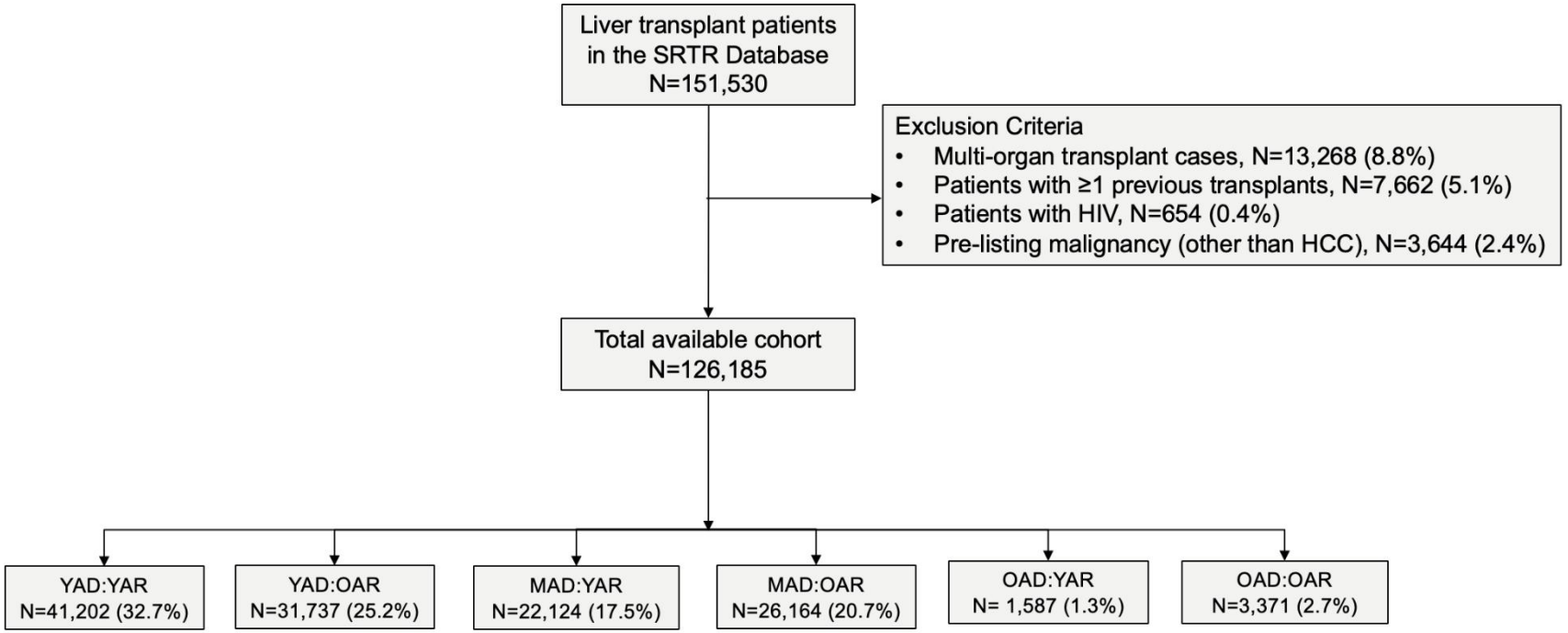
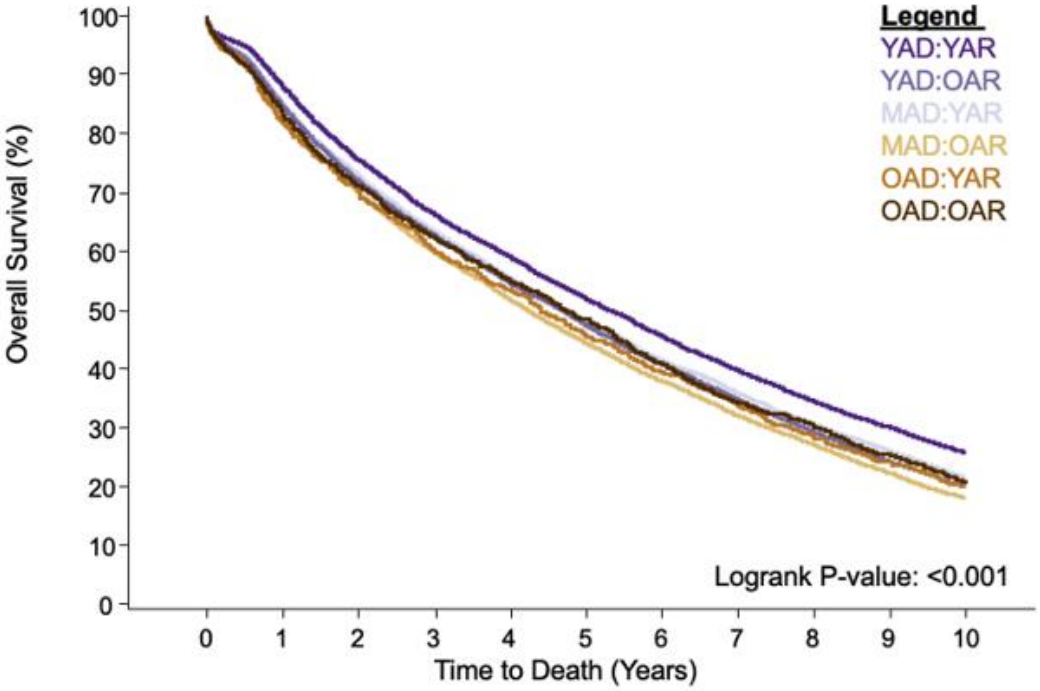


