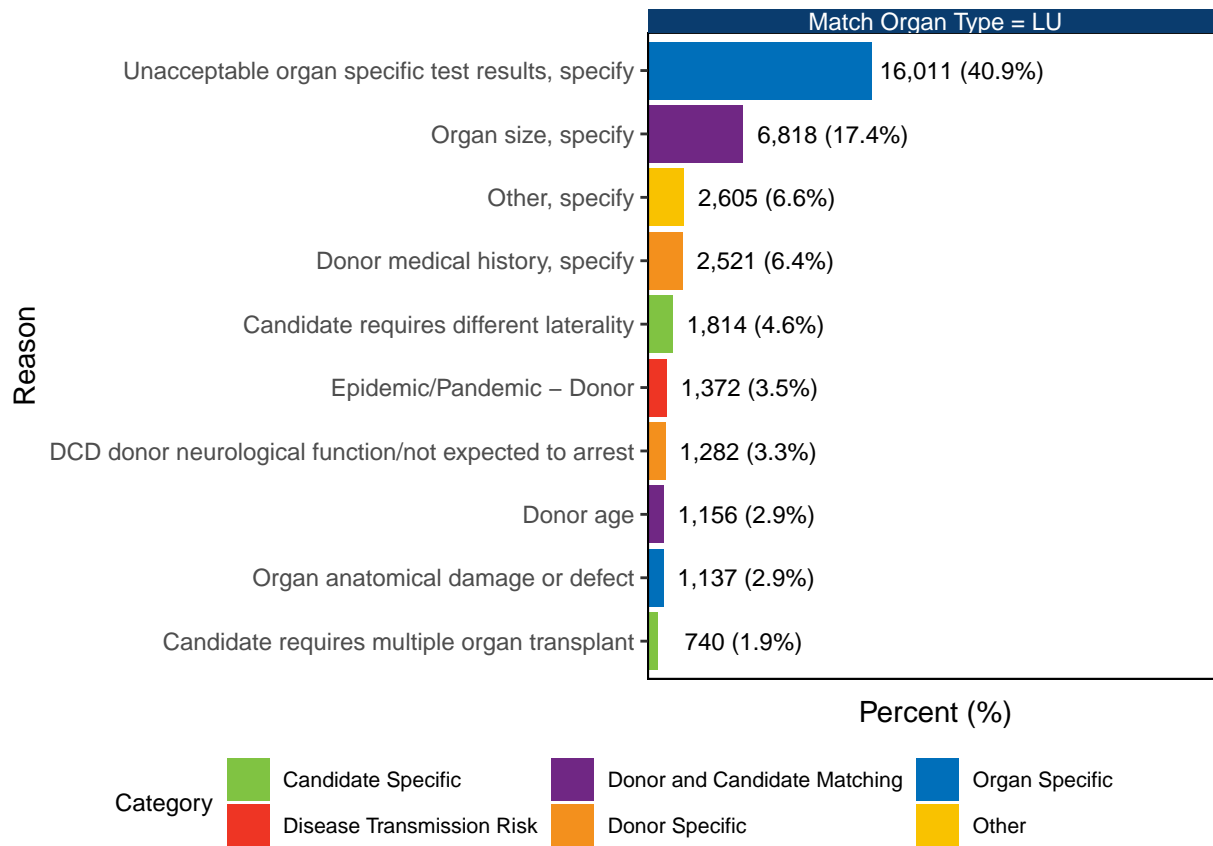


Table 5: Count and percent of reasons for refusal of lung match organ offers post implementation, for lung matches submitted December 02, 2021 - September 02, 2022

Category	Description	N	%
<b>Lung</b>			
Organ Specific	Unacceptable organ specific test results, specify	16,011	40.85%
Donor and Candidate Matching	Organ size, specify	6,818	17.40%
Other	Other, specify	2,605	6.65%
Donor Specific	Donor medical history, specify	2,521	6.43%
Candidate Specific	Candidate requires different laterality	1,814	4.63%
Disease Transmission Risk	Epidemic/Pandemic - Donor	1,372	3.50%
Donor Specific	DCD donor neurological function/not expected to arrest	1,282	3.27%
Donor and Candidate Matching	Donor age	1,156	2.95%
Organ Specific	Organ anatomical damage or defect	1,137	2.90%
Candidate Specific	Candidate requires multiple organ transplant	740	1.89%
Candidate Specific	Candidate transplanted or pending transplant	631	1.61%
Organ Specific	Actual or projected cold ischemic time too long	612	1.56%
Logistics	Resource time constraint (OPO, TXC, donor hospital, etc.)	382	0.97%
Organ Specific	Organ specific test results not available, specify	370	0.94%
Histocompatibility Related	Positive virtual crossmatch/unacceptable antigens	337	0.86%
Candidate Specific	Candidate temporarily medically unsuitable	255	0.65%
Disease Transmission Risk	PHS risk criteria or social history	218	0.56%
Disease Transmission Risk	Donor infection or positive culture	202	0.52%
Disease Transmission Risk	Positive infectious disease screening test: CMV, HBV, HCV, etc.	183	0.47%
Logistics	Transplant team or transplant facility availability	85	0.22%
Organ Specific	Organ preservation: Unacceptable method or findings	81	0.21%
Logistics	Donor family time constraint	61	0.16%
Candidate Specific	Epidemic/Pandemic - Candidate	53	0.14%
Histocompatibility Related	Number of HLA mismatches unacceptable	49	0.13%
Histocompatibility Related	Positive physical crossmatch	42	0.11%
Candidate Specific	Candidate unavailable	31	0.08%
Donor Specific	Prolonged downtime/CPR	31	0.08%
Organ Specific	Warm ischemic time too long	24	0.06%
Histocompatibility Related	No candidate serum for crossmatching	22	0.06%
Logistics	Exceeded policy defined response time	16	0.04%
Candidate Specific	Candidate refused	14	0.04%
Disease Transmission Risk	Malignancy or suspected malignancy	7	0.02%
Logistics	Recovery team availability	5	0.01%
Candidate Specific	Candidate's condition improved, transplant not needed	4	0.01%
Organ Specific	Biopsy not available	4	0.01%
Candidate Specific	Candidate temporarily ineligible due to insurance or financial issue	3	0.01%
Donor Specific	Donor instability/high vasopressor usage	3	0.01%
Histocompatibility Related	No donor cells/specimen for crossmatching, or no time for crossmatch	3	0.01%
Logistics	Transportation availability	3	0.01%
Other	Disaster Emergency Management Consideration	3	0.01%
Organ Specific	Biopsy results unacceptable	1	0.00%



Figure 8: Top ten reasons for refusal of kidney-pancreas match organ offers for transplant candidates post implementation, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022.

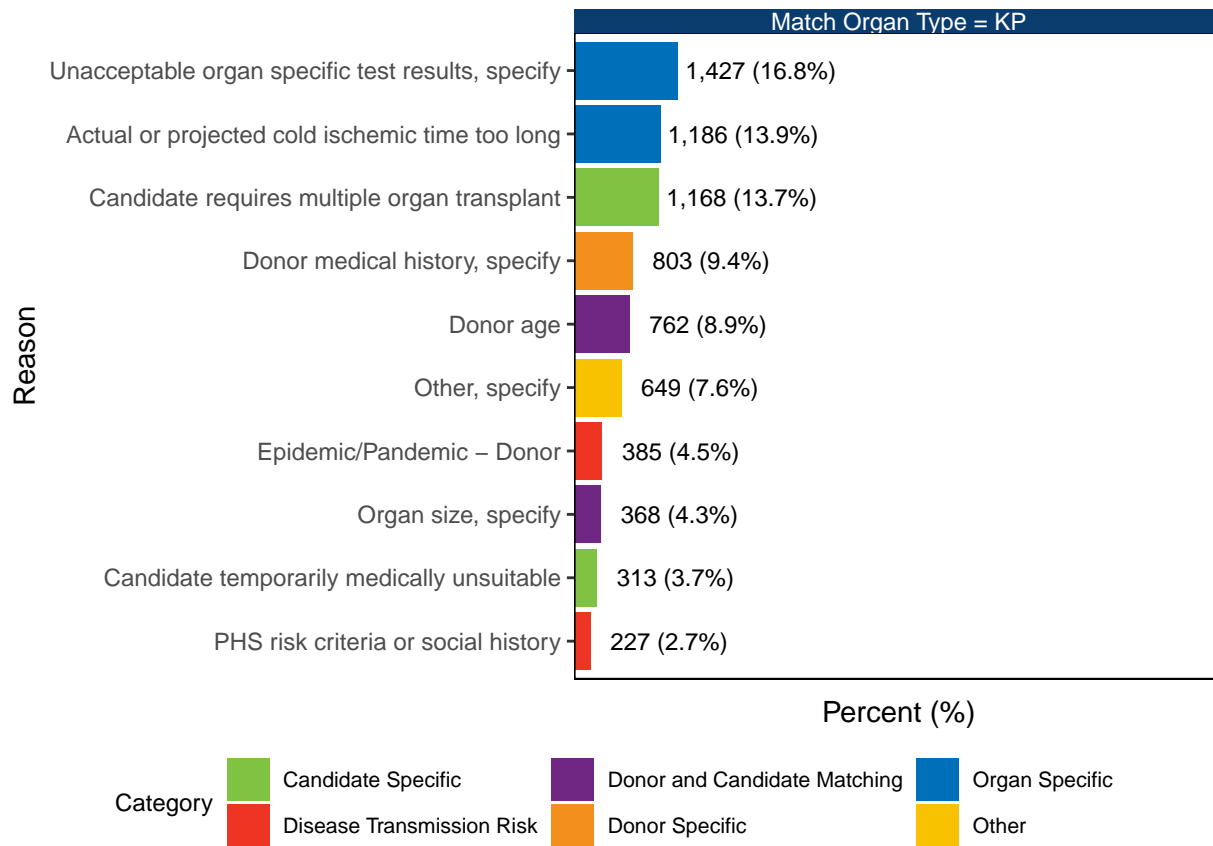


Table 6: Count and percent of reasons for refusal of kidney-pancreas match organ offers post implementation, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022

Category	Description	N	%
<b>Kidney-Pancreas</b>			
Organ Specific	Unacceptable organ specific test results, specify	1,427	16.76%
Organ Specific	Actual or projected cold ischemic time too long	1,186	13.93%
Candidate Specific	Candidate requires multiple organ transplant	1,168	13.72%
Donor Specific	Donor medical history, specify	803	9.43%
Donor and Candidate Matching	Donor age	762	8.95%
Other	Other, specify	649	7.62%
Disease Transmission Risk	Epidemic/Pandemic - Donor	385	4.52%
Donor and Candidate Matching	Organ size, specify	368	4.32%
Candidate Specific	Candidate temporarily medically unsuitable	313	3.68%
Disease Transmission Risk	PHS risk criteria or social history	227	2.67%
Organ Specific	Organ anatomical damage or defect	160	1.88%
Donor Specific	Prolonged downtime/CPR	133	1.56%
Logistics	Transplant team or transplant facility availability	116	1.36%
Organ Specific	Organ preservation: Unacceptable method or findings	92	1.08%
Donor Specific	Donor instability/high vasopressor usage	76	0.89%
Logistics	Resource time constraint (OPO, TXC, donor hospital, etc.)	73	0.86%
Histocompatibility Related	Positive virtual crossmatch/unacceptable antigens	71	0.83%
Candidate Specific	Candidate transplanted or pending transplant	66	0.78%
Organ Specific	Organ specific test results not available, specify	56	0.66%
Histocompatibility Related	Number of HLA mismatches unacceptable	55	0.65%
Candidate Specific	Epidemic/Pandemic - Candidate	53	0.62%
Logistics	Recovery team availability	39	0.46%
Donor Specific	DCD donor neurological function/not expected to arrest	36	0.42%
Candidate Specific	Candidate refused	35	0.41%
Candidate Specific	Candidate unavailable	29	0.34%
Disease Transmission Risk	Positive infectious disease screening test: CMV, HBV, HCV, etc.	24	0.28%
Disease Transmission Risk	Donor infection or positive culture	22	0.26%
Candidate Specific	Candidate temporarily ineligible due to insurance or financial issue	21	0.25%
Histocompatibility Related	Positive physical crossmatch	17	0.20%
Disease Transmission Risk	Malignancy or suspected malignancy	9	0.11%
Histocompatibility Related	No candidate serum for crossmatching	8	0.09%
Logistics	Transportation availability	8	0.09%
Organ Specific	Warm ischemic time too long	8	0.09%
Histocompatibility Related	No donor cells/specimen for crossmatching, or no time for crossmatch	6	0.07%
Logistics	Donor family time constraint	6	0.07%
Candidate Specific	Candidate's condition improved, transplant not needed	5	0.06%
Logistics	Exceeded policy defined response time	3	0.04%
Organ Specific	Biopsy results unacceptable	1	0.01%

Figure 9: Top ten reasons for refusal of intestine match organ offers for transplant candidates post implementation, for intestine matches submitted December 02, 2021 - September 02, 2022.

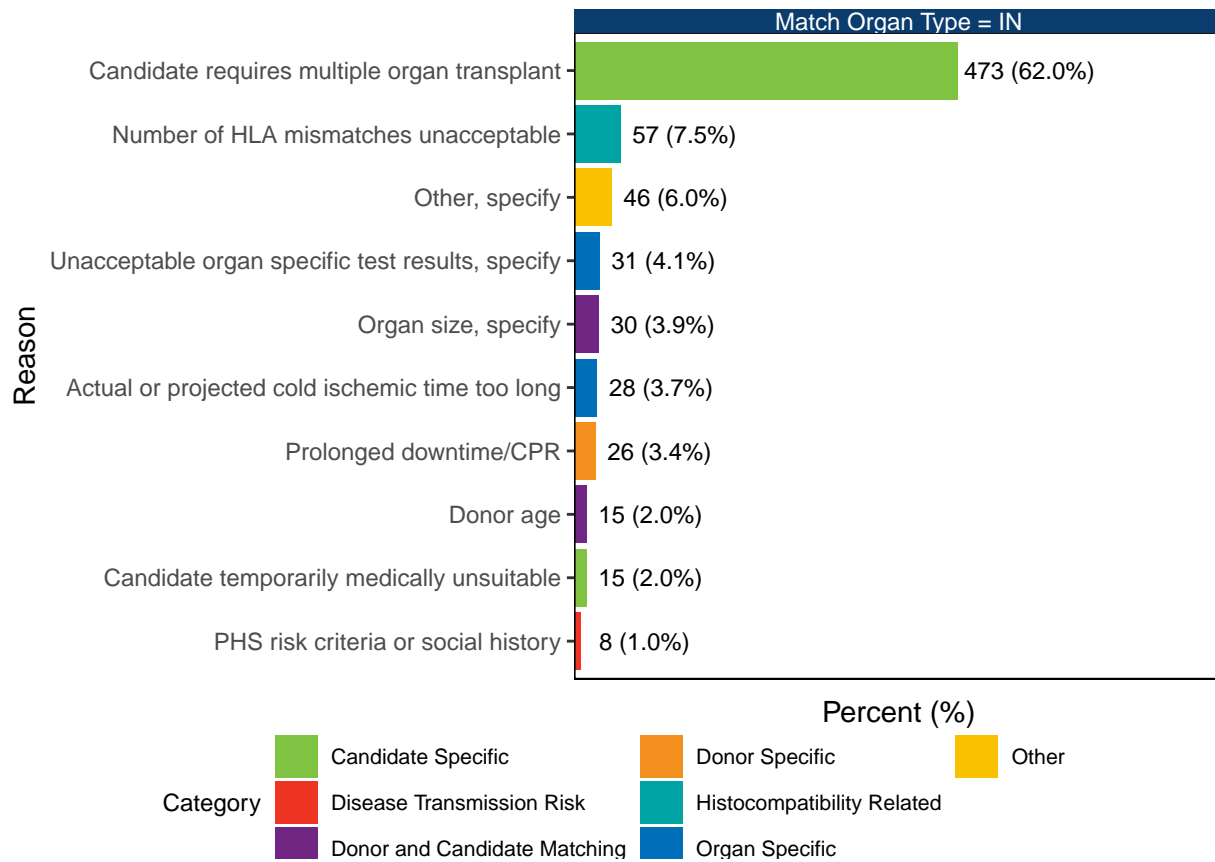


Table 7: Count and percent of reasons for refusal of intestine match organ offers post implementation, for intestine matches submitted December 02, 2021 - September 02, 2022

Category	Description	N	%
<b>Intestine</b>			
Candidate Specific	Candidate requires multiple organ transplant	473	61.99%
Histocompatibility Related	Number of HLA mismatches unacceptable	57	7.47%
Other	Other, specify	46	6.03%
Organ Specific	Unacceptable organ specific test results, specify	31	4.06%
Donor and Candidate Matching	Organ size, specify	30	3.93%
Organ Specific	Actual or projected cold ischemic time too long	28	3.67%
Donor Specific	Prolonged downtime/CPR	26	3.41%
Candidate Specific	Candidate temporarily medically unsuitable	15	1.97%
Donor and Candidate Matching	Donor age	15	1.97%
Disease Transmission Risk	PHS risk criteria or social history	8	1.05%
Organ Specific	Warm ischemic time too long	8	1.05%
Donor Specific	Donor medical history, specify	6	0.79%
Disease Transmission Risk	Positive infectious disease screening test: CMV, HBV, HCV, etc.	5	0.66%
Donor Specific	Donor instability/high vasopressor usage	5	0.66%
Organ Specific	Organ anatomical damage or defect	4	0.52%
Disease Transmission Risk	Donor infection or positive culture	3	0.39%
Candidate Specific	Candidate transplanted or pending transplant	1	0.13%
Disease Transmission Risk	Epidemic/Pandemic - Donor	1	0.13%
Histocompatibility Related	Positive virtual crossmatch/unacceptable antigens	1	0.13%

We were also interested in examining refusal reasons that have not yet been used, or have only been used a handful of times. Table 8 lists the refusal reasons by category that have been used for less than 10 organ offers, or not at all, by match organ type.

Table 8: Refusal reasons given for less than 10 organ offers for transplant candidates post implementation by match organ type, matches submitted December 02, 2021 - September 02, 2022

Category	Description	Match Organ Type						
		KI	LI	HL	LU	HR	KP	IN
Candidate Specific	Candidate refused					X		X
	Candidate requires different laterality		X	X		X	X	X
	Candidate temporarily ineligible due to insurance or financial issue				X			X
	Candidate transplanted or pending transplant							X
	Candidate unavailable					X		X
	Candidate's condition improved, transplant not needed				X		X	X
Disease Transmission Risk	Epidemic/Pandemic - Candidate							X
	Donor infection or positive culture							X
	Epidemic/Pandemic - Donor							X
	Malignancy or suspected malignancy				X	X	X	X
	PHS risk criteria or social history							X
Donor Specific	Positive infectious disease screening test: CMV, HBV, HCV, etc.							X
	DCD donor neurological function/not expected to arrest							X
	Donor instability/high vasopressor usage				X			X
	Donor medical history, specify							X
	VCA graft appearance or quality, specify	X	X	X	X	X	X	X
Histocompatibility Related	No candidate serum for crossmatching		X				X	X
	No donor cells/specimen for crossmatching, or no time for crossmatch				X		X	X
	Positive physical crossmatch		X					X
	Positive virtual crossmatch/unacceptable antigens							X
	Donor family time constraint	X					X	X

Logistics	Exceeded policy defined response time					X	X	X
	Recovery team availability			X	X			X
	Resource time constraint (OPO, TXC, donor hospital, etc.)							X
	Transplant team or transplant facility availability							X
	Transportation availability			X	X	X	X	X
Organ Specific	Biopsy not available			X	X	X	X	X
	Biopsy results unacceptable			X	X	X	X	X
	Organ anatomical damage or defect							X
	Organ preservation: Unacceptable method or findings							X
	Organ specific test results not available, specify							X
Other	Warm ischemic time too long						X	X
	Disaster Emergency Management Consideration			X	X	X	X	X

**By Program Size**

Program size groups were defined based on the following volumes of deceased donor transplants during 2020:

Match Organ Type	Volume Range Definitions			Number of Programs		
	Small	Medium	Large	Small	Medium	Large
KI	[2, 26]	(26, 89]	(89, 455]	79	76	78
LI	[1, 26]	(26, 76]	(76, 181]	48	47	46
HL	[1, 11]	(11, 29]	(29, 148]	49	46	48
LU	[1, 20]	(20, 41]	(41, 142]	23	22	22
KP	[1, 3]	(3, 8]	(8, 30]	38	35	34
IN	[1, 2]	(2, 6]	(6, 18]	6	5	5

Figure 10: Top five reasons for refusal of kidney match organ offers for transplant candidates post implementation stratified by program size, for kidney matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor kidney transplants during 2020.