Supplementary Figure 1 Flow chart of cohort construction with inclusion and exclusion criteria.



Patients at Risk

	0 Years	2 Years	4 Years	6 Years	8 Years	10 Years
YAD:YAR	41202	21473	15882	11854	8578	5914
YAD:OAR	31737	16047	11304	7877	5295	3278
MAD:YAR	22124	11411	8317	6086	4398	2939
MAD:OAR	26164	12864	8902	6161	4147	2558
OAD:YAR	1587	906	678	516	384	271
OAD:OAR	3371	1710	1224	868	599	381

Supplementary Figure 2 Over long-term follow-up (10-years), MAD:OAR pairs had the lowest median patient survival (4.23 [4.10, 4.37] years), followed by OAD:YAR (4.41 [3.97, 4.95] years), while YAD:YAR pairs had the highest median patient survival (5.25 [5.09, 5.47] years). OAD:OAR, MAD:YAR, MAD:OAR had similar survival.

Supplementary Table 1 STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1	
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	4	
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5	
Objectives	3	State specific objectives, including any prespecified hypotheses	5-6	
Methods				
Study design	4	Present key elements of study design early in the paper	6	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6	
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources		

			and methods of selection of participants		
			(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	6	Figure S1
Variables		7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6	
Data sources/ measurement		8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6	
Bias		9	Describe any efforts to address potential sources of bias	6, 8	
Study size		10	Explain how the study size was arrived at	6	Figure S1
Quantitative variables	11		Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6	
Statistical methods	12		(*a*) Describe all statistical methods, including those used to control for confounding	7-8	
			(*b*) Describe any methods used to examine subgroups and interactions	7-8	
			(*c*) Explain how missing data were addressed	8	
			(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed	8	

		Case-control study—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy		
		(*e*) Describe any sensitivity analyses	N/A	
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8	Figure S1
		(b) Give reasons for non-participation at each stage	8-9	Figure S1
		(c) Consider use of a flow diagram	8	Figure S1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	--	
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	--	
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	8-11	Figure 1
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	--	

		Cross-sectional study—Report numbers of outcome events or summary measures	--	
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	8-11	Figure 1-3, Table 1-4
		(*b*) Report category boundaries when continuous variables were categorized	--	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	--	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8-11	Table 2-4
Discussion				
Key results	18	Summarise key results with reference to study objectives	11	
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	15	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-16	
Generalisability	21	Discuss the generalisability (external validity) of the study results	14-16	
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study	2	

and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Supplementary Table 2 Multivariate Fine-Gray competing risk regression analysis identifying independent risk factors for different causes of death within 10-year outcomes for DDLT