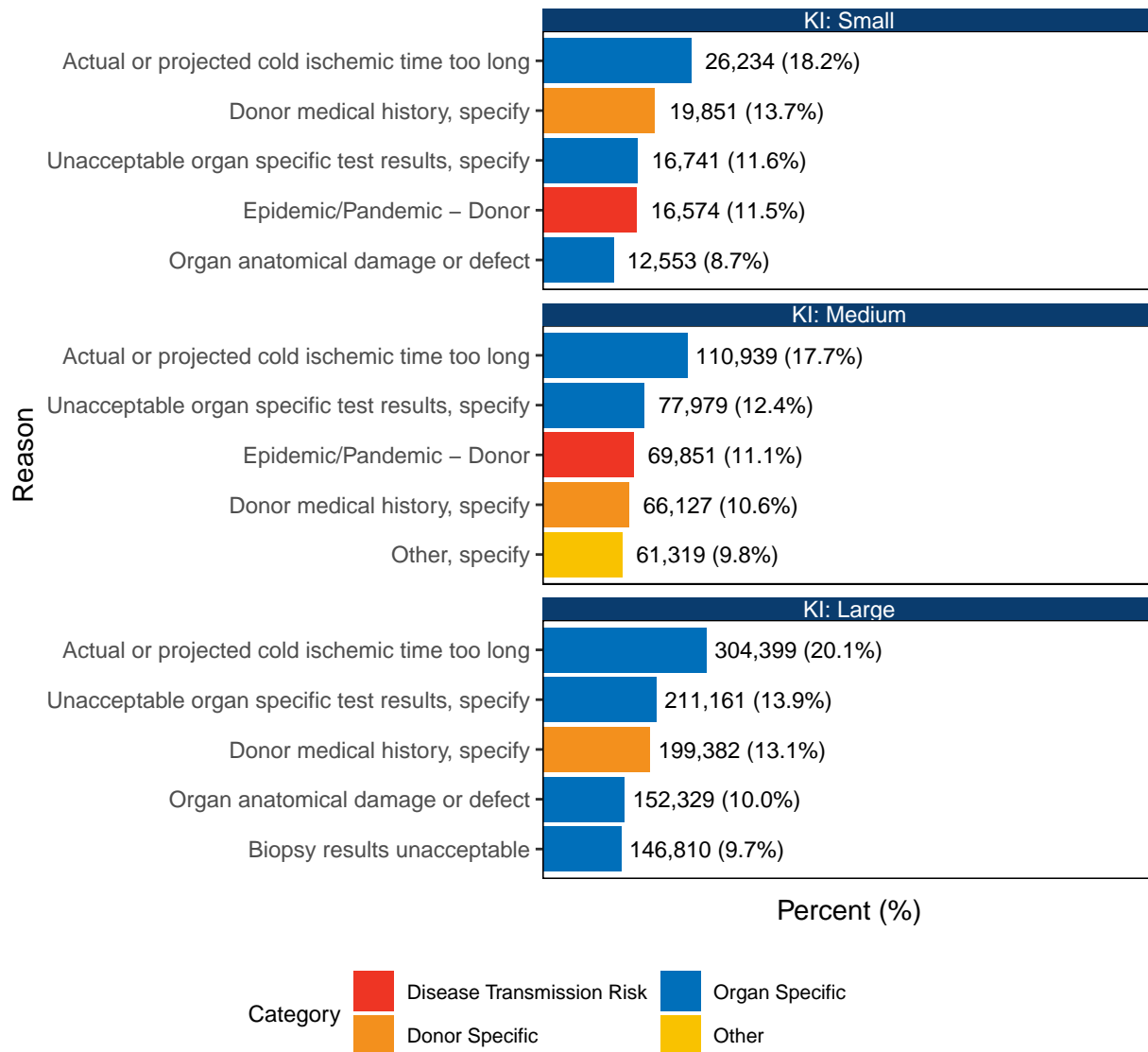




Figure 11: Top five reasons for refusal of liver match organ offers for transplant candidates post implementation stratified by program size, for liver matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor liver transplants during 2020.

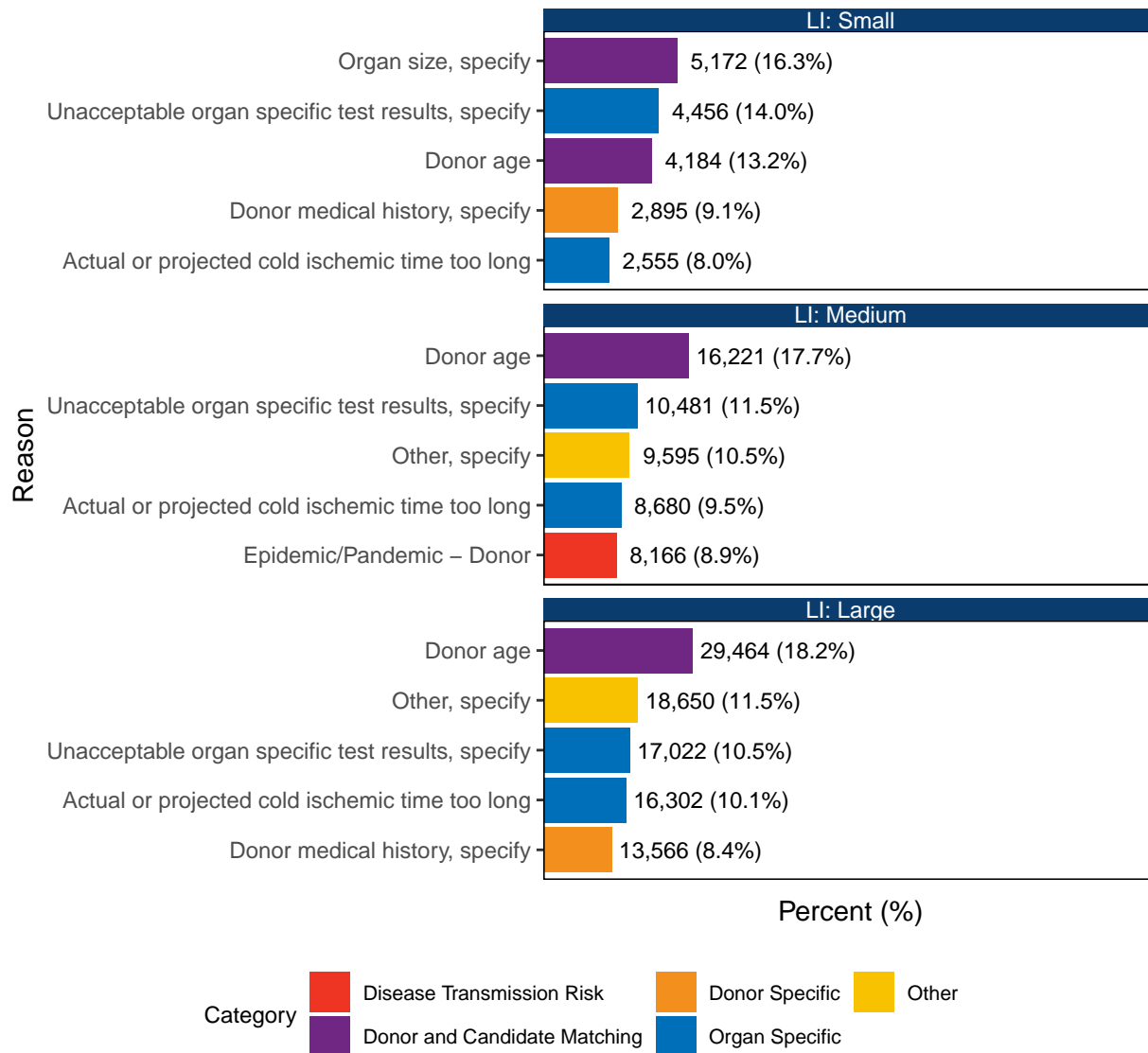


Figure 12: Top five reasons for refusal of heart and heart-lung match organ offers for transplant candidates post implementation stratified by program size, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor heart and heart-lung transplants during 2020.

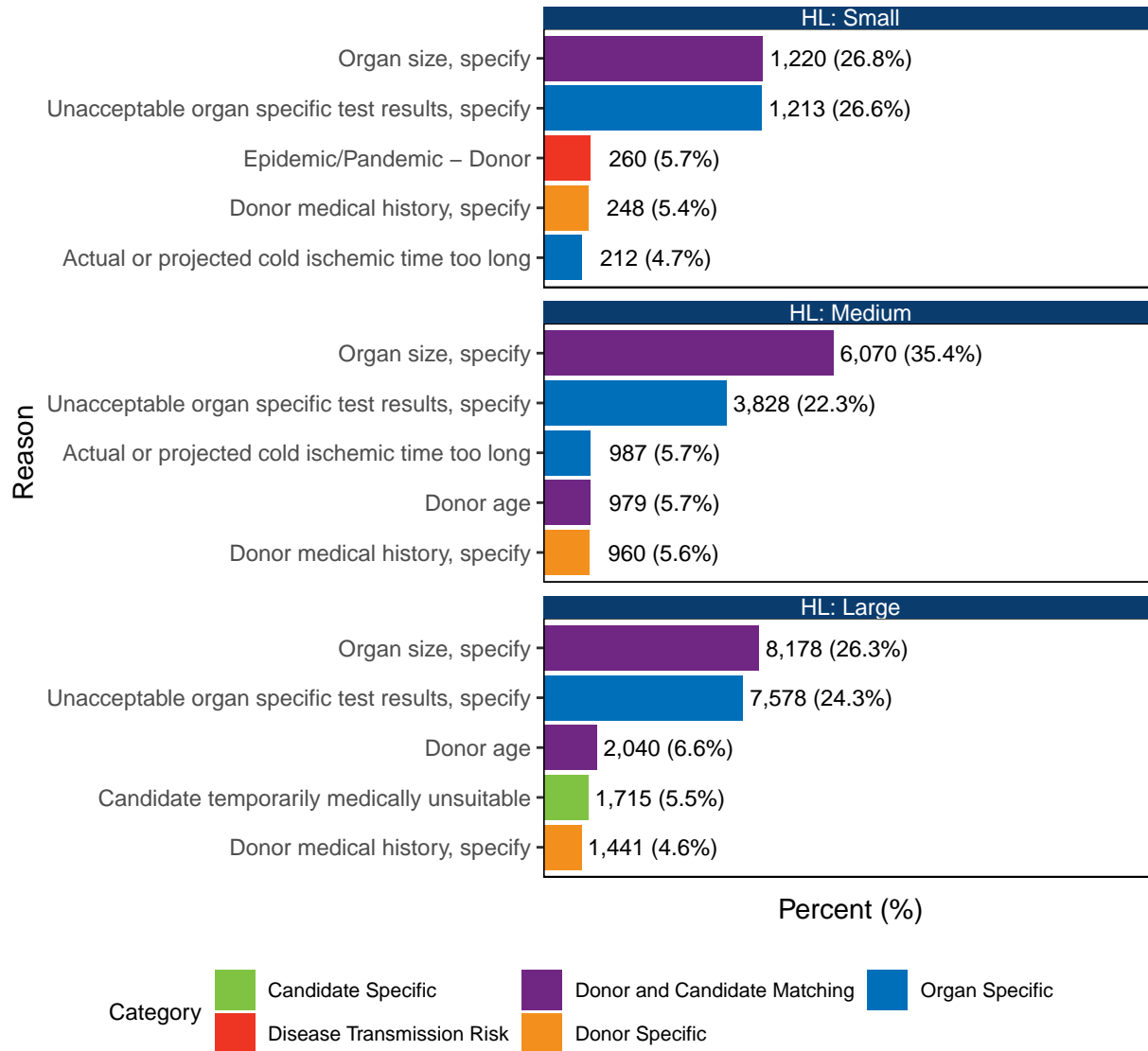


Figure 13: Top five reasons for refusal of lung match organ offers for transplant candidates post implementation stratified by program size, for lung matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor lung transplants during 2020.

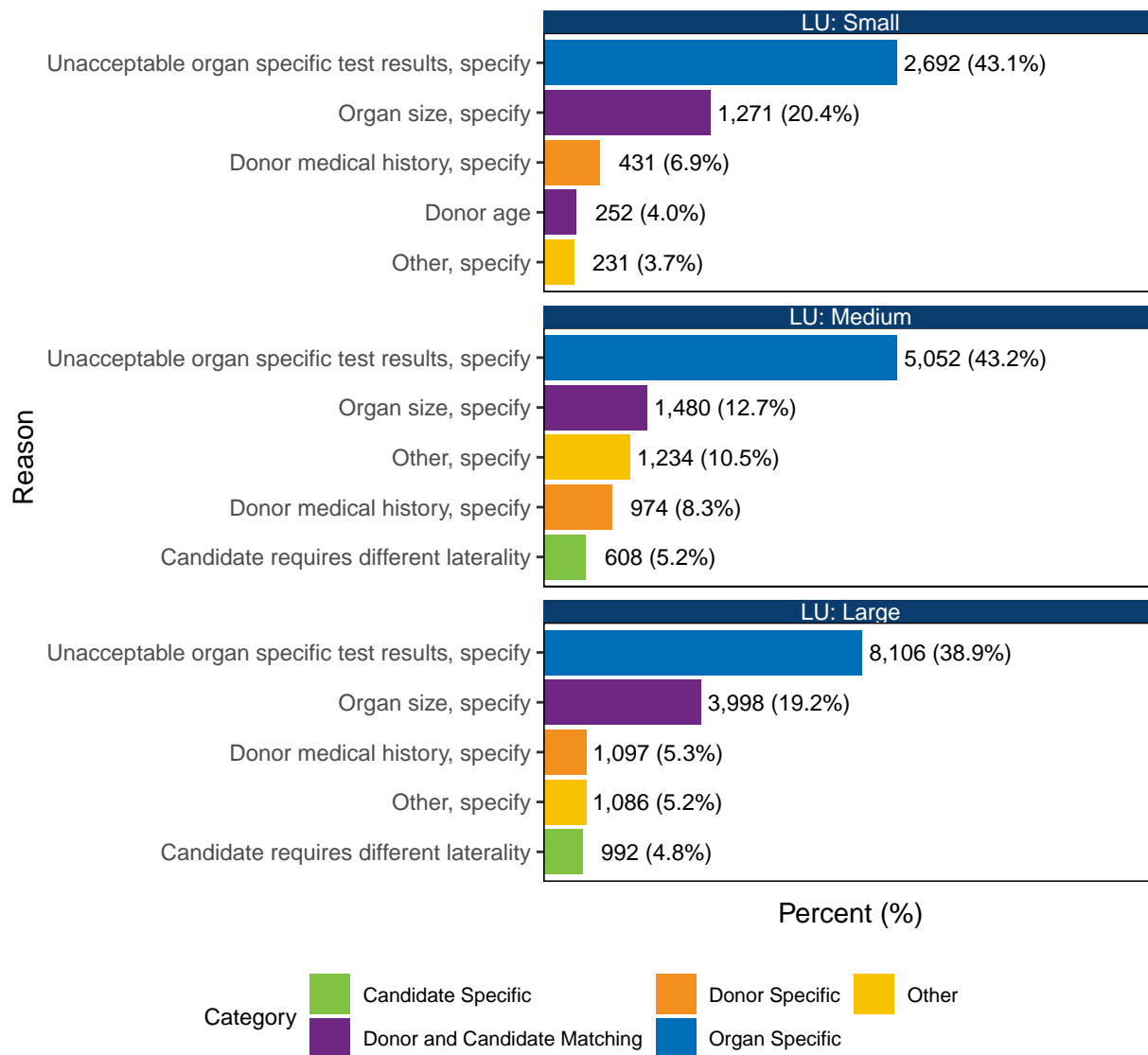
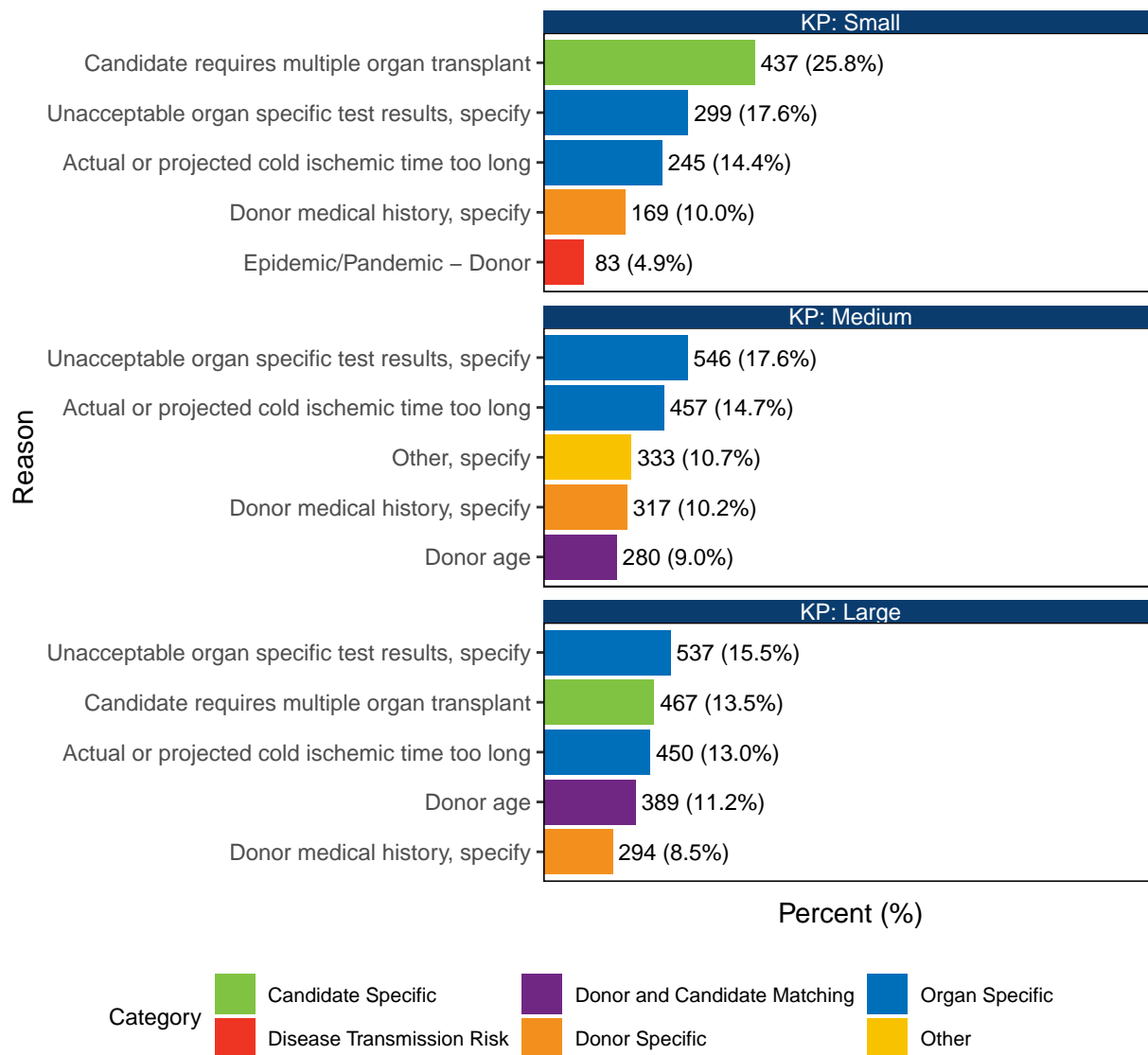


Figure 14: Top five reasons for refusal of kidney-pancreas match organ offers for transplant candidates post implementation stratified by program size, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor kidney-pancreas transplants during 2020.



### By Sequence Number

The following figures group all offers on a match into one category based on the last sequence number of the acceptor on the match. We specify 'last' here as some organs may have more than one final acceptor, e.g. left and right kidney. Sequence number groups were defined by the 90th percentile of sequence numbers for organ acceptors in 2020 as the following:

Match Organ Type	Match Acceptor Sequence Number < 90th Percentile	Match Acceptor Sequence Number ≥ 90th Percentile
KI	[1, 667]	[667, 31425]
LI	[1, 78]	[78, 7555]
HL	[1, 41]	[41, 1396]
LU	[1, 53]	[53, 514]
KP	[1, 29]	[29, 286]
IN	[1, 34]	[34, 59]

Figure 15: Top five reasons for refusal of kidney match organ offers for transplant candidates post implementation stratified by match acceptance number, for kidney matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on kidney matches during 2020.