	All-cause Mortality			Graft-Related			Infection-related			Cardioneurovascular-related			Malignancy-related			Renal-related		
-	sHR	95%CI		sHR	95%CI		sHR	95%CI		sHR	95%CI		sHR	95%CI		sHR	95%CI	
Donor:Recipient Age Pairs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YAD:YAR	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
YAD:OAR	1.19	1.15	1.24	0.63	0.56	0.71	1.33	1.19	1.49	1.40	1.28	1.54	1.39	1.27	1.52	1.58	1.18	2.12
MAD:YAR	1.18	1.14	1.22	1.42	1.28	1.58	1.51	1.35	1.70	0.98	0.88	1.09	0.91	0.82	1.01	1.19	0.85	1.66
MAD:OAR	1.30	1.26	1.35	0.85	0.76	0.96	1.72	1.54	1.93	1.33	1.21	1.47	1.30	1.19	1.42	1.82	1.35	2.44
OAD:YAR	1.19	1.15	1.24	1.65	1.29	2.11	1.83	1.39	2.42	0.78	0.57	1.08	0.81	0.61	1.06	1.53	0.74	3.17

OAD:OAR	1.30	1.22	1.39	0.96	0.76	1.21	2.65	2.21	3.19	1.17	0.96	1.42	1.10	0.93	1.31	2.12	1.32	3.43
Recipient Diabetes	1.07	1.04	1.10	0.86	0.78	0.95	1.10	1.01	1.20	1.33	1.24	1.43	0.87	0.81	0.93	1.77	1.45	2.17
Recipient diagnosis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALD	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Autoimmune Hepatitis	1.07	0.99	1.16	1.14	0.87	1.50	1.39	1.12	1.72	1.14	0.93	1.39	0.73	0.55	0.97	0.75	0.34	1.64
Biliary	0.89	0.84	0.93	1.10	0.92	1.31	1.11	0.95	1.30	0.84	0.73	0.97	0.98	0.84	1.15	0.88	0.55	1.41
HBV	0.97	0.88	1.07	0.95	0.68	1.33	0.79	0.58	1.08	0.80	0.62	1.04	1.72	1.37	2.16	0.67	0.27	1.67
HCC	1.44	1.38	1.50	1.46	1.26	1.69	0.97	0.84	1.11	0.93	0.82	1.04	2.52	2.25	2.82	1.08	0.77	1.51
HCV	1.23	1.18	1.27	1.96	1.73	2.21	1.21	1.08	1.35	0.99	0.89	1.09	1.24	1.12	1.39	1.28	0.96	1.72
Idiopathic	0.97	0.93	1.02	1.01	0.86	1.17	1.04	0.92	1.19	1.17	1.05	1.30	0.86	0.75	0.99	1.11	0.79	1.57

MASH	1.19	1.13	1.25	0.86	0.70	1.04	0.99	0.85	1.14	1.09	0.97	1.23	0.90	0.77	1.05	1.18	0.82	1.69
Other	1.84	1.68	2.01	0.86	0.58	1.26	0.95	0.67	1.35	0.79	0.57	1.09	5.19	4.40	6.12	0.38	0.09	1.56
Recipient Functional Status	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Independent	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Mildly dependent	1.26	1.22	1.29	1.09	0.99	1.19	1.27	1.16	1.39	1.21	1.11	1.30	1.03	0.96	1.10	0.99	0.80	1.23
Totally dependent	1.69	1.63	1.76	1.10	0.97	1.24	1.80	1.60	2.02	1.63	1.47	1.80	1.03	0.93	1.14	1.13	0.84	1.53
LDLT (vs. DDLT)	1.04	0.98	1.11	0.72	0.56	0.91	1.15	0.95	1.40	0.85	0.71	1.02	0.90	0.77	1.06	1.08	0.66	1.79

*Adjusted for donor:recipient age pairs, functional status at transplant, recipient diabetes, transplant indication, LDLT vs. DDLT, MELD/PELD

Supplementary Table 3 Multivariable logistic regression analysis for odds of improving functional status at 5 years of post-transplant follow-up without pediatric (<18-years-old), DCD, and LDLT patients