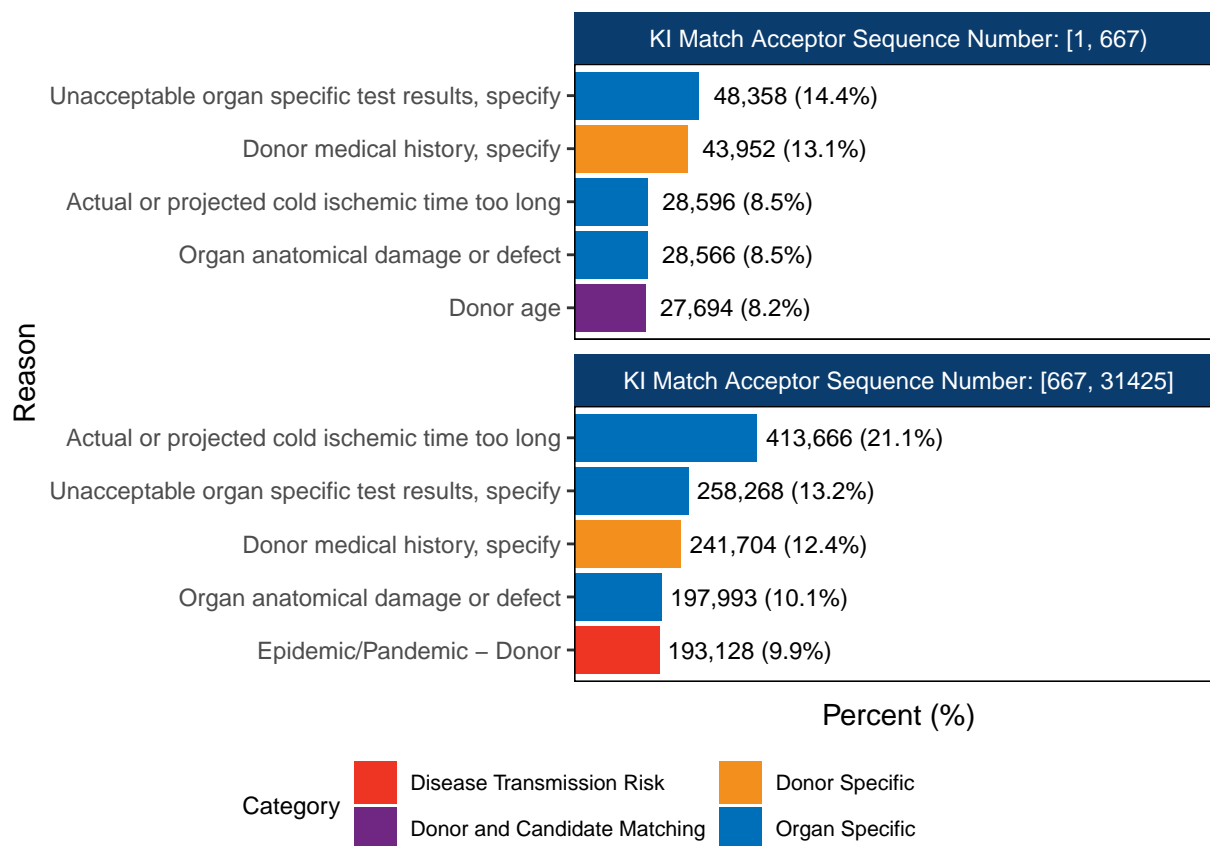


Figure 16: Top five reasons for refusal of liver match organ offers for transplant candidates post implementation stratified by match acceptance number, for liver matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on liver matches during 2020.

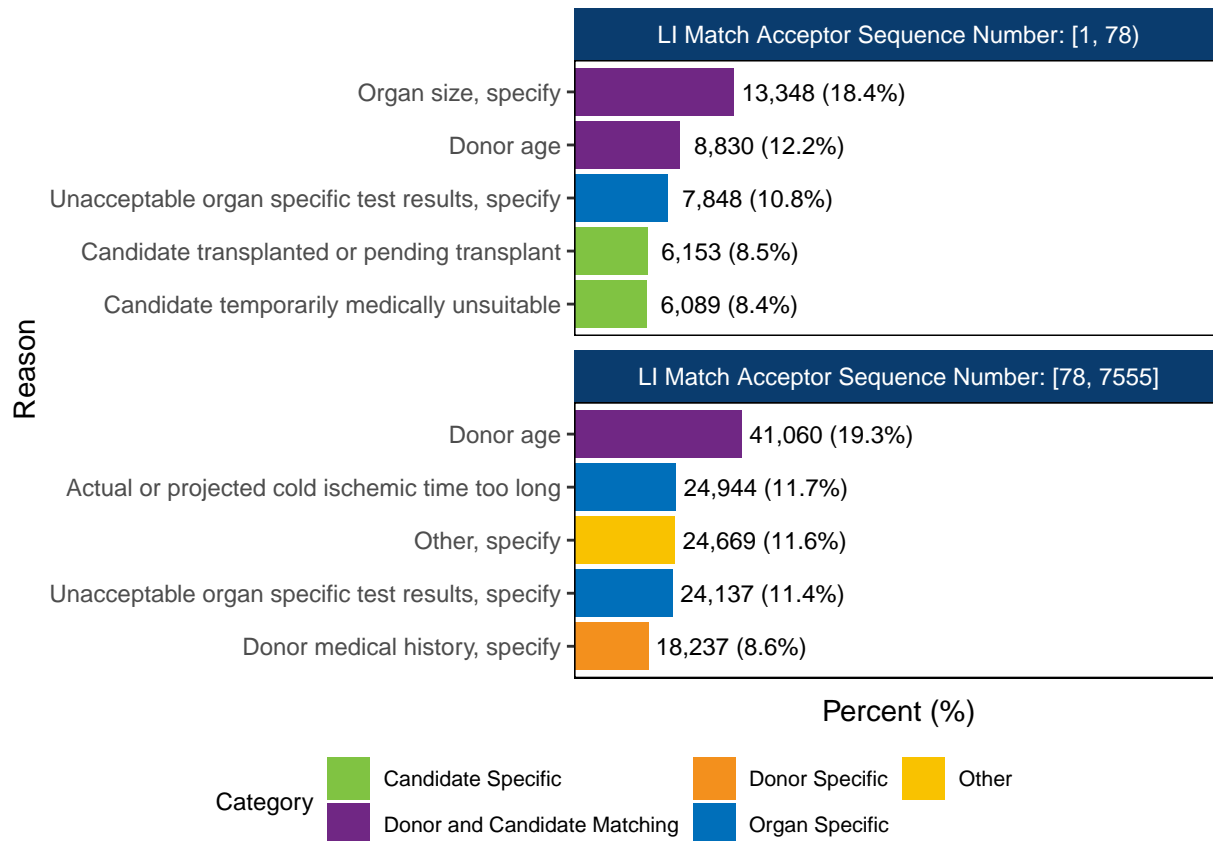


Figure 17: Top five reasons for refusal of heart and heart-lung match organ offers for transplant candidates post implementation stratified by match acceptance number, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on heart and heart-lung matches during 2020.

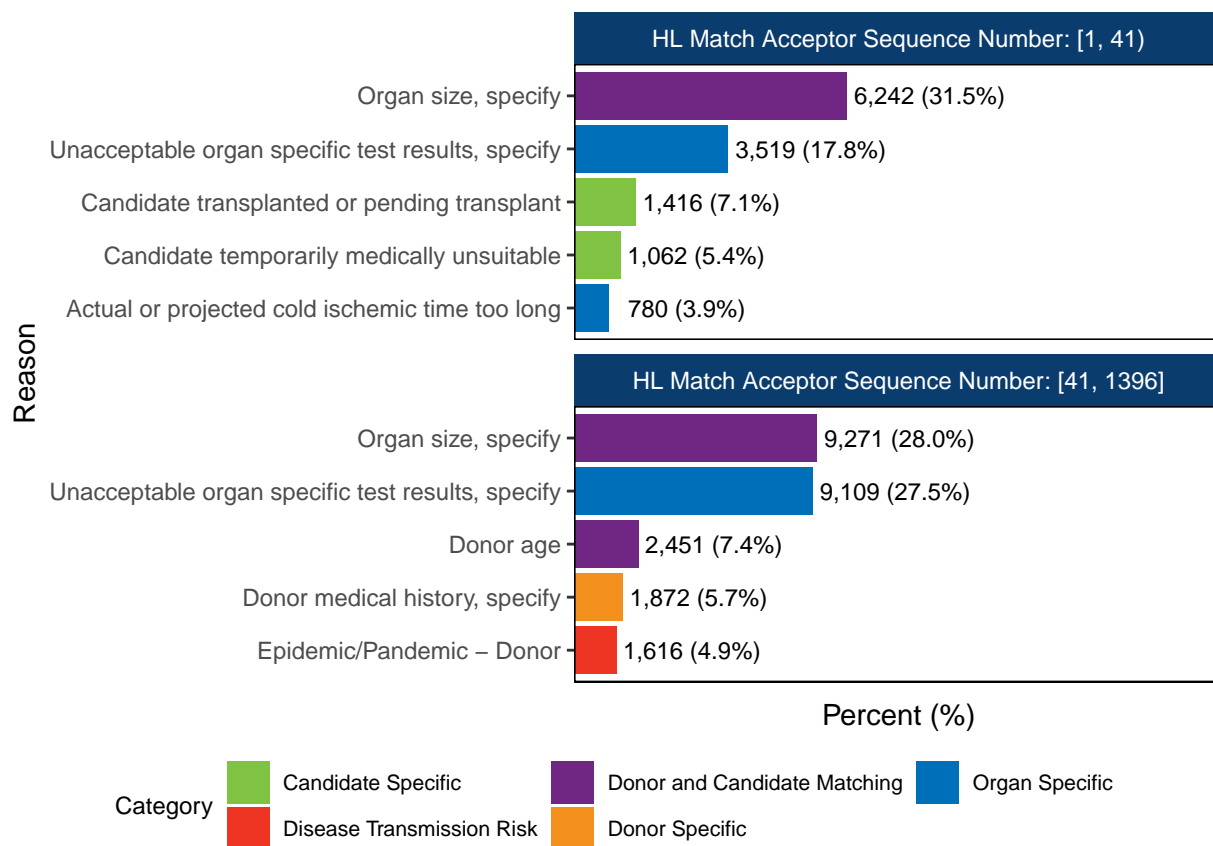


Figure 18: Top five reasons for refusal of lung match organ offers for transplant candidates post implementation stratified by match acceptance number, for lung matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on lung matches during 2020.

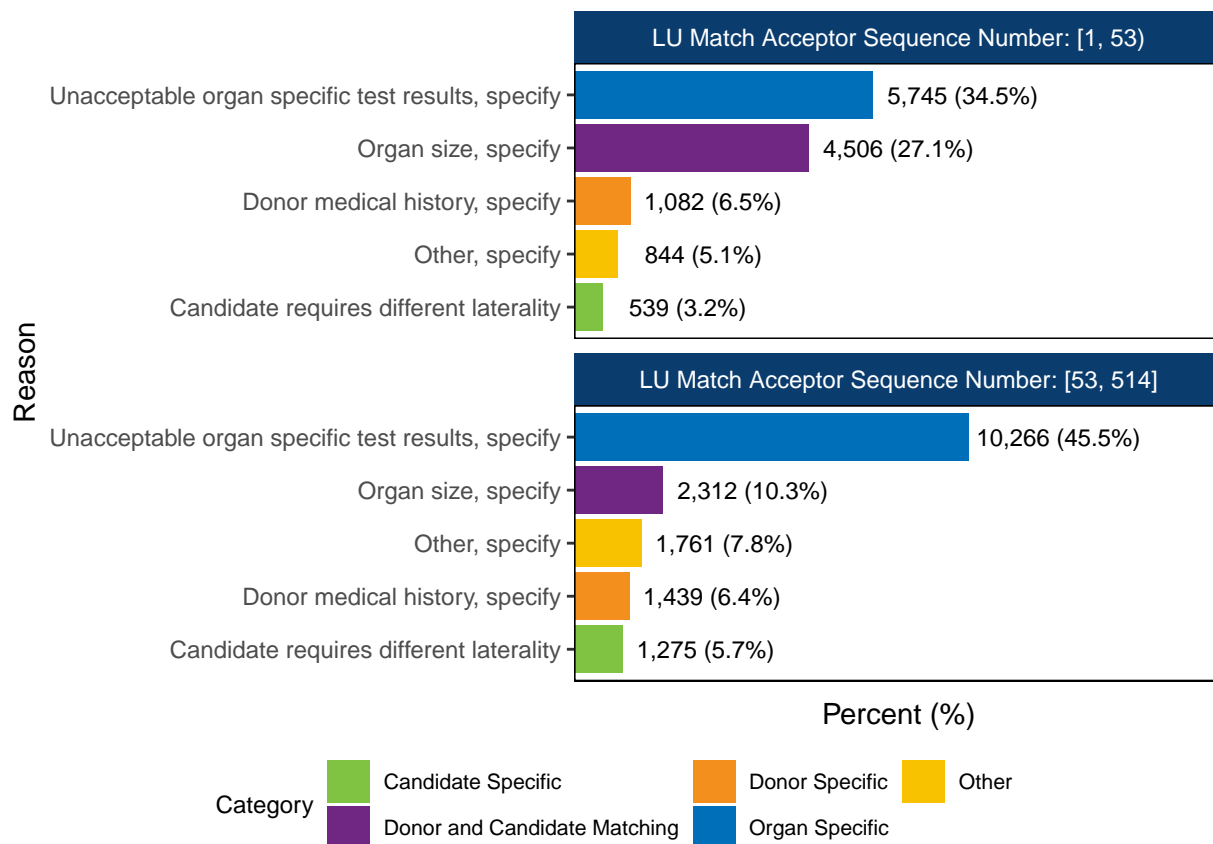
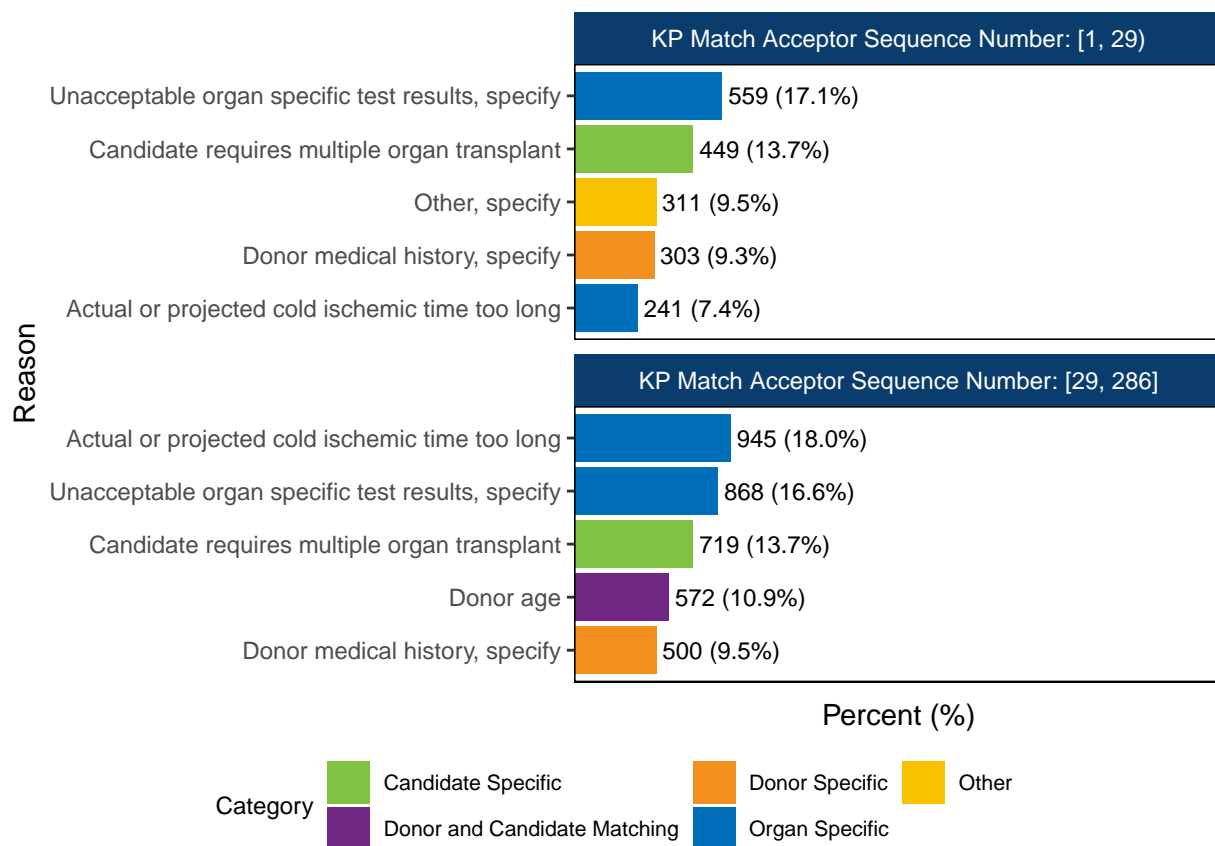




Figure 19: Top five reasons for refusal of kidney-pancreas match organ offers for transplant candidates post implementation stratified by match acceptance number, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on kidney-pancreas matches during 2020.

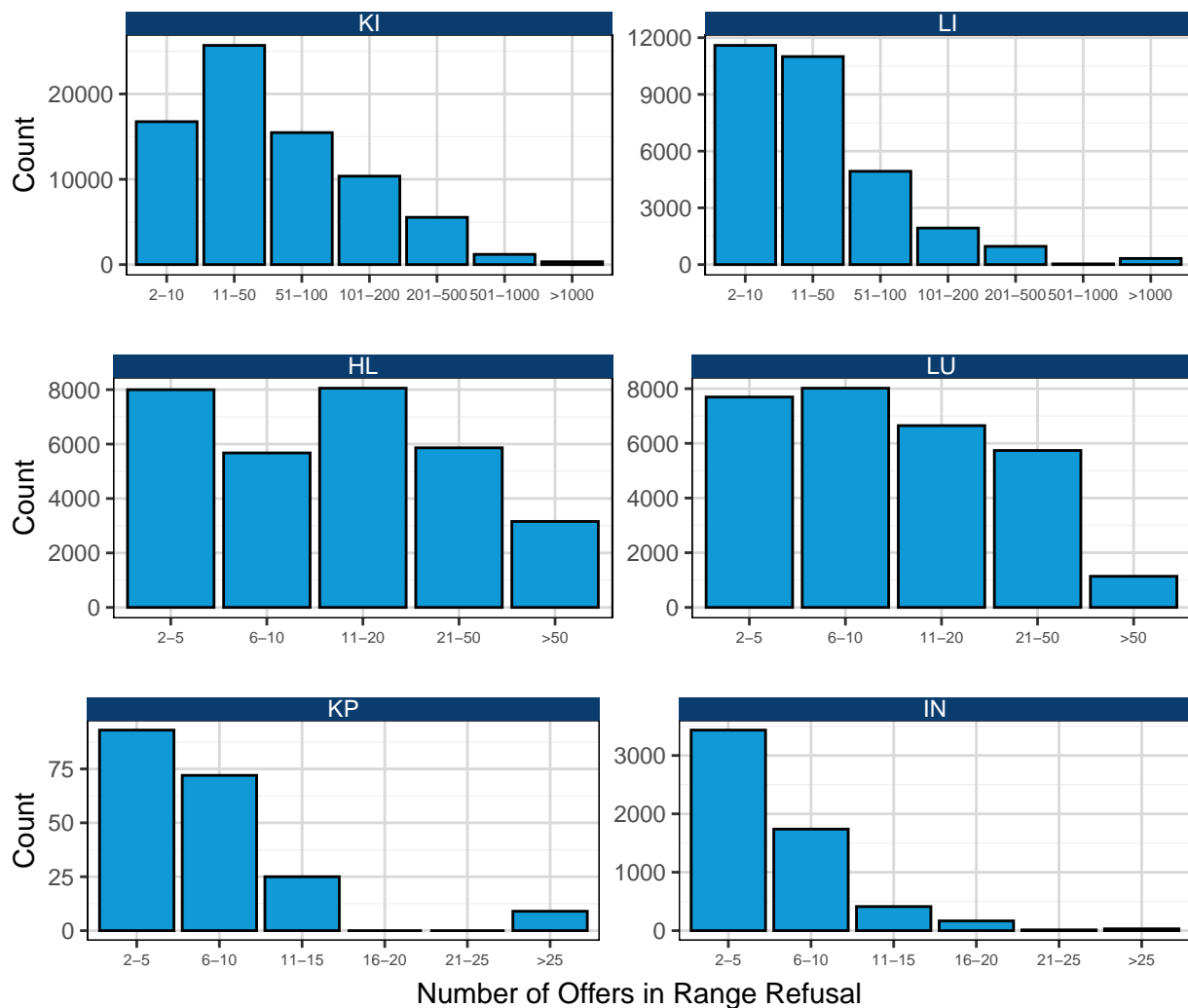


### Range Refusals

Transplant centers are not only able to accept or refuse organ offers for an individual transplant candidate, they may also refuse multiple organ offers on a match run for transplant candidates at their center. When this is done, the same reason for refusal is applied for that chunk of organ offers for the transplant candidates. Because the same reason for refusal is used for varying numbers of organ offers in a batch, the following are de-duplicated such that an instance of refusing 15 organ offers for transplant candidates at a center only presents this reason once rather than 15 times. This ensures that the results are not unnecessarily skewed by the number of offers in a range refusal.

Figure 20 indicates how many offers were typically included in a range refusal instance, by match organ type. For kidney and liver matches, there were most often 11-50 offers in a range refusal, though it was possible for there to be upwards of 1,000 offers in a range refusal instance. Heart-lung matches most often included 11-20 offers in a range refusal, though there could be upwards of 50 offers in some. There were most often 2-10 offers in a range refusal for lung matches, 2-5 offers for kidney-pancreas matches, and 6-10 offers for intestine matches.

Figure 20: Number of organ offers in range refusal post implementation by match organ type, December 02, 2021 - September 02, 2022



**By Organ**

Figure 21: Percentage of Covid-19 range refusal codes among all codes December 02, 2021 - September 02, 2022, by organ.

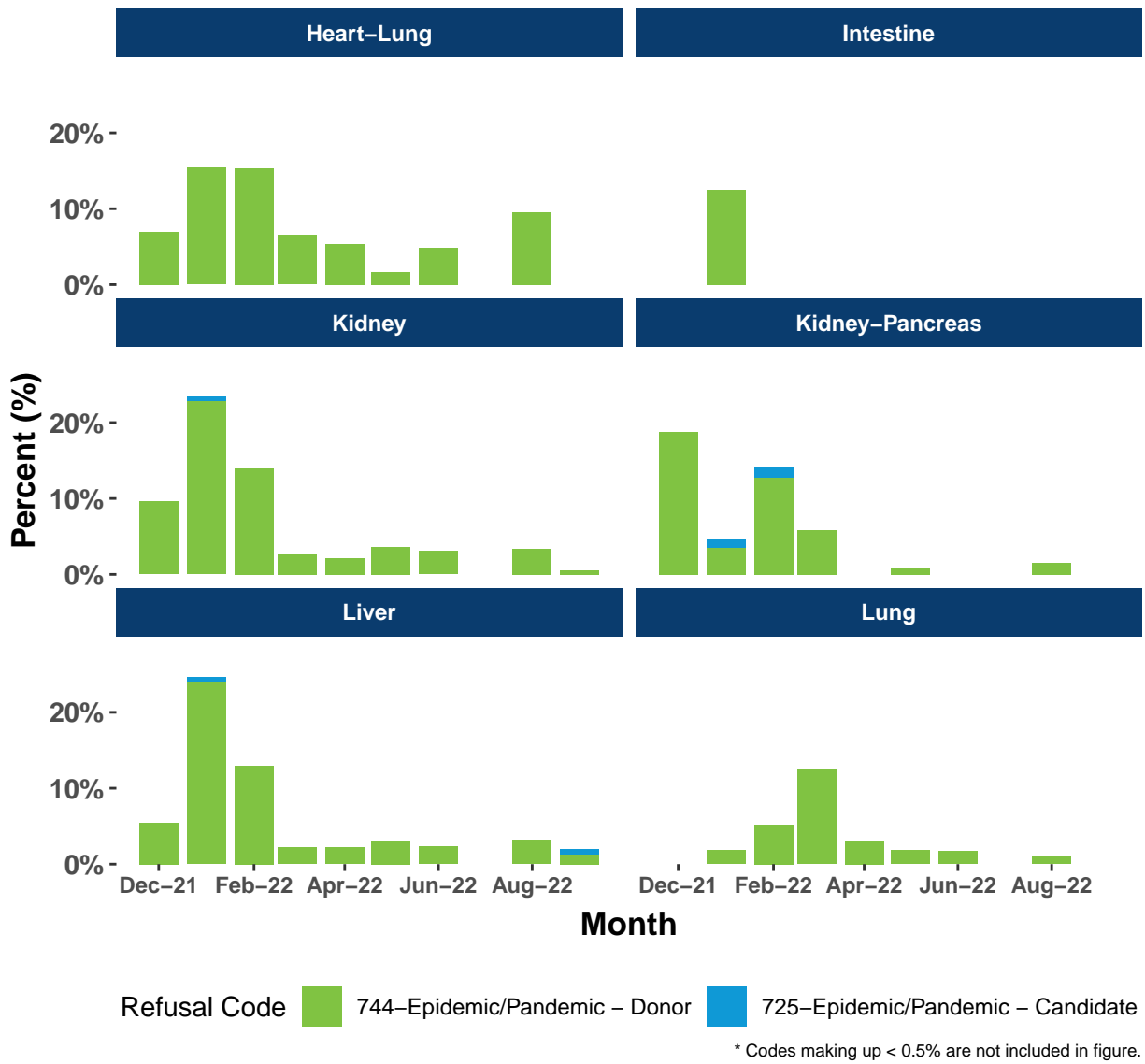


Figure 22: Top ten reasons for refusal of range refused kidney match organ offers for transplant candidates post implementation, for kidney matches submitted December 02, 2021 - September 02, 2022.

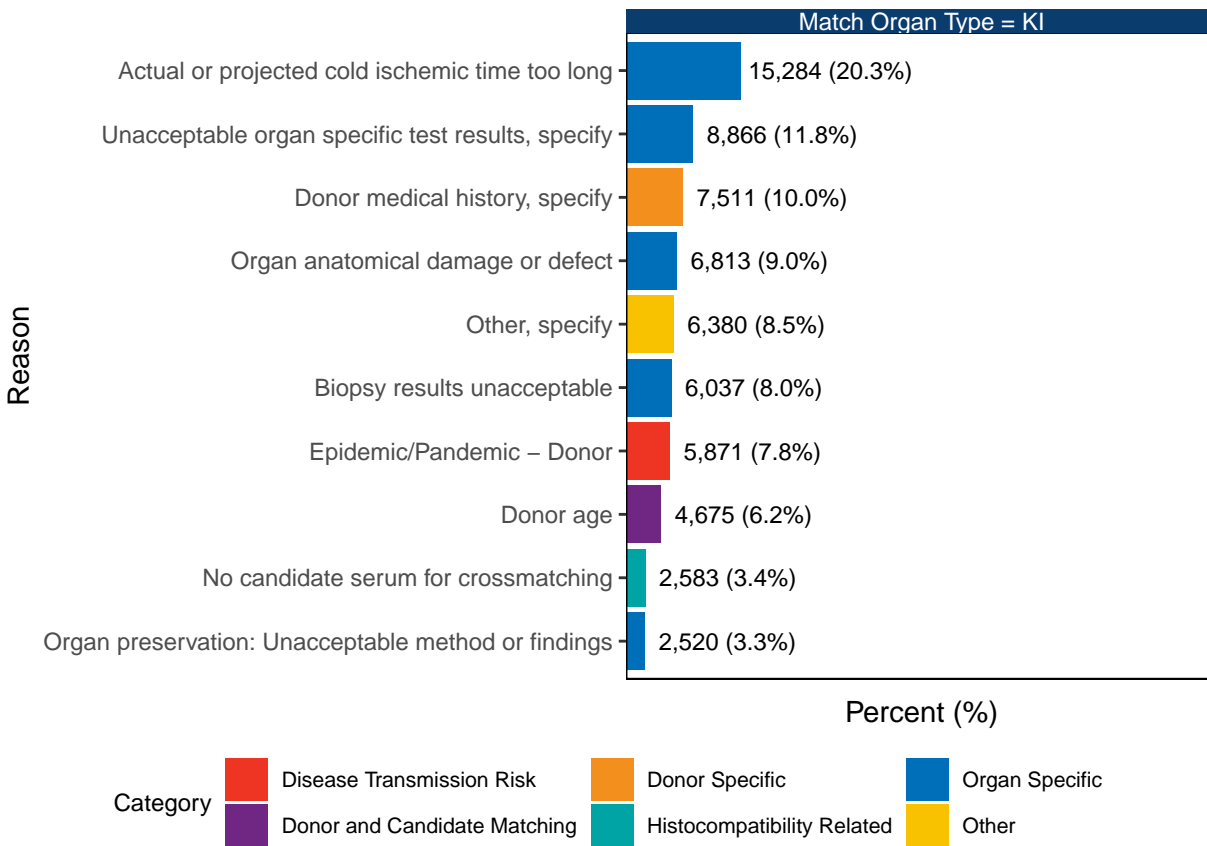


Figure 23: Top ten reasons for refusal of range refused liver match organ offers for transplant candidates post implementation, for liver matches submitted December 02, 2021 - September 02, 2022.

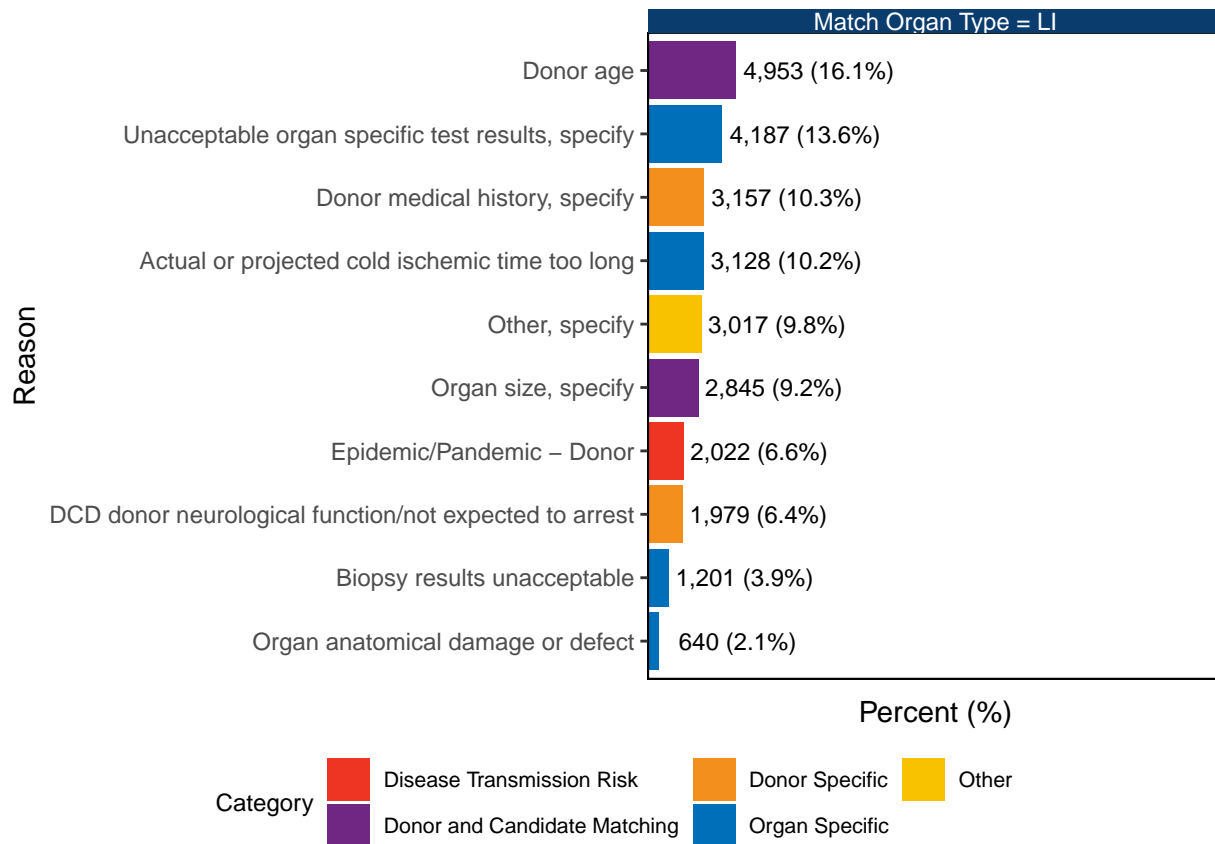


Figure 24: Top ten reasons for refusal of range refused heart and heart-lung match organ offers for transplant candidates post implementation, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022.

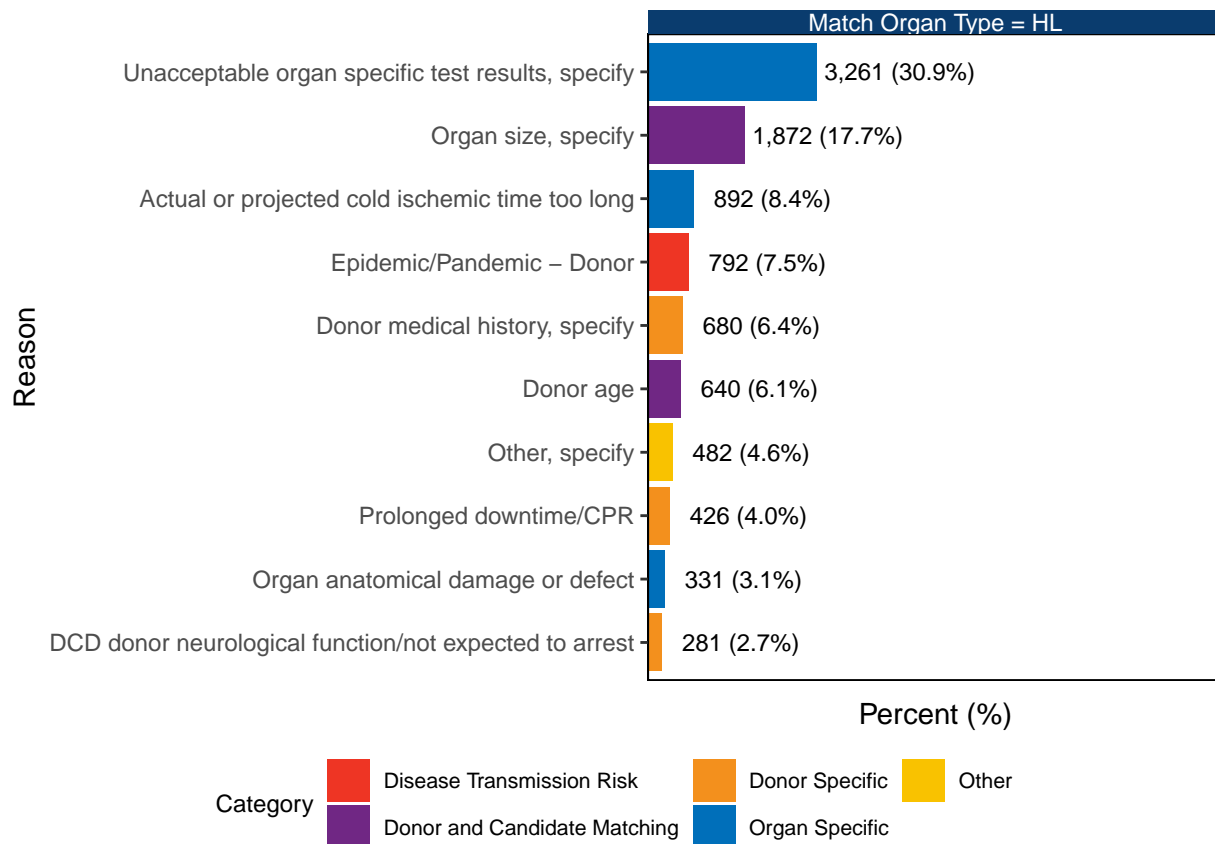


Figure 25: Top ten reasons for refusal of range refused lung match organ offers for transplant candidates post implementation, for lung matches submitted December 02, 2021 - September 02, 2022.

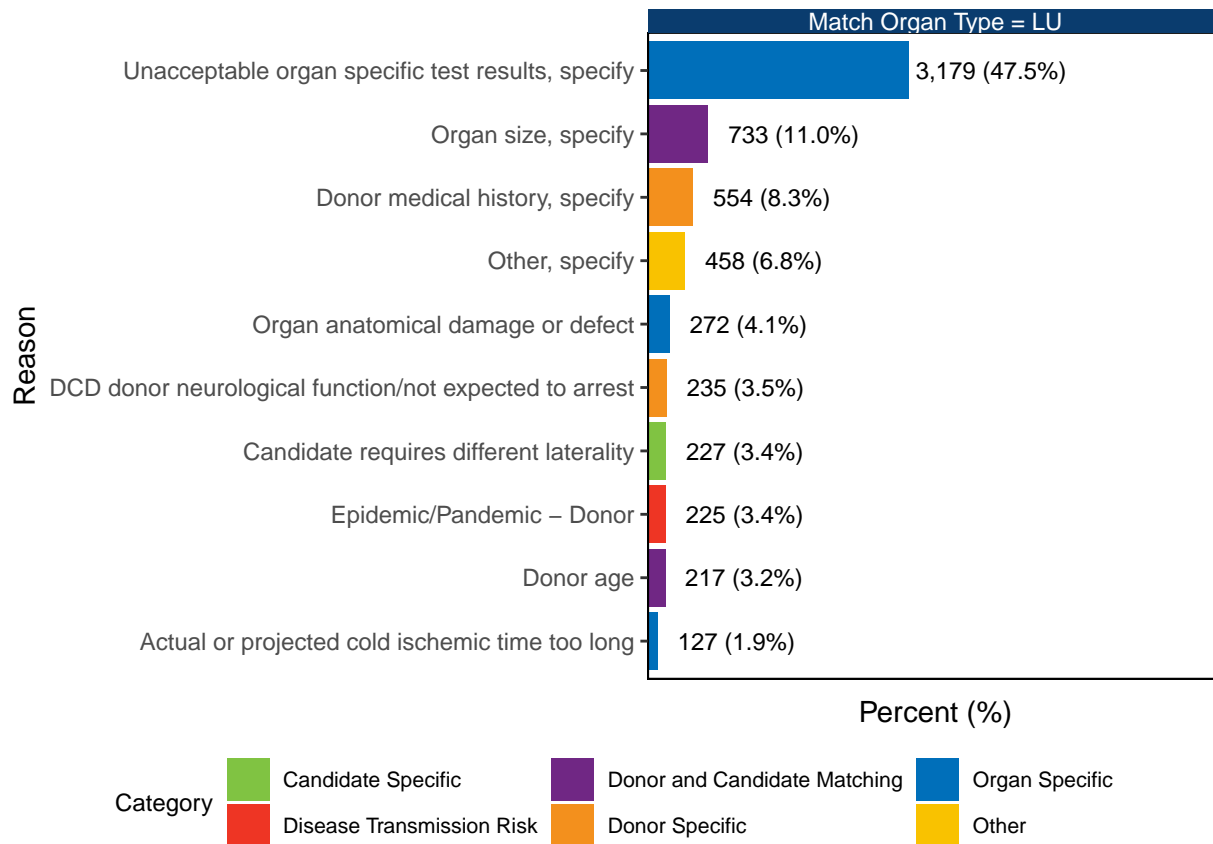


Figure 26: Top ten reasons for refusal of range refused kidney-pancreas match organ offers for transplant candidates post implementation, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022.

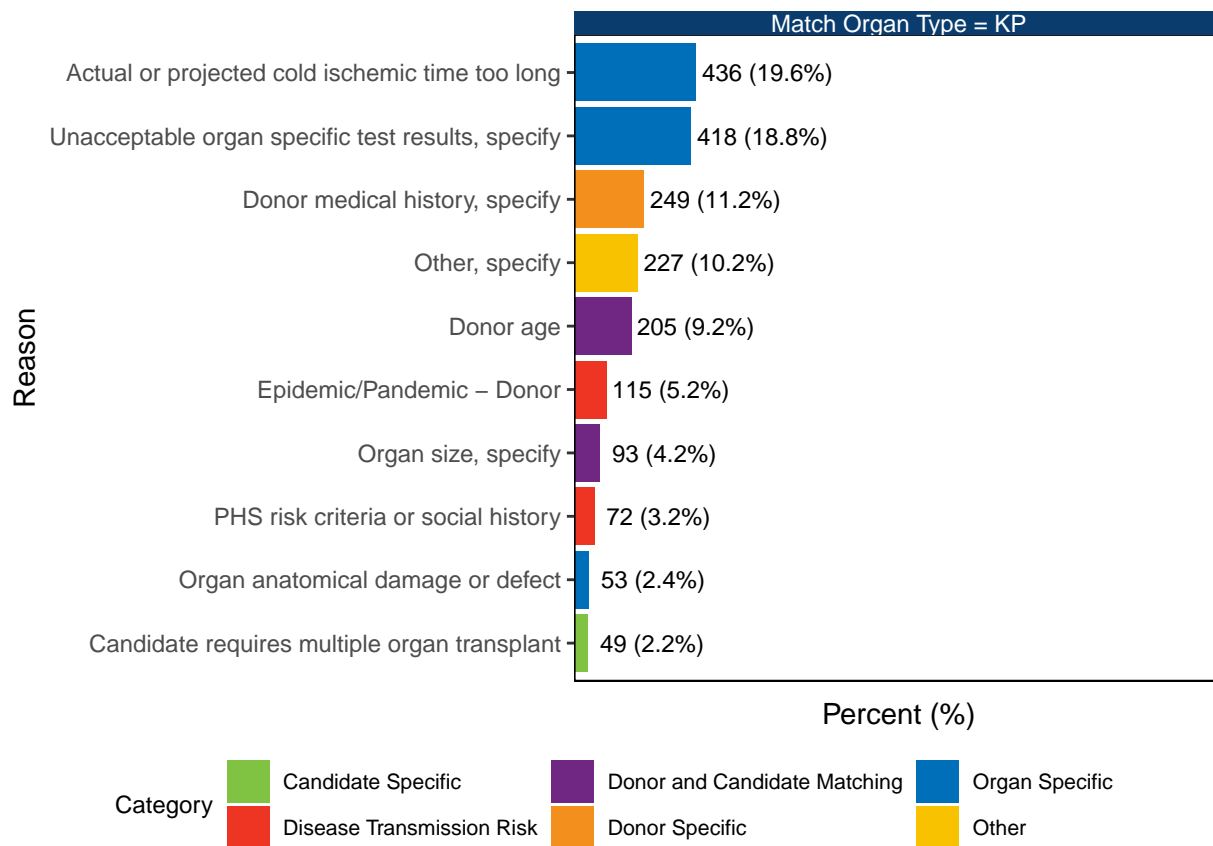
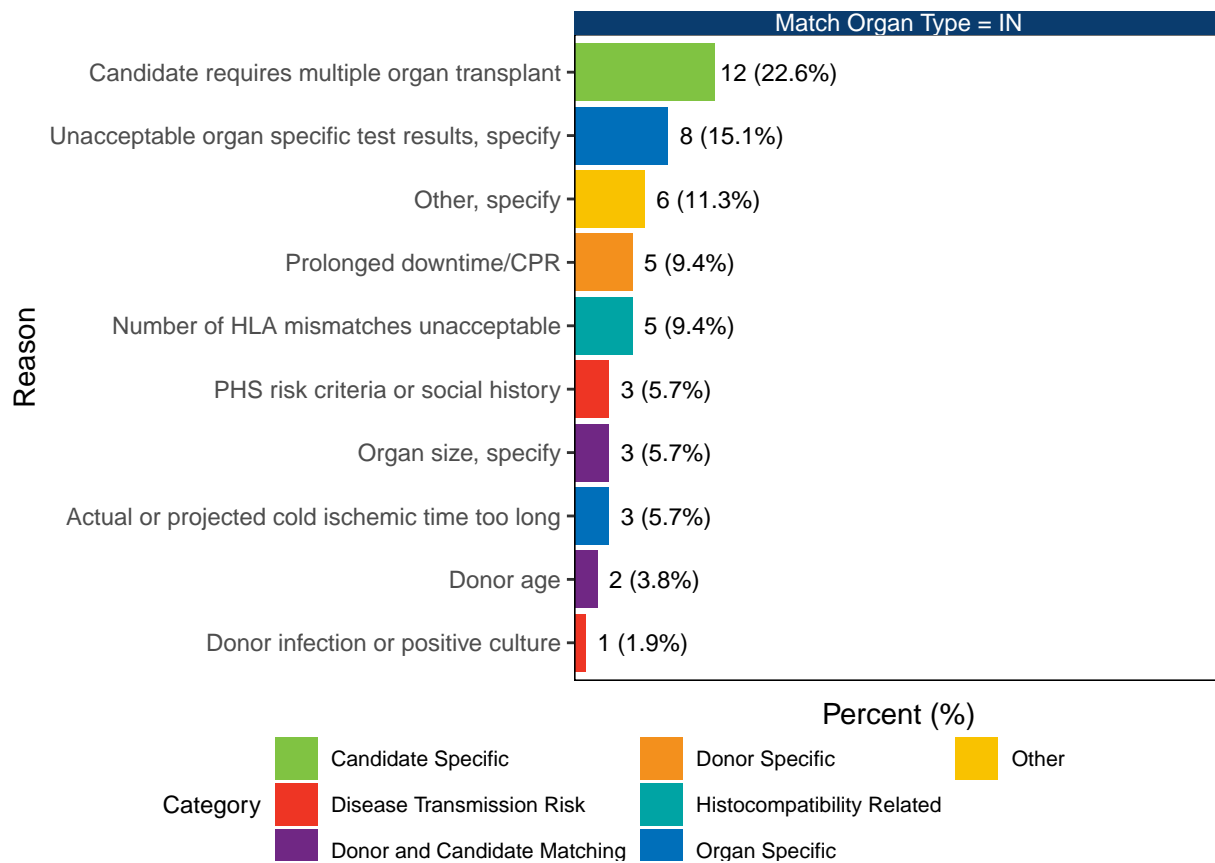




Figure 27: Top ten reasons for refusal of range refused intestine match organ offers for transplant candidates post implementation, for intestine matches submitted December 02, 2021 - September 02, 2022.



**By Program Size**

Figure 28: Top five reasons for refusal of range refused kidney match organ offers for transplant candidates post implementation stratified by program size, for kidney matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor kidney transplants during 2020.

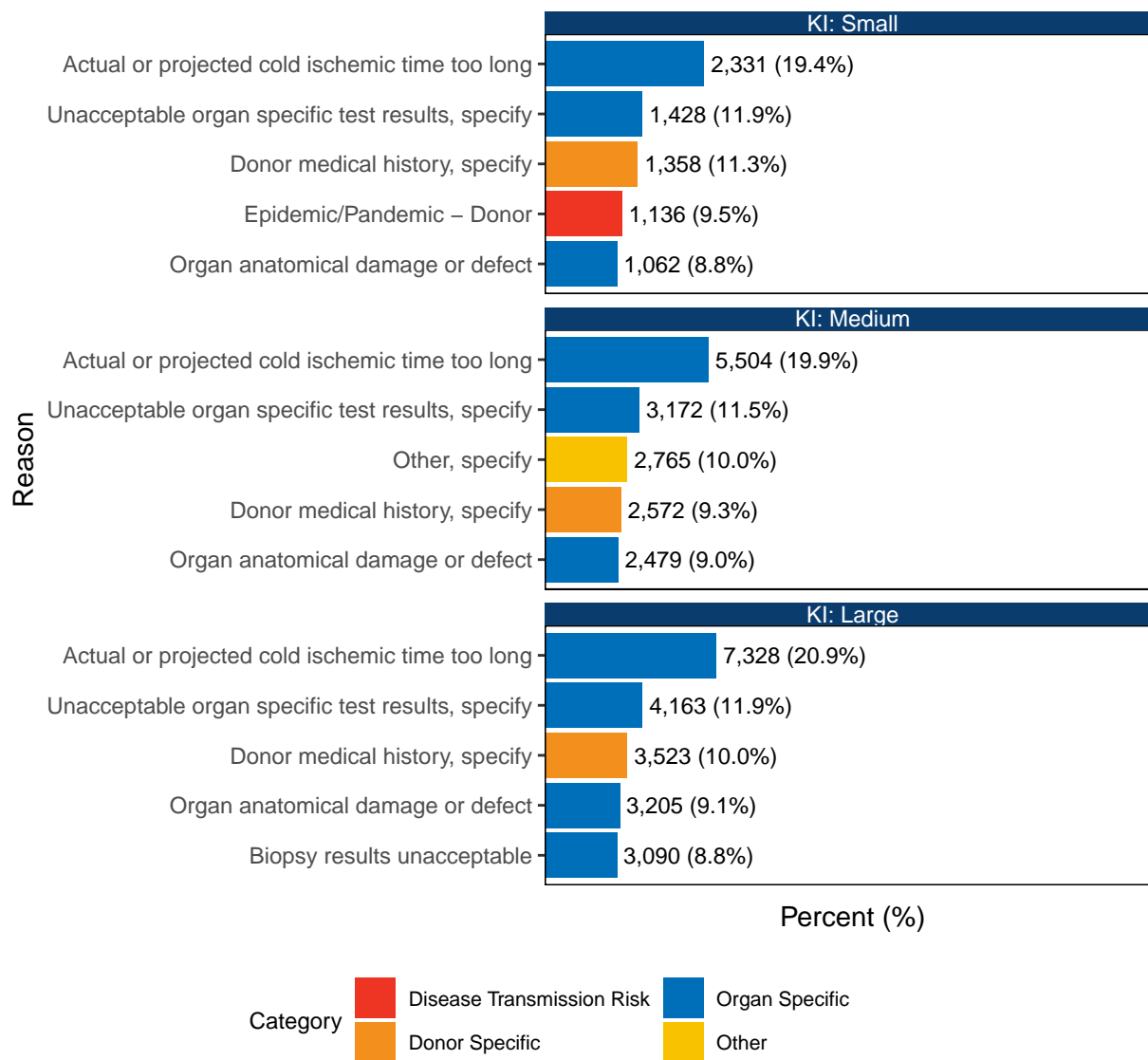


Figure 29: Top five reasons for refusal of range refused liver match organ offers for transplant candidates post implementation stratified by program size, for liver matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor liver transplants during 2020.

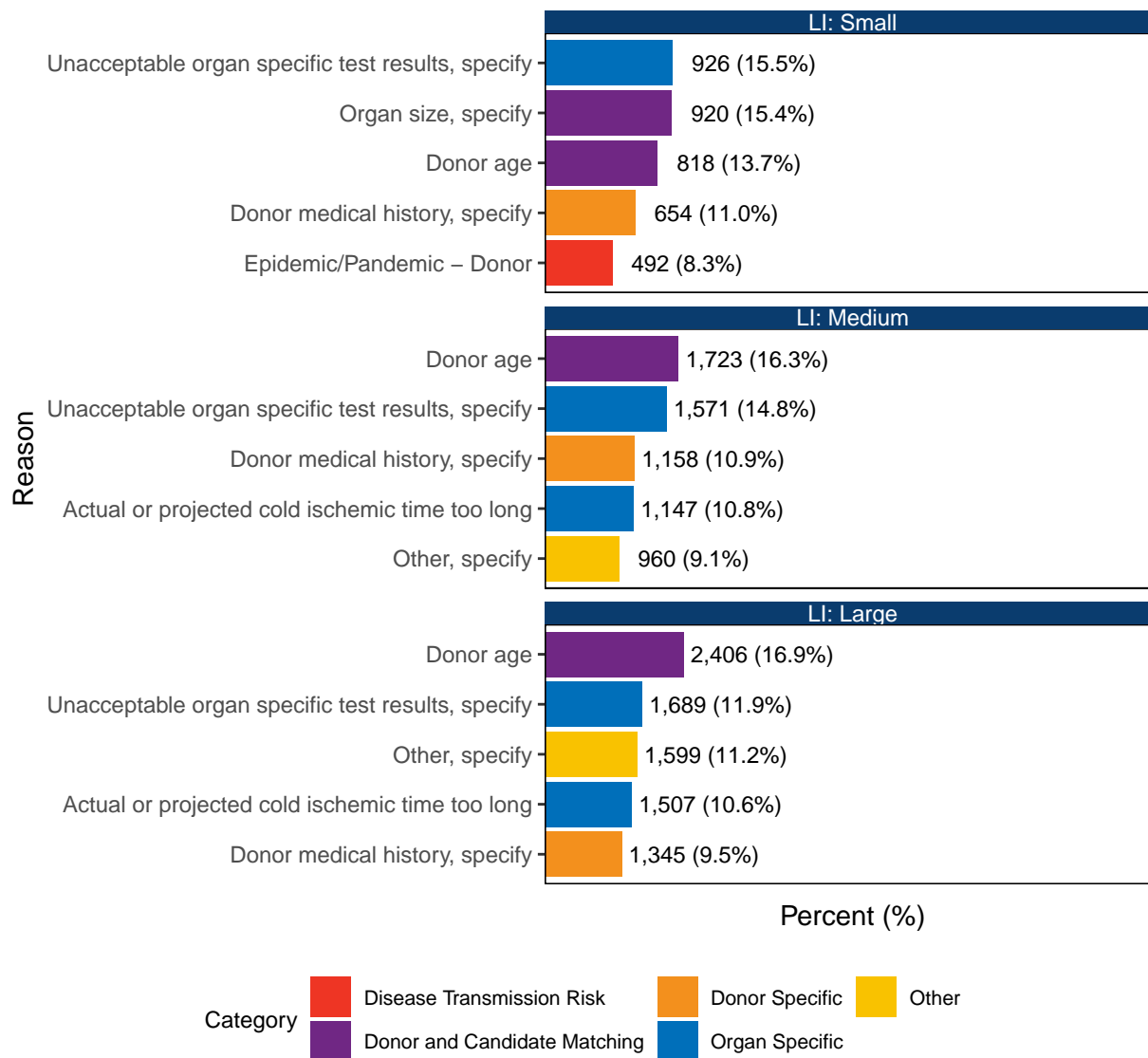


Figure 30: Top five reasons for refusal of range refused heart and heart-lung match organ offers for transplant candidates post implementation stratified by program size, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor heart and heart-lung transplants during 2020.

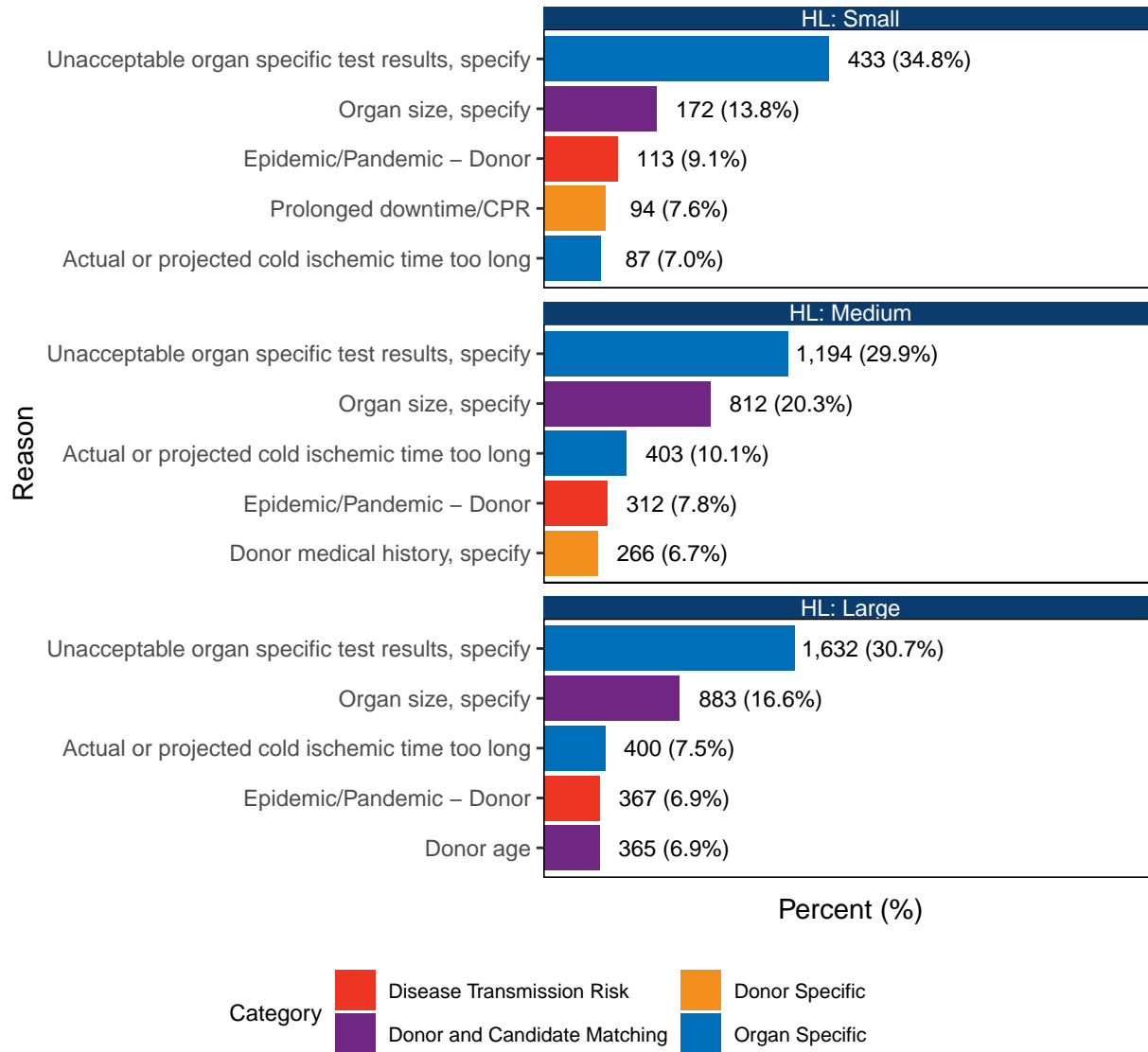
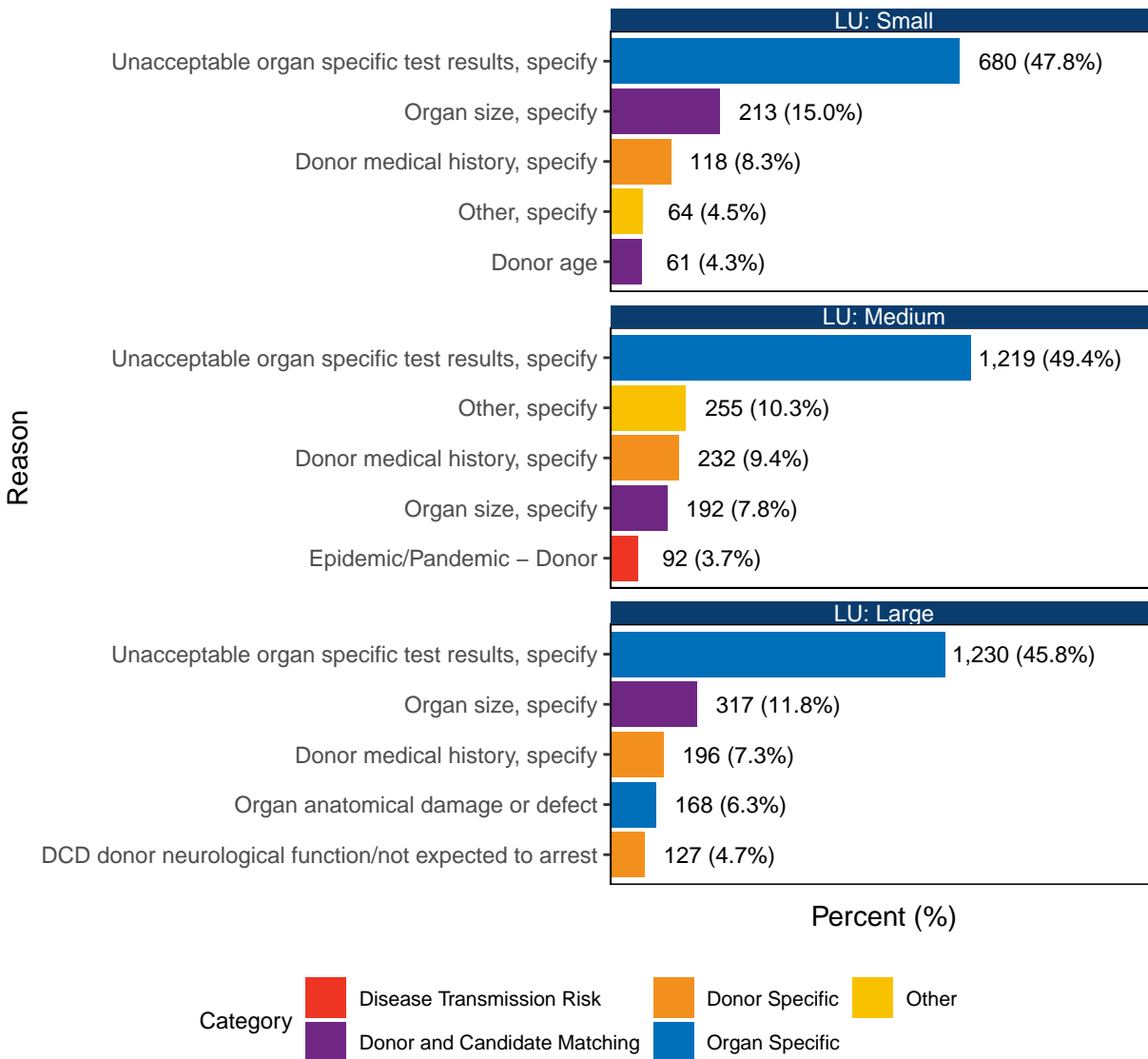


Figure 31: Top five reasons for refusal of range refused lung match organ offers for transplant candidates post implementation stratified by program size, for lung matches submitted December 02, 2021 - September 02, 2022. Program size defined by volume of deceased donor lung transplants during 2020.



**By Sequence Number**

Figure 32: Top five reasons for refusal of range refused kidney match organ offers for transplant candidates post implementation stratified by match acceptance number, for kidney matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on kidney matches during 2020.

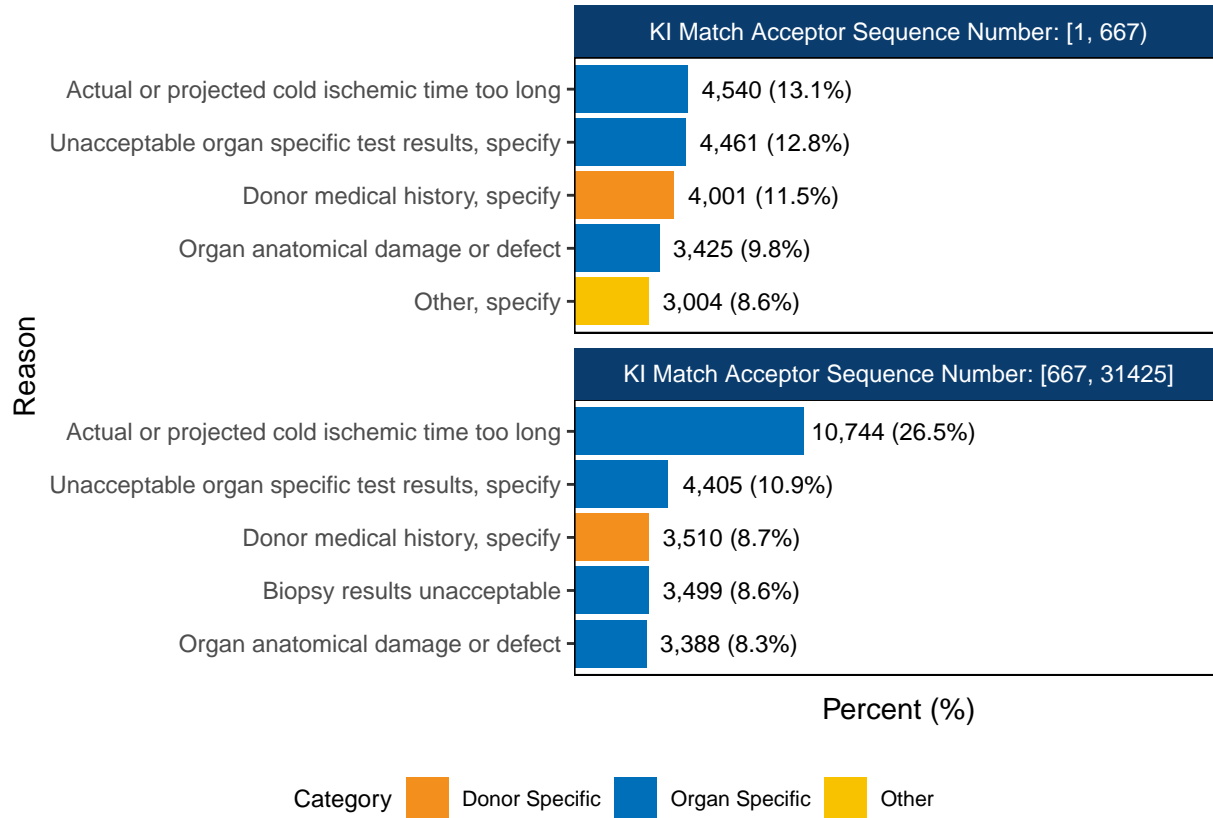


Figure 33: Top five reasons for refusal of range refused liver match organ offers for transplant candidates post implementation stratified by match acceptance number, for liver matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on liver matches during 2020.

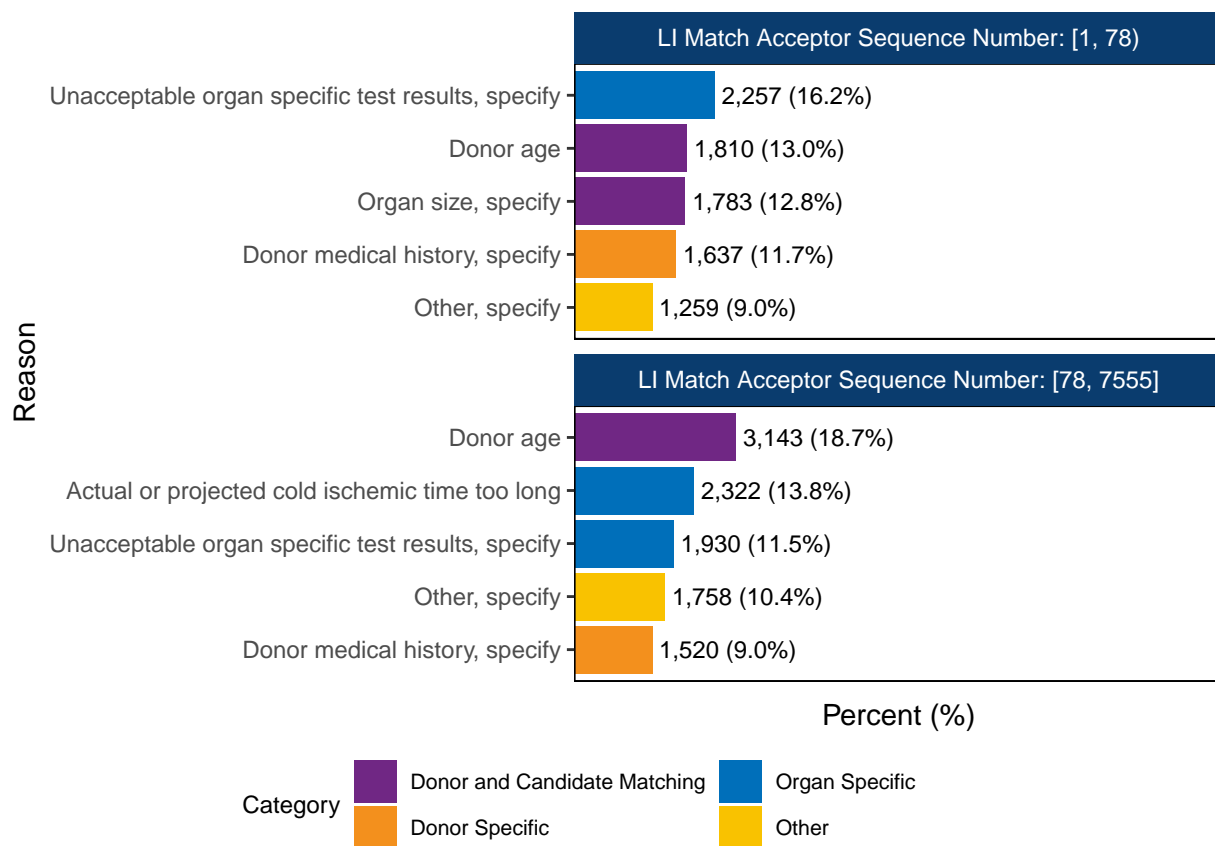


Figure 34: Top five reasons for refusal of range refused heart and heart-lung match organ offers for transplant candidates post implementation stratified by match acceptance number, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on heart and heart-lung matches during 2020.

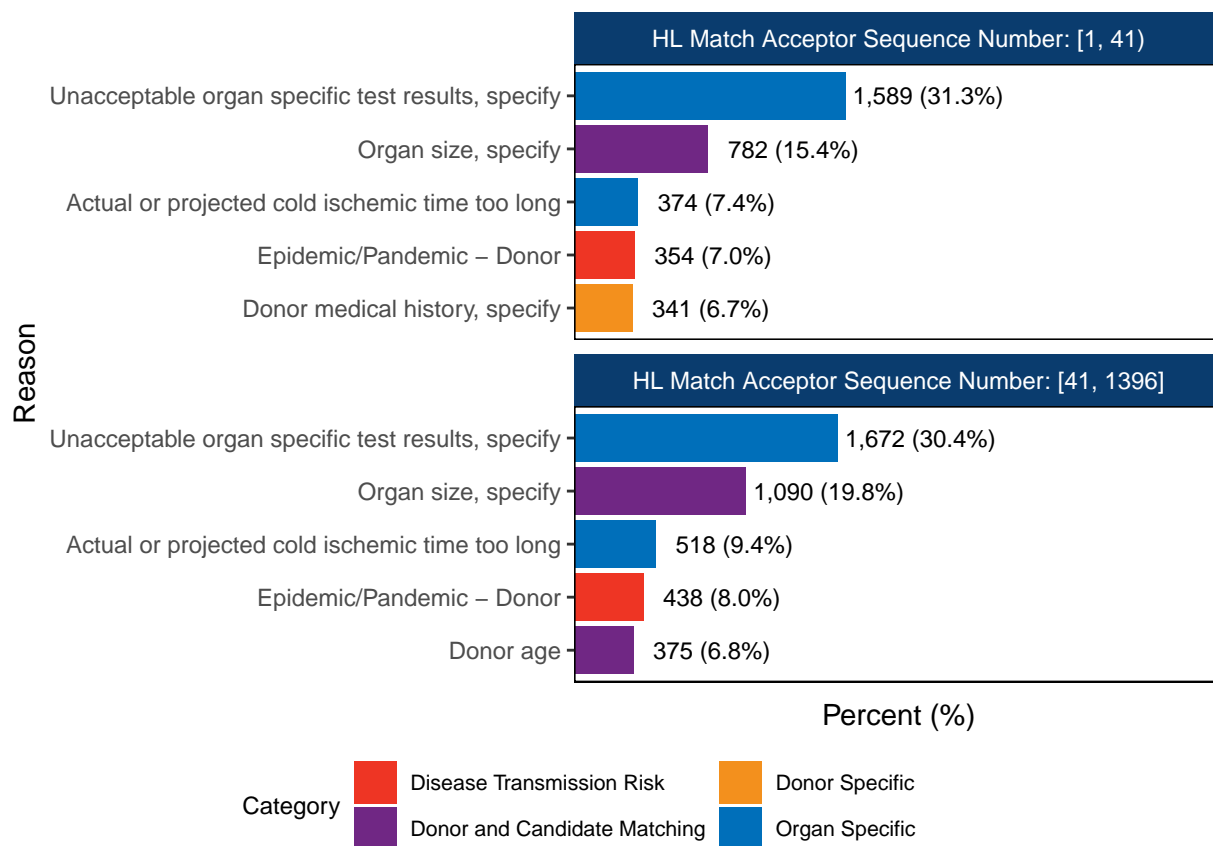
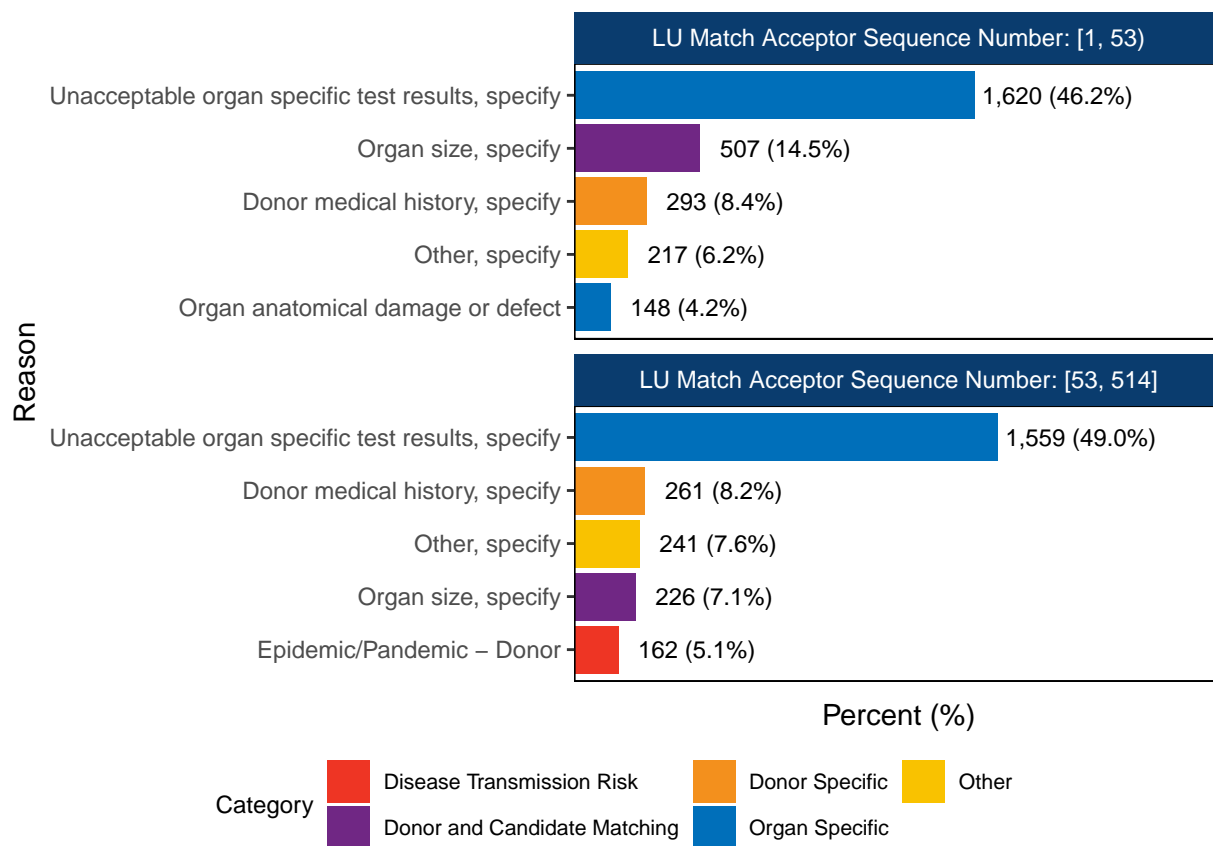




Figure 35: Top five reasons for refusal of range refused lung match organ offers for transplant candidates post implementation stratified by match acceptance number, for lung matches submitted December 02, 2021 - September 02, 2022. Group was defined by the 90th percentile of sequence numbers for acceptances on lung matches during 2020.



## “Other, Specify” Free Text Fields

At the request of the DAC, this report also includes an analysis of the use of “Other, specify” organ refusal reasons. We carried out this analysis by analyzing the most frequent word use of any free text entered by the user for a primary or secondary “Other, specify” refusal code for all match types. These codes included:

- 701 - Organ size, specify
- 750 - Donor medical history, specify
- 717 - Unacceptable organ specific test results, specify
- 798 - Other, specify

Note that this analysis was restricted to the post-policy era. Range refusal text was limited to one observation per unique donor and listing center. Standard natural language processing (NLP) pre-processing techniques were used to standardize the free text, accounting for capitalization variation, removing common English words, and removing punctuation, numerals, and additional spacing.

For each included refusal code and match type, an aggregated table of the top 10 words entered, along with a wordcloud displaying the top 20 words entered, is presented below. Note that due to very small numbers, analysis of words reported commonly for IN matches has not been reported here.

### 701: Organ size, specify

The following graphs and tables report free text words most commonly found in the **701: Organ size, specify** field by organ.

Table 9: Top ten words in free text for refusal code 701 and match type KI

Word	Frequency
small	384
donor	250
size	135
weight	66
kidney	45
kidneys	42
bmi	38
recipient	35
pediatric	30
dcd	29

Figure 36: Top twenty words in free text for refusal code 701 and match type KI



Table 10: Top ten words in free text for refusal code 701 and match type KP

Word	Frequency
bmi	35
donor	20
small	19
size	13
high	3
weight	1
recips	1
match	1
mis	1
mismatch	1

Figure 37: Top twenty words in free text for refusal code 701 and match type KP



Table 11: Top ten words in free text for refusal code 701 and match type LI

Word	Frequency
bmi	579
donor	396
big	254
large	234
size	176
small	129
liver	123
recipient	100
dcd	79
organ	66

Figure 38: Top twenty words in free text for refusal code 701 and match type LI

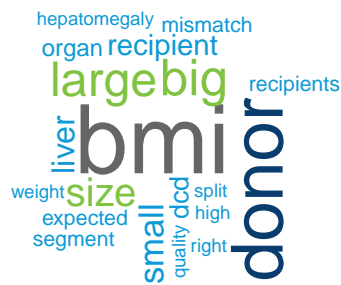


Table 12: Top ten words in free text for refusal code 701 and match type HR

Word	Frequency
small	158
donor	108
female	47
size	47
male	33
recipient	23
mismatch	19
recipients	17
mass	17
cardiac	16

Figure 39: Top twenty words in free text for refusal code 701 and match type HR

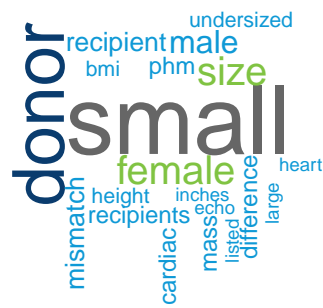


Table 13: Top ten words in free text for refusal code 701 and match type LU

Word	Frequency
big	75
size	72
donor	65
large	65
small	58
lung	52
recipient	36
measurements	34
lungs	25
mismatch	24

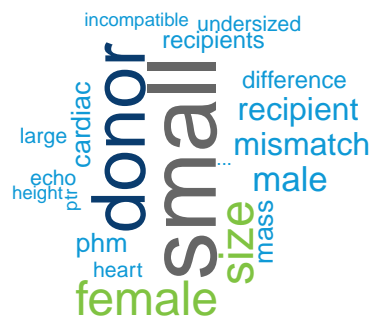
Figure 40: Top twenty words in free text for refusal code 701 and match type LU



Table 14: Top ten words in free text for refusal code 701 and match type HL

Word	Frequency
small	377
donor	271
size	154
female	150
male	94
mismatch	76
recipient	74
mass	56
phm	54
cardiac	47

Figure 41: Top twenty words in free text for refusal code 701 and match type HL



**750: Donor medical history, specify**

The following graphs and tables report free text words most commonly found in the **750: Donor medical history, specify** field by organ.

Table 15: Top ten words in free text for refusal code 750 and match type KI

Word	Frequency
htn	1753
kdpi	1102
dcd	818
creatinine	715
age	437
elevated	419
quality	418
history	393
crrt	383
kidney	328

Figure 42: Top twenty words in free text for refusal code 750 and match type KI

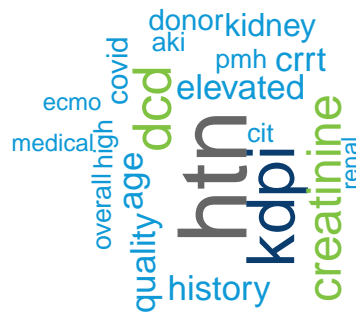




Table 16: Top ten words in free text for refusal code 750 and match type KP

Word	Frequency
etoh	39
use	27
history	24
bmi	23
drug	19
elevated	19
htn	16
heavy	16
insulin	15
abuse	14

Figure 43: Top twenty words in free text for refusal code 750 and match type KP

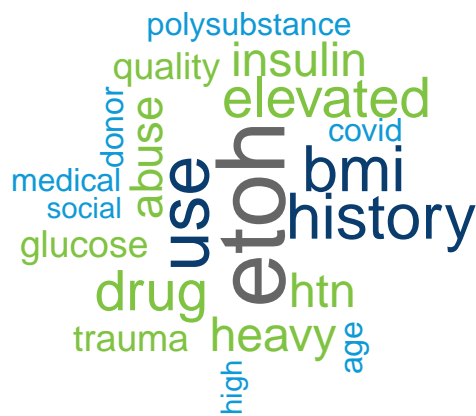


Table 17: Top ten words in free text for refusal code 750 and match type LI

Word	Frequency
etoh	379
quality	365
htn	333
bmi	312
dcd	253
overall	210
history	210
age	181
liver	179
donor	166

Figure 44: Top twenty words in free text for refusal code 750 and match type LI



Table 18: Top ten words in free text for refusal code 750 and match type HR

Word	Frequency
quality	38
use	27
history	21
cath	20
echo	20
cardiac	18
htn	18
drug	17
unknown	15
arrest	14

Figure 45: Top twenty words in free text for refusal code 750 and match type HR

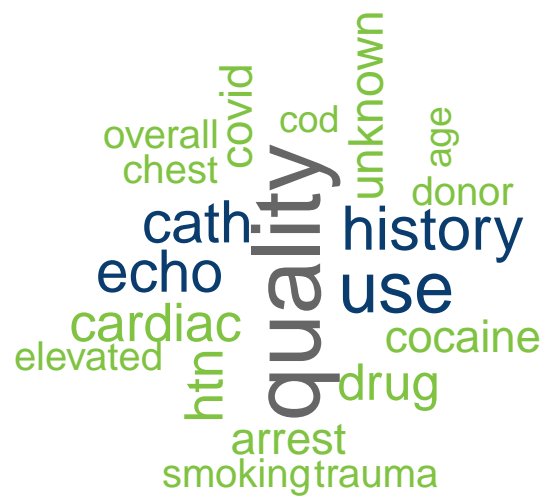


Table 19: Top ten words in free text for refusal code 750 and match type LU

Word	Frequency
smoking	154
history	77
quality	65
asthma	64
pack	27
smoker	24
covid	24
overall	23
sternotomy	23
lung	22

Figure 46: Top twenty words in free text for refusal code 750 and match type LU



Table 20: Top ten words in free text for refusal code 750 and match type HL

Word	Frequency
quality	66
history	60
use	52
drug	43
echo	42
htn	42
unknown	38
endocarditis	35
abuse	33
cath	32

Figure 47: Top twenty words in free text for refusal code 750 and match type HL



**717: Unacceptable organ specific test results, specify**

The following graphs and tables report free text words most commonly found in the **717: Unacceptable organ specific test results, specify** field by organ.

Table 21: Top ten words in free text for refusal code 717 and match type KI

Word	Frequency
creatinine	3540
elevated	1369
pump	1152
kdpi	749
numbers	740
high	540
crrt	391
poor	301
terminal	284
dcd	268

Figure 48: Top twenty words in free text for refusal code 717 and match type KI

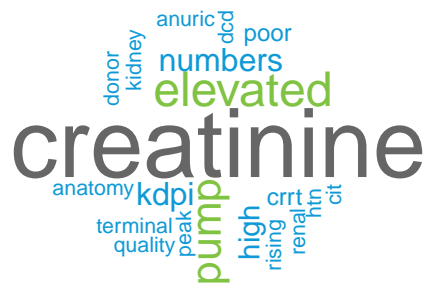


Table 22: Top ten words in free text for refusal code 717 and match type KP

Word	Frequency
elevated	106
creatinine	71
lipase	50
amylase	40
labs	29
insulin	17
high	17
glucose	16
blood	14
sugars	13

Figure 49: Top twenty words in free text for refusal code 717 and match type KP

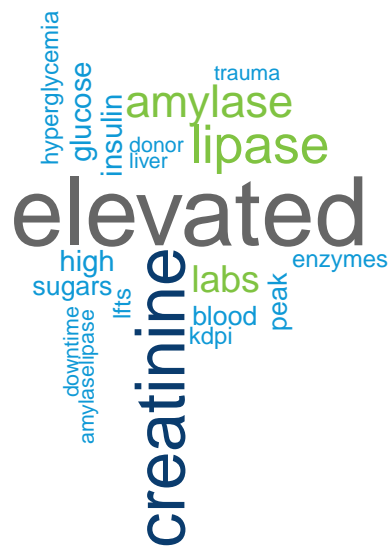


Table 23: Top ten words in free text for refusal code 717 and match type LI

Word	Frequency
lfts	721
elevated	679
liver	659
steatosis	448
fatty	344
hepatic	298
enzymes	196
labs	186
imaging	185
results	154

Figure 50: Top twenty words in free text for refusal code 717 and match type LI

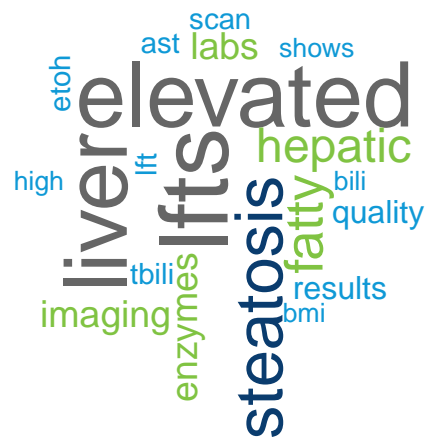




Table 24: Top ten words in free text for refusal code 717 and match type HR

Word	Frequency
echo	295
cath	176
lvh	93
quality	66
results	57
cad	57
elevated	57
troponin	49
mild	42
poor	39

Figure 51: Top twenty words in free text for refusal code 717 and match type HR



Table 25: Top ten words in free text for refusal code 717 and match type LU

Word	Frequency
chest	352
imaging	289
bronch	236
cxr	218
poor	196
pneumonia	187
quality	170
aspiration	149
results	147
bilateral	143

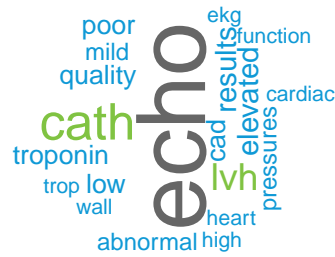
Figure 52: Top twenty words in free text for refusal code 717 and match type LU



Table 26: Top ten words in free text for refusal code 717 and match type HL

Word	Frequency
echo	917
cath	392
lvh	239
elevated	158
results	144
quality	132
troponin	124
low	117
poor	111
cad	110

Figure 53: Top twenty words in free text for refusal code 717 and match type HL



**798: Other, specify**

The following graphs and tables report free text words most commonly found in the **717: Other, specify** field by organ.

Table 27: Top ten words in free text for refusal code 798 and match type KI

Word	Frequency
criteria	1563
kdpi	1481
dcd	1424
cit	1333
meet	1057
center	1013
pump	868
quality	804
donor	554
anatomy	519

Figure 54: Top twenty words in free text for refusal code 798 and match type KI



Table 28: Top ten words in free text for refusal code 798 and match type KP

Word	Frequency
import	53
quality	45
non	43
distance	28
donor	20
elevated	19
insulin	15
offer	13
criteria	12
dcd	11

Figure 55: Top twenty words in free text for refusal code 798 and match type KP

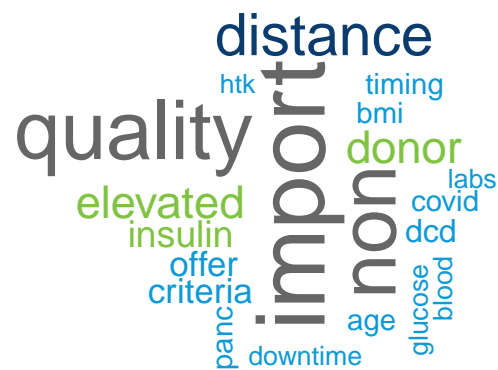


Table 29: Top ten words in free text for refusal code 798 and match type LI

Word	Frequency
dcd	1020
quality	839
donor	319
age	314
distance	294
criteria	271
liver	227
overall	196
bmi	171
covid	145

Figure 56: Top twenty words in free text for refusal code 798 and match type LI

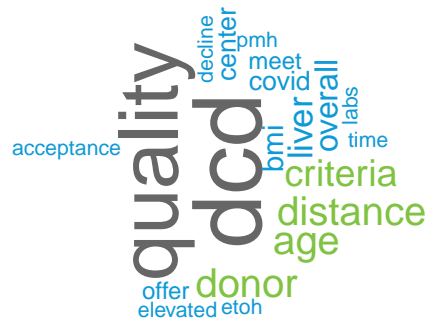


Table 30: Top ten words in free text for refusal code 798 and match type HR

Word	Frequency
quality	79
dcd	46
donor	36
distance	35
time	31
covid	28
heart	22
overall	20
elevated	11
echo	11

Figure 57: Top twenty words in free text for refusal code 798 and match type HR



Table 31: Top ten words in free text for refusal code 798 and match type LU

Word	Frequency
quality	197
dcd	47
lung	46
donor	35
chest	25
bilateral	23
overall	22
covid	21
offer	18
smoking	17

Figure 58: Top twenty words in free text for refusal code 798 and match type LU

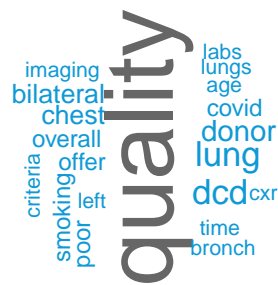




Table 32: Top ten words in free text for refusal code 798 and match type HL

Word	Frequency
quality	109
dcd	76
donor	61
distance	39
time	38
echo	35
overall	33
unknown	32
downtime	32
heart	27

Figure 59: Top twenty words in free text for refusal code 798 and match type HL



## Summary

To date, no single refusal code has replaced the previously over-utilized “860: Donor age and quality” code. And while in earlier post-implementation monitoring reports, for most organs the “Epidemic/Pandemic - Donor” reason for organ offer refusal was one of the top used codes, the frequency of use of this code has declined over time. There are some differences in the most frequently used reasons for refusal by organ, program size, and whether the last acceptor on a match is within the 90th percentile or not. This also holds true for range refusals.

In the supplemental analysis of free text entered in “Other, specify” options for the refusal code field, we also found common occurrences of words that suggest future evaluation of the use of these fields is warranted, including “DCD”, “CIT” (i.e. cold ischemic time), and “KDPI”. If terms such as “DCD” and “CIT” are being cited in free text, and the drop-down options for refusals related to these two things are not being used, an evaluation of whether 1) additional data entry training is needed, or 2) whether additional response options are required to fully capture standardized refusal reasons for a significant portion of match refusals is warranted. Furthermore, there is no standardized option currently that indicates a refusal is related to donor KDPI. The frequent appearance of this term in free text fields should be evaluated.

Current data suggest that implementation of the new refusal reasons largely accomplished its goals of providing more relevant, discrete, and mutually exclusive information and promoting the collection of more actionable data on organ refusals. Subsequent monitoring reports should consider the ongoing use of free text responses and evaluate whether they support the development of additional standardized refusal reason categories.

## Appendix

Table 33: Count and percent of reasons for refusal of range refused kidney match organ offers post implementation stratified by program size, for kidney matches submitted December 02, 2021 - September 02, 2022. Program size is defined by volume of deceased donor kidney transplants during 2020.

Description	Large		Medium		Small		No Transplants in 2020	
	N	%	N	%	N	%	N	%
Actual or projected cold ischemic time too long	302,758	20.8%	109,963	18.4%	25,629	19.1%	668	17.9%
Unacceptable organ specific test results, specify	207,949	14.3%	76,532	12.8%	16,095	12.0%	722	19.3%
Donor medical history, specify	194,553	13.4%	63,873	10.7%	18,925	14.1%	277	7.4%
Organ anatomical damage or defect	150,909	10.4%	60,517	10.1%	12,075	9.0%	521	14.0%
Biopsy results unacceptable	145,135	10.0%	52,437	8.8%	11,001	8.2%	254	6.8%
Epidemic/Pandemic - Donor	126,530	8.7%	69,588	11.7%	16,090	12.0%	520	13.9%
Other, specify	88,500	6.1%	59,950	10.1%	8,717	6.5%	83	2.2%
Donor age	73,037	5.0%	34,201	5.7%	9,999	7.5%	123	3.3%
Organ preservation: Unacceptable method or findings	43,847	3.0%	21,092	3.5%	3,607	2.7%	253	6.8%
Warm ischemic time too long	38,696	2.7%	16,608	2.8%	3,461	2.6%	28	0.7%
Organ size, specify	22,490	1.5%	5,017	0.8%	1,542	1.2%	34	0.9%
Biopsy not available	12,328	0.8%	2,697	0.5%	617	0.5%	102	2.7%
Donor infection or positive culture	10,394	0.7%	5,123	0.9%	1,186	0.9%	42	1.1%
Malignancy or suspected malignancy	9,178	0.6%	5,011	0.8%	935	0.7%	0	0.0%
DCD donor neurological function/not expected to arrest	7,878	0.5%	2,512	0.4%	653	0.5%	7	0.2%
Organ specific test results not available, specify	7,189	0.5%	3,374	0.6%	802	0.6%	17	0.5%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	4,141	0.3%	1,905	0.3%	401	0.3%	35	0.9%
PHS risk criteria or social history	3,027	0.2%	584	0.1%	838	0.6%	42	1.1%
Donor instability/high vasopressor usage	1,376	0.1%	669	0.1%	77	0.1%	0	0.0%
No candidate serum for crossmatching	1,252	0.1%	1,182	0.2%	168	0.1%	0	0.0%
Candidate temporarily medically unsuitable	1,124	0.1%	207	0.0%	80	0.1%	1	0.0%
Transplant team or transplant facility availability	938	0.1%	312	0.1%	299	0.2%	0	0.0%
Candidate requires multiple organ transplant	840	0.1%	63	0.0%	51	0.0%	0	0.0%
Epidemic/Pandemic - Candidate	401	0.0%	938	0.2%	110	0.1%	0	0.0%
Prolonged downtime/CPR	351	0.0%	1,068	0.2%	210	0.2%	3	0.1%
Resource time constraint (OPO, TXC, donor hospital, etc.)	313	0.0%	264	0.0%	100	0.1%	0	0.0%
Positive virtual crossmatch/unacceptable antigens	281	0.0%	25	0.0%	24	0.0%	0	0.0%
Exceeded policy defined response time	200	0.0%	68	0.0%	24	0.0%	0	0.0%
Transportation availability	124	0.0%	9	0.0%	1	0.0%	0	0.0%
Positive physical crossmatch	122	0.0%	122	0.0%	23	0.0%	0	0.0%
Candidate refused	106	0.0%	39	0.0%	24	0.0%	0	0.0%
Candidate unavailable	104	0.0%	81	0.0%	7	0.0%	1	0.0%
Candidate transplanted or pending transplant	75	0.0%	45	0.0%	5	0.0%	0	0.0%
Disaster Emergency Management Consideration	31	0.0%	207	0.0%	0	0.0%	0	0.0%
Candidate requires different laterality	13	0.0%	4	0.0%	0	0.0%	0	0.0%
Candidate temporarily ineligible due to insurance or financial issue	11	0.0%	6	0.0%	0	0.0%	1	0.0%
No donor cells/specimen for crossmatching, or no time for crossmatch	11	0.0%	42	0.0%	90	0.1%	0	0.0%
Number of HLA mismatches unacceptable	8	0.0%	2	0.0%	9	0.0%	0	0.0%
Candidate's condition improved, transplant not needed	1	0.0%	0	0.0%	1	0.0%	0	0.0%
Donor family time constraint	1	0.0%	0	0.0%	0	0.0%	0	0.0%
Recovery team availability	0	0.0%	41	0.0%	0	0.0%	0	0.0%

Table 34: Count and percent of reasons for refusal of range refused liver match organ offers post implementation stratified by program size, for liver matches submitted December 02, 2021 - September 02, 2022. Program size is defined by volume of deceased donor liver transplants during 2020.

Description	Large		Medium		Small	
	N	%	N	%	N	%
Donor age	25,896	20.0%	14,981	19.6%	3,854	16.1%
Other, specify	15,935	12.3%	8,550	11.2%	2,018	8.4%
Actual or projected cold ischemic time too long	15,866	12.2%	8,489	11.1%	2,355	9.8%
Unacceptable organ specific test results, specify	15,051	11.6%	9,514	12.5%	3,764	15.7%
DCD donor neurological function/not expected to arrest	13,084	10.1%	5,626	7.4%	855	3.6%
Donor medical history, specify	11,914	9.2%	6,738	8.8%	2,577	10.7%
Epidemic/Pandemic - Donor	8,021	6.2%	8,008	10.5%	2,130	8.9%
Organ size, specify	6,148	4.7%	4,270	5.6%	2,270	9.5%
Biopsy results unacceptable	5,637	4.3%	3,874	5.1%	1,126	4.7%
Organ anatomical damage or defect	2,067	1.6%	1,075	1.4%	619	2.6%
Malignancy or suspected malignancy	1,334	1.0%	729	1.0%	213	0.9%
Resource time constraint (OPO, TXC, donor hospital, etc.)	1,168	0.9%	529	0.7%	187	0.8%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	1,064	0.8%	675	0.9%	211	0.9%
Organ specific test results not available, specify	836	0.6%	384	0.5%	133	0.6%
Donor infection or positive culture	783	0.6%	314	0.4%	149	0.6%
Organ preservation: Unacceptable method or findings	726	0.6%	229	0.3%	536	2.2%
Donor instability/high vasopressor usage	670	0.5%	488	0.6%	160	0.7%
Biopsy not available	496	0.4%	238	0.3%	25	0.1%
Candidate unavailable	402	0.3%	21	0.0%	42	0.2%
Candidate temporarily medically unsuitable	341	0.3%	149	0.2%	50	0.2%
PHS risk criteria or social history	337	0.3%	390	0.5%	154	0.6%
Transplant team or transplant facility availability	303	0.2%	65	0.1%	7	0.0%
Donor family time constraint	302	0.2%	112	0.1%	60	0.2%
Candidate transplanted or pending transplant	260	0.2%	115	0.2%	30	0.1%
Candidate requires multiple organ transplant	244	0.2%	32	0.0%	13	0.1%
Exceeded policy defined response time	214	0.2%	97	0.1%	28	0.1%
Epidemic/Pandemic - Candidate	158	0.1%	39	0.1%	22	0.1%
Warm ischemic time too long	136	0.1%	261	0.3%	45	0.2%
Prolonged downtime/CPR	111	0.1%	201	0.3%	277	1.2%
Transportation availability	40	0.0%	16	0.0%	40	0.2%
Candidate refused	39	0.0%	20	0.0%	4	0.0%
Recovery team availability	7	0.0%	37	0.0%	10	0.0%
No donor cells/specimen for crossmatching, or no time for crossmatch	6	0.0%	0	0.0%	0	0.0%
Candidate temporarily ineligible due to insurance or financial issue	4	0.0%	0	0.0%	0	0.0%
Candidate's condition improved, transplant not needed	3	0.0%	4	0.0%	12	0.0%
Number of HLA mismatches unacceptable	2	0.0%	0	0.0%	0	0.0%
Positive virtual crossmatch/unacceptable antigens	1	0.0%	2	0.0%	1	0.0%
Positive physical crossmatch	0	0.0%	1	0.0%	2	0.0%
Disaster Emergency Management Consideration	0	0.0%	0	0.0%	32	0.1%

Table 35: Count and percent of reasons for refusal of range refused heart and heart-lung match organ offers post implementation stratified by program size, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022. Program size is defined by volume of deceased donor heart and heart-lung transplants during 2020.

Description	Large		Medium		Small	
	N	%	N	%	N	%
Unacceptable organ specific test results, specify	6,678	37.2%	3,138	29.6%	845	38.9%
Organ size, specify	2,323	12.9%	2,349	22.2%	263	12.1%
Donor age	1,655	9.2%	837	7.9%	84	3.9%
Donor medical history, specify	1,276	7.1%	849	8.0%	132	6.1%
Epidemic/Pandemic - Donor	1,090	6.1%	788	7.4%	181	8.3%
DCD donor neurological function/not expected to arrest	868	4.8%	82	0.8%	0	0.0%
Other, specify	858	4.8%	353	3.3%	115	5.3%
Actual or projected cold ischemic time too long	752	4.2%	822	7.8%	127	5.8%
Prolonged downtime/CPR	614	3.4%	335	3.2%	163	7.5%
Organ anatomical damage or defect	465	2.6%	495	4.7%	44	2.0%
Organ specific test results not available, specify	265	1.5%	72	0.7%	15	0.7%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	201	1.1%	25	0.2%	10	0.5%
PHS risk criteria or social history	163	0.9%	105	1.0%	80	3.7%
Resource time constraint (OPO, TXC, donor hospital, etc.)	148	0.8%	27	0.3%	18	0.8%
Donor infection or positive culture	113	0.6%	60	0.6%	33	1.5%
Organ preservation: Unacceptable method or findings	108	0.6%	29	0.3%	2	0.1%
Warm ischemic time too long	71	0.4%	13	0.1%	1	0.0%
Donor instability/high vasopressor usage	56	0.3%	78	0.7%	26	1.2%
Malignancy or suspected malignancy	52	0.3%	40	0.4%	4	0.2%
Candidate temporarily medically unsuitable	42	0.2%	10	0.1%	2	0.1%
Transplant team or transplant facility availability	31	0.2%	4	0.0%	7	0.3%
Candidate requires multiple organ transplant	27	0.2%	20	0.2%	1	0.0%
Epidemic/Pandemic - Candidate	24	0.1%	6	0.1%	11	0.5%
Candidate transplanted or pending transplant	21	0.1%	15	0.1%	3	0.1%
Exceeded policy defined response time	13	0.1%	6	0.1%	1	0.0%
Donor family time constraint	12	0.1%	10	0.1%	2	0.1%
Positive virtual crossmatch/unacceptable antigens	12	0.1%	5	0.0%	1	0.0%
Recovery team availability	9	0.1%	8	0.1%	0	0.0%
Candidate refused	4	0.0%	1	0.0%	0	0.0%
No donor cells/specimen for crossmatching, or no time for crossmatch	4	0.0%	0	0.0%	0	0.0%
Number of HLA mismatches unacceptable	4	0.0%	0	0.0%	0	0.0%
Positive physical crossmatch	4	0.0%	0	0.0%	0	0.0%
Transportation availability	4	0.0%	1	0.0%	0	0.0%
Biopsy not available	2	0.0%	0	0.0%	0	0.0%
Candidate's condition improved, transplant not needed	0	0.0%	2	0.0%	0	0.0%
Biopsy results unacceptable	0	0.0%	1	0.0%	2	0.1%
Candidate unavailable	0	0.0%	1	0.0%	0	0.0%
No candidate serum for crossmatching	0	0.0%	1	0.0%	1	0.0%

Table 36: Count and percent of reasons for refusal of range refused lung match organ offers post implementation stratified by program size, for lung matches submitted December 02, 2021 - September 02, 2022. Program size is defined by volume of deceased donor lung transplants during 2020.

Description	Large		Medium		Small		No Transplants in 2020	
	N	%	N	%	N	%	N	%
Unacceptable organ specific test results, specify	7,542	49.7%	4,669	49.8%	2,281	51.3%	112	47.3%
Organ size, specify	1,171	7.7%	461	4.9%	513	11.5%	19	8.0%
Donor medical history, specify	1,028	6.8%	916	9.8%	381	8.6%	16	6.8%
Other, specify	991	6.5%	1,184	12.6%	195	4.4%	46	19.4%
Epidemic/Pandemic - Donor	804	5.3%	384	4.1%	119	2.7%	7	3.0%
DCD donor neurological function/not expected to arrest	728	4.8%	370	3.9%	80	1.8%	0	0.0%
Organ anatomical damage or defect	669	4.4%	190	2.0%	132	3.0%	3	1.3%
Donor age	518	3.4%	290	3.1%	226	5.1%	7	3.0%
Candidate requires different laterality	387	2.5%	325	3.5%	101	2.3%	9	3.8%
Organ specific test results not available, specify	236	1.6%	65	0.7%	53	1.2%	1	0.4%
Actual or projected cold ischemic time too long	225	1.5%	121	1.3%	194	4.4%	14	5.9%
Resource time constraint (OPO, TXC, donor hospital, etc.)	197	1.3%	121	1.3%	26	0.6%	0	0.0%
PHS risk criteria or social history	153	1.0%	47	0.5%	3	0.1%	0	0.0%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	144	0.9%	10	0.1%	2	0.0%	1	0.4%
Donor infection or positive culture	124	0.8%	58	0.6%	10	0.2%	1	0.4%
Organ preservation: Unacceptable method or findings	40	0.3%	3	0.0%	31	0.7%	0	0.0%
Donor family time constraint	39	0.3%	8	0.1%	3	0.1%	0	0.0%
Candidate requires multiple organ transplant	34	0.2%	51	0.5%	74	1.7%	1	0.4%
Prolonged downtime/CPR	26	0.2%	2	0.0%	2	0.0%	0	0.0%
Epidemic/Pandemic - Candidate	23	0.2%	1	0.0%	0	0.0%	0	0.0%
Warm ischemic time too long	22	0.1%	1	0.0%	0	0.0%	0	0.0%
Candidate unavailable	18	0.1%	6	0.1%	0	0.0%	0	0.0%
Candidate temporarily medically unsuitable	14	0.1%	5	0.1%	2	0.0%	0	0.0%
Candidate transplanted or pending transplant	11	0.1%	10	0.1%	1	0.0%	0	0.0%
Positive virtual crossmatch/unacceptable antigens	10	0.1%	7	0.1%	3	0.1%	0	0.0%
Exceeded policy defined response time	9	0.1%	4	0.0%	3	0.1%	0	0.0%
Positive physical crossmatch	5	0.0%	4	0.0%	1	0.0%	0	0.0%
Disaster Emergency Management Consideration	3	0.0%	0	0.0%	0	0.0%	0	0.0%
Number of HLA mismatches unacceptable	3	0.0%	0	0.0%	0	0.0%	0	0.0%
Donor instability/high vasopressor usage	2	0.0%	0	0.0%	0	0.0%	0	0.0%
Malignancy or suspected malignancy	2	0.0%	2	0.0%	0	0.0%	0	0.0%
Candidate refused	1	0.0%	0	0.0%	1	0.0%	0	0.0%
No candidate serum for crossmatching	1	0.0%	0	0.0%	2	0.0%	0	0.0%
Transplant team or transplant facility availability	0	0.0%	60	0.6%	3	0.1%	0	0.0%
Biopsy not available	0	0.0%	4	0.0%	0	0.0%	0	0.0%
Recovery team availability	0	0.0%	3	0.0%	1	0.0%	0	0.0%
Transportation availability	0	0.0%	1	0.0%	0	0.0%	0	0.0%

Table 37: Count and percent of reasons for refusal of range refused kidney-pancreas match organ offers post implementation stratified by program size, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022. Program size is defined by volume of deceased donor kidney-pancreas transplants during 2020.

Description	Large		Medium		Small		No Transplants in 2020	
	N	%	N	%	N	%	N	%
Unacceptable organ specific test results, specify	471	19.2%	455	21.0%	247	24.7%	38	22.2%
Actual or projected cold ischemic time too long	398	16.2%	415	19.1%	205	20.5%	27	15.8%
Donor age	355	14.5%	226	10.4%	63	6.3%	8	4.7%
Donor medical history, specify	253	10.3%	272	12.5%	144	14.4%	15	8.8%
Other, specify	169	6.9%	282	13.0%	59	5.9%	17	9.9%
Organ size, specify	156	6.4%	67	3.1%	21	2.1%	2	1.2%
Epidemic/Pandemic - Donor	123	5.0%	125	5.8%	71	7.1%	9	5.3%
Transplant team or transplant facility availability	68	2.8%	3	0.1%	18	1.8%	4	2.3%
Candidate requires multiple organ transplant	65	2.6%	3	0.1%	9	0.9%	3	1.8%
PHS risk criteria or social history	62	2.5%	93	4.3%	31	3.1%	15	8.8%
Organ anatomical damage or defect	61	2.5%	41	1.9%	28	2.8%	3	1.8%
Organ preservation: Unacceptable method or findings	48	2.0%	29	1.3%	1	0.1%	3	1.8%
Resource time constraint (OPO, TXC, donor hospital, etc.)	48	2.0%	17	0.8%	0	0.0%	0	0.0%
Donor instability/high vasopressor usage	28	1.1%	22	1.0%	13	1.3%	11	6.4%
Candidate temporarily medically unsuitable	27	1.1%	14	0.6%	5	0.5%	0	0.0%
Prolonged downtime/CPR	27	1.1%	42	1.9%	32	3.2%	13	7.6%
Recovery team availability	13	0.5%	4	0.2%	15	1.5%	3	1.8%
Donor infection or positive culture	12	0.5%	0	0.0%	5	0.5%	0	0.0%
DCD donor neurological function/not expected to arrest	10	0.4%	10	0.5%	5	0.5%	0	0.0%
Organ specific test results not available, specify	9	0.4%	24	1.1%	16	1.6%	0	0.0%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	9	0.4%	7	0.3%	3	0.3%	0	0.0%
Candidate transplanted or pending transplant	8	0.3%	1	0.0%	1	0.1%	0	0.0%
Epidemic/Pandemic - Candidate	8	0.3%	4	0.2%	4	0.4%	0	0.0%
Transportation availability	7	0.3%	0	0.0%	0	0.0%	0	0.0%
Donor family time constraint	5	0.2%	0	0.0%	0	0.0%	0	0.0%
Candidate refused	3	0.1%	1	0.0%	0	0.0%	0	0.0%
Malignancy or suspected malignancy	3	0.1%	4	0.2%	0	0.0%	0	0.0%
Candidate unavailable	2	0.1%	1	0.0%	2	0.2%	0	0.0%
Warm ischemic time too long	2	0.1%	2	0.1%	3	0.3%	0	0.0%
Exceeded policy defined response time	1	0.0%	2	0.1%	0	0.0%	0	0.0%
Number of HLA mismatches unacceptable	1	0.0%	2	0.1%	0	0.0%	0	0.0%
Positive physical crossmatch	1	0.0%	1	0.0%	0	0.0%	0	0.0%
Positive virtual crossmatch/unacceptable antigens	1	0.0%	2	0.1%	1	0.1%	0	0.0%

Table 38: Count and percent of reasons for refusal of range refused intestine match organ offers post implementation stratified by program size, for intestine matches submitted December 02, 2021 - September 02, 2022. Program size is defined by volume of deceased donor intestine transplants during 2020.

Description	Large		Medium		Small		No Transplants in 2020	
	N	%	N	%	N	%	N	%
Candidate requires multiple organ transplant	36	48.0%	23	25.3%	1	3.4%	0	0.0%
Number of HLA mismatches unacceptable	12	16.0%	0	0.0%	0	0.0%	0	0.0%
Donor age	9	12.0%	5	5.5%	0	0.0%	0	0.0%
Warm ischemic time too long	8	10.7%	0	0.0%	0	0.0%	0	0.0%
Unacceptable organ specific test results, specify	4	5.3%	13	14.3%	7	24.1%	2	50.0%
Actual or projected cold ischemic time too long	2	2.7%	0	0.0%	5	17.2%	0	0.0%
Organ size, specify	2	2.7%	9	9.9%	0	0.0%	2	50.0%
Donor infection or positive culture	1	1.3%	0	0.0%	0	0.0%	0	0.0%
Other, specify	1	1.3%	23	25.3%	6	20.7%	0	0.0%
PHS risk criteria or social history	0	0.0%	8	8.8%	0	0.0%	0	0.0%
Prolonged downtime/CPR	0	0.0%	7	7.7%	6	20.7%	0	0.0%
Organ anatomical damage or defect	0	0.0%	2	2.2%	0	0.0%	0	0.0%
Epidemic/Pandemic - Donor	0	0.0%	1	1.1%	0	0.0%	0	0.0%
Donor instability/high vasopressor usage	0	0.0%	0	0.0%	3	10.3%	0	0.0%
Positive virtual crossmatch/unacceptable antigens	0	0.0%	0	0.0%	1	3.4%	0	0.0%



Table 39: Count and percent of reasons for refusal of range refused kidney match organ offers post implementation stratified by match acceptance number, for kidney matches submitted December 02, 2021 - September 02, 2022. Group is defined by the 90th percentile of sequence numbers for acceptances on kidney matches during 2020.

Description	Acceptor Sequence Number: [1, 667)		Acceptor Sequence Number: [667, 31425]	
	N	%	N	%
Unacceptable organ specific test results, specify	45,074	16.6%	256,224	13.3%
Donor medical history, specify	39,017	14.4%	238,611	12.4%
Organ anatomical damage or defect	27,166	10.0%	196,856	10.3%
Actual or projected cold ischemic time too long	26,900	9.9%	412,118	21.5%
Biopsy results unacceptable	25,930	9.6%	182,897	9.5%
Other, specify	22,567	8.3%	134,683	7.0%
Donor age	22,508	8.3%	94,852	4.9%
Epidemic/Pandemic - Donor	20,169	7.4%	192,559	10.0%
Organ preservation: Unacceptable method or findings	8,729	3.2%	60,070	3.1%
Warm ischemic time too long	7,733	2.9%	51,060	2.7%
Organ size, specify	5,170	1.9%	23,913	1.2%
Donor infection or positive culture	2,923	1.1%	13,822	0.7%
Biopsy not available	2,886	1.1%	12,858	0.7%
DCD donor neurological function/not expected to arrest	2,536	0.9%	8,514	0.4%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	1,728	0.6%	4,754	0.2%
Organ specific test results not available, specify	1,626	0.6%	9,756	0.5%
PHS risk criteria or social history	1,552	0.6%	2,939	0.2%
Malignancy or suspected malignancy	1,546	0.6%	13,578	0.7%
No candidate serum for crossmatching	985	0.4%	1,617	0.1%
Candidate temporarily medically unsuitable	723	0.3%	689	0.0%
Donor instability/high vasopressor usage	602	0.2%	1,520	0.1%
Transplant team or transplant facility availability	575	0.2%	974	0.1%
Candidate requires multiple organ transplant	388	0.1%	566	0.0%
Prolonged downtime/CPR	358	0.1%	1,274	0.1%
Epidemic/Pandemic - Candidate	269	0.1%	1,180	0.1%
Positive physical crossmatch	187	0.1%	80	0.0%
Resource time constraint (OPO, TXC, donor hospital, etc.)	160	0.1%	517	0.0%
Candidate refused	123	0.0%	46	0.0%
Candidate unavailable	119	0.0%	74	0.0%
Positive virtual crossmatch/unacceptable antigens	115	0.0%	215	0.0%
Candidate transplanted or pending transplant	98	0.0%	27	0.0%
Exceeded policy defined response time	88	0.0%	204	0.0%
Disaster Emergency Management Consideration	63	0.0%	175	0.0%
No donor cells/specimen for crossmatching, or no time for crossmatch	48	0.0%	95	0.0%
Recovery team availability	32	0.0%	9	0.0%
Number of HLA mismatches unacceptable	16	0.0%	3	0.0%
Candidate requires different laterality	15	0.0%	2	0.0%
Candidate temporarily ineligible due to insurance or financial issue	14	0.0%	4	0.0%
Transportation availability	8	0.0%	126	0.0%
Candidate's condition improved, transplant not needed	2	0.0%	0	0.0%
Donor family time constraint	0	0.0%	1	0.0%



Table 40: Count and percent of reasons for refusal of range refused liver match organ offers post implementation stratified by match acceptance number, for liver matches submitted December 02, 2021 - September 02, 2022. Group is defined by the 90th percentile of sequence numbers for acceptances on liver matches during 2020.

Description	Acceptor Sequence Number: [1, 78]		Acceptor Sequence Number: [78, 7555]	
	N	%	N	%
Donor age	5,700	16.6%	39,038	20.0%
Unacceptable organ specific test results, specify	5,308	15.4%	23,022	11.8%
Donor medical history, specify	4,008	11.6%	17,221	8.8%
Organ size, specify	3,621	10.5%	9,070	4.6%
Other, specify	3,467	10.1%	23,043	11.8%
DCD donor neurological function/not expected to arrest	2,502	7.3%	17,063	8.7%
Actual or projected cold ischemic time too long	2,104	6.1%	24,606	12.6%
Epidemic/Pandemic - Donor	1,927	5.6%	16,232	8.3%
Biopsy results unacceptable	960	2.8%	9,681	5.0%
Organ anatomical damage or defect	721	2.1%	3,042	1.6%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	510	1.5%	1,440	0.7%
Candidate temporarily medically unsuitable	400	1.2%	144	0.1%
Candidate transplanted or pending transplant	344	1.0%	63	0.0%
Resource time constraint (OPO, TXC, donor hospital, etc.)	277	0.8%	1,607	0.8%
PHS risk criteria or social history	258	0.7%	623	0.3%
Donor infection or positive culture	244	0.7%	1,002	0.5%
Prolonged downtime/CPR	244	0.7%	345	0.2%
Organ specific test results not available, specify	229	0.7%	1,125	0.6%
Organ preservation: Unacceptable method or findings	215	0.6%	1,277	0.7%
Donor instability/high vasopressor usage	189	0.5%	1,129	0.6%
Candidate requires multiple organ transplant	187	0.5%	102	0.1%
Malignancy or suspected malignancy	173	0.5%	2,103	1.1%
Biopsy not available	161	0.5%	598	0.3%
Donor family time constraint	120	0.3%	354	0.2%
Warm ischemic time too long	120	0.3%	323	0.2%
Transplant team or transplant facility availability	116	0.3%	259	0.1%
Candidate unavailable	109	0.3%	356	0.2%
Exceeded policy defined response time	49	0.1%	290	0.1%
Epidemic/Pandemic - Candidate	45	0.1%	174	0.1%
Candidate refused	34	0.1%	29	0.0%
Recovery team availability	22	0.1%	32	0.0%
Disaster Emergency Management Consideration	19	0.1%	13	0.0%
Transportation availability	17	0.0%	79	0.0%
Candidate's condition improved, transplant not needed	13	0.0%	7	0.0%
Candidate temporarily ineligible due to insurance or financial issue	4	0.0%	0	0.0%
Positive physical crossmatch	3	0.0%	0	0.0%
Positive virtual crossmatch/unacceptable antigens	2	0.0%	2	0.0%
No donor cells/specimen for crossmatching, or no time for crossmatch	0	0.0%	6	0.0%
Number of HLA mismatches unacceptable	0	0.0%	2	0.0%

Table 41: Count and percent of reasons for refusal of range refused heart and heart-lung match organ offers post implementation stratified by match acceptance number, for heart and heart-lung matches submitted December 02, 2021 - September 02, 2022. Group is defined by the 90th percentile of sequence numbers for acceptances on heart and heart-lung matches during 2020.

Description	Acceptor Sequence Number: [1, 41)		Acceptor Sequence Number: [41, 1396]	
	N	%	N	%
Unacceptable organ specific test results, specify	2,447	29.8%	8,216	36.5%
Organ size, specify	1,302	15.8%	3,644	16.2%
Epidemic/Pandemic - Donor	575	7.0%	1,484	6.6%
Donor medical history, specify	570	6.9%	1,687	7.5%
Actual or projected cold ischemic time too long	521	6.3%	1,182	5.2%
DCD donor neurological function/not expected to arrest	487	5.9%	463	2.1%
Donor age	457	5.6%	2,119	9.4%
Other, specify	427	5.2%	899	4.0%
Prolonged downtime/CPR	401	4.9%	712	3.2%
Organ anatomical damage or defect	220	2.7%	784	3.5%
Organ specific test results not available, specify	154	1.9%	198	0.9%
PHS risk criteria or social history	106	1.3%	242	1.1%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	68	0.8%	168	0.7%
Donor infection or positive culture	63	0.8%	143	0.6%
Donor instability/high vasopressor usage	60	0.7%	100	0.4%
Resource time constraint (OPO, TXC, donor hospital, etc.)	56	0.7%	137	0.6%
Warm ischemic time too long	44	0.5%	41	0.2%
Organ preservation: Unacceptable method or findings	38	0.5%	101	0.4%
Candidate temporarily medically unsuitable	33	0.4%	21	0.1%
Malignancy or suspected malignancy	31	0.4%	65	0.3%
Candidate transplanted or pending transplant	28	0.3%	11	0.0%
Candidate requires multiple organ transplant	25	0.3%	23	0.1%
Transplant team or transplant facility availability	23	0.3%	19	0.1%
Donor family time constraint	17	0.2%	7	0.0%
Epidemic/Pandemic - Candidate	16	0.2%	25	0.1%
Exceeded policy defined response time	15	0.2%	5	0.0%
Recovery team availability	13	0.2%	4	0.0%
Positive virtual crossmatch/unacceptable antigens	12	0.1%	6	0.0%
Candidate refused	3	0.0%	2	0.0%
Positive physical crossmatch	3	0.0%	1	0.0%
Biopsy not available	2	0.0%	0	0.0%
No donor cells/specimen for crossmatching, or no time for crossmatch	2	0.0%	2	0.0%
Candidate unavailable	1	0.0%	0	0.0%
No candidate serum for crossmatching	1	0.0%	1	0.0%
Transportation availability	1	0.0%	4	0.0%
Number of HLA mismatches unacceptable	0	0.0%	4	0.0%
Biopsy results unacceptable	0	0.0%	3	0.0%
Candidate's condition improved, transplant not needed	0	0.0%	2	0.0%

Table 42: Count and percent of reasons for refusal of range refused lung match organ offers post implementation stratified by match acceptance number, for lung matches submitted December 02, 2021 - September 02, 2022. Group is defined by the 90th percentile of sequence numbers for acceptances on lung matches during 2020.

Description	Acceptor Sequence Number: [1, 53)		Acceptor Sequence Number: [53, 514]	
	N	%	N	%
Unacceptable organ specific test results, specify	4,927	47.5%	9,677	51.3%
Organ size, specify	1,256	12.1%	908	4.8%
Donor medical history, specify	977	9.4%	1,364	7.2%
Other, specify	717	6.9%	1,699	9.0%
Donor age	423	4.1%	618	3.3%
DCD donor neurological function/not expected to arrest	413	4.0%	765	4.1%
Organ anatomical damage or defect	403	3.9%	591	3.1%
Epidemic/Pandemic - Donor	232	2.2%	1,082	5.7%
Candidate requires different laterality	191	1.8%	631	3.3%
Organ specific test results not available, specify	174	1.7%	181	1.0%
Actual or projected cold ischemic time too long	118	1.1%	436	2.3%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	115	1.1%	42	0.2%
PHS risk criteria or social history	75	0.7%	128	0.7%
Resource time constraint (OPO, TXC, donor hospital, etc.)	73	0.7%	271	1.4%
Donor infection or positive culture	49	0.5%	144	0.8%
Candidate requires multiple organ transplant	45	0.4%	115	0.6%
Transplant team or transplant facility availability	32	0.3%	31	0.2%
Organ preservation: Unacceptable method or findings	24	0.2%	50	0.3%
Warm ischemic time too long	23	0.2%	0	0.0%
Candidate transplanted or pending transplant	19	0.2%	3	0.0%
Candidate temporarily medically unsuitable	12	0.1%	9	0.0%
Exceeded policy defined response time	12	0.1%	4	0.0%
Positive virtual crossmatch/unacceptable antigens	12	0.1%	8	0.0%
Positive physical crossmatch	10	0.1%	0	0.0%
Donor family time constraint	8	0.1%	42	0.2%
Candidate unavailable	6	0.1%	18	0.1%
Biopsy not available	4	0.0%	0	0.0%
Recovery team availability	4	0.0%	0	0.0%
Epidemic/Pandemic - Candidate	3	0.0%	21	0.1%
Number of HLA mismatches unacceptable	3	0.0%	0	0.0%
Donor instability/high vasopressor usage	2	0.0%	0	0.0%
Malignancy or suspected malignancy	2	0.0%	2	0.0%
No candidate serum for crossmatching	2	0.0%	1	0.0%
Prolonged downtime/CPR	2	0.0%	28	0.1%
Candidate refused	1	0.0%	1	0.0%
Transportation availability	1	0.0%	0	0.0%
Disaster Emergency Management Consideration	0	0.0%	3	0.0%

Table 43: Count and percent of reasons for refusal of range refused kidney-pancreas match organ offers post implementation stratified by match acceptance number, for kidney-pancreas matches submitted December 02, 2021 - September 02, 2022. Group is defined by the 90th percentile of sequence numbers for acceptances on kidney-pancreas matches during 2020.

Description	Acceptor Sequence Number: [1, 29)		Acceptor Sequence Number: [29, 286]	
	N	%	N	%
Unacceptable organ specific test results, specify	459	23.4%	752	19.6%
Donor medical history, specify	245	12.5%	439	11.5%
Other, specify	243	12.4%	284	7.4%
Actual or projected cold ischemic time too long	191	9.7%	854	22.3%
Donor age	150	7.6%	502	13.1%
Organ size, specify	118	6.0%	128	3.3%
PHS risk criteria or social history	90	4.6%	111	2.9%
Epidemic/Pandemic - Donor	64	3.3%	264	6.9%
Prolonged downtime/CPR	59	3.0%	55	1.4%
Organ anatomical damage or defect	48	2.4%	85	2.2%
Transplant team or transplant facility availability	43	2.2%	50	1.3%
Candidate temporarily medically unsuitable	42	2.1%	4	0.1%
Candidate requires multiple organ transplant	33	1.7%	47	1.2%
Organ preservation: Unacceptable method or findings	30	1.5%	51	1.3%
DCD donor neurological function/not expected to arrest	25	1.3%	0	0.0%
Donor instability/high vasopressor usage	23	1.2%	51	1.3%
Recovery team availability	22	1.1%	13	0.3%
Resource time constraint (OPO, TXC, donor hospital, etc.)	18	0.9%	47	1.2%
Organ specific test results not available, specify	8	0.4%	41	1.1%
Candidate transplanted or pending transplant	7	0.4%	3	0.1%
Malignancy or suspected malignancy	7	0.4%	0	0.0%
Positive infectious disease screening test: CMV, HBV, HCV, etc.	7	0.4%	12	0.3%
Warm ischemic time too long	7	0.4%	0	0.0%
Candidate unavailable	5	0.3%	0	0.0%
Epidemic/Pandemic - Candidate	4	0.2%	12	0.3%
Exceeded policy defined response time	3	0.2%	0	0.0%
Number of HLA mismatches unacceptable	3	0.2%	0	0.0%
Transportation availability	3	0.2%	4	0.1%
Candidate refused	2	0.1%	2	0.1%
Donor infection or positive culture	2	0.1%	15	0.4%
Positive virtual crossmatch/unacceptable antigens	2	0.1%	2	0.1%
Positive physical crossmatch	1	0.1%	1	0.0%
Donor family time constraint	0	0.0%	5	0.1%

Table 44: Count and percent of reasons for refusal of range refused intestine match organ offers post implementation stratified by match acceptance number, for intestine matches submitted December 02, 2021 - September 02, 2022. Group is defined by the 90th percentile of sequence numbers for acceptances on intestine matches during 2020.

Description	Acceptor Sequence Number: [1, 34)		Acceptor Sequence Number: [34, 59]	
	N	%	N	%
Candidate requires multiple organ transplant	18	24.7%	42	33.3%
Organ size, specify	13	17.8%	0	0.0%
Unacceptable organ specific test results, specify	12	16.4%	14	11.1%
Number of HLA mismatches unacceptable	9	12.3%	3	2.4%
Prolonged downtime/CPR	9	12.3%	4	3.2%
Other, specify	5	6.8%	25	19.8%
Donor instability/high vasopressor usage	3	4.1%	0	0.0%
Organ anatomical damage or defect	2	2.7%	0	0.0%
Donor infection or positive culture	1	1.4%	0	0.0%
Epidemic/Pandemic - Donor	1	1.4%	0	0.0%
Donor age	0	0.0%	14	11.1%
PHS risk criteria or social history	0	0.0%	8	6.3%
Warm ischemic time too long	0	0.0%	8	6.3%
Actual or projected cold ischemic time too long	0	0.0%	7	5.6%
Positive virtual crossmatch/unacceptable antigens	0	0.0%	1	0.8%