Donor-Recipient Age Pairs	**OR**	**95% CI LL**	**95% CI UL**	***P*-value**
YAD:YAR	Reference	-	-	-
YAD:OAR	0.984	0.922	1.05	0.62
OAD:YAR	0.773	0.634	0.943	0.01
OAD:OAR	0.685	0.573	0.818	<0.0001
Diabetes	0.948	0.877	1.025	0.18
Recipient diagnosis	-	-	-	-
ALD	Reference	-	-	-
Autoimmune Hepatitis	1.02	0.855	1.215	0.83
Biliary	0.632	0.56	0.713	<0.0001
HBV	1.327	1.102	1.598	0.0028
HCC	0.603	0.524	0.695	<0.0001
HCV	0.719	0.657	0.787	<0.0001
Idiopathic	0.719	0.657	0.787	<0.0001
MASLD/MASH	0.971	0.864	1.092	0.63
Other	0.741	0.456	1.204	0.23
MELD	-	-	-	-
≤10	Reference	-	-	-
11-20	2.677	2.123	3.377	<0.0001
21-30	18.159	14.485	22.763	<0.0001
31-40	119.607	95.379	149.99	<0.0001

Supplementary Table 4 Multivariate Fine-Gray competing risk regression analysis identifying independent risk factors for different causes of death within 5-year outcomes without pediatric (<18-years-old), DCD, and LDLT patients

	All-cause Mortality			Graft-Related			Infection-related			Cardioneurovascular-related			Malignancy-related			Renal-related		
	sHR	95%CI		sHR	95%CI		sHR	95%CI		sHR	95%CI		sHR	95%CI		sHR	95%CI	
Donor:Recipient Age Pairs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YAD:YAR	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
YAD:OAR	1.252	1.21	1.29	0.679	0.62	0.749	1.393	1.264	1.536	1.517	1.39	1.652	1.503	1.374	1.645	1.663	1.245	2.222
OAD:YAR	1.562	1.44	1.69	1.676	1.37	2.053	1.786	1.417	2.25	1.164	0.91	1.492	1.269	1.007	1.601	1.212	0.528	2.782
OAD:OAR	1.521	1.43	1.62	0.897	0.73	1.108	2.442	2.07	2.882	1.479	1.24	1.76	1.456	1.237	1.714	1.925	1.135	3.267
Recipient	1.2	1.1	1.2	1.0	0.9	1.1	1.2	1.1	1.3	1.382	1.27	1.5	1.02	0.93	1.1	2.1	1.6	2.8

Diabetes	17	8	6	38	3	55	42	24	73			06	3	8	15	38	27	08
Recipient diagnosis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALD	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Autoimmune Hepatitis	1.108	1	1.23	1.097	0.79	1.521	1.212	0.929	1.582	1.234	0.98	1.562	0.785	0.535	1.15	1.29	0.577	2.883
Biliary	0.861	0.8	0.93	0.912	0.72	1.149	1.023	0.846	1.237	0.791	0.66	0.955	1.126	0.912	1.392	0.554	0.257	1.992
HBV	0.857	0.76	0.96	0.814	0.54	1.217	0.695	0.485	0.998	0.848	0.63	1.137	1.642	1.234	2.185	0.402	0.097	1.67
HCC	1.473	1.4	1.55	1.729	1.45	2.059	1.014	0.862	1.192	1.03	0.89	1.187	3.141	2.698	3.655	1.077	0.677	1.714
HCV	1.478	1.41	1.55	2.554	2.21	2.918	1.378	1.21	1.568	1.153	1.03	1.296	1.61	1.392	1.862	1.456	0.988	2.147
Idiopathic	1.084	1.03	1.15	0.98	0.81	1.182	1.028	0.881	1.199	1.252	1.1	1.426	1.002	0.831	1.208	1.204	0.762	1.902
MASH	1.064	1	1.13	0.902	0.73	1.119	0.909	0.768	1.076	1.093	0.95	1.255	0.899	0.734	1.1	1.048	0.652	1.685
Other	2.1	1.9	2.4	1.0	0.6	1.8	1.2	0.7	1.9	1.165	0.77	1.7	7.03	5.63	8.7	0.5	0.0	3.9

	9	4	7	83	5	03	28	91	07			52		9	63	49	76	86
Recipient Functional Status	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Independent	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Mildly dependent	1.17	1.13	1.21	1.036	0.93	1.151	1.297	1.161	1.448	1.275	1.16	1.404	1.031	0.947	1.121	1.05	0.771	1.429
Totally dependent	1.485	1.42	1.56	1.041	0.9	1.21	1.899	1.649	2.186	1.761	1.56	1.994	1.037	0.903	1.193	1.404	0.91	2.166
MELD/PELD	1.004	1	1.01	1.012	1.01	1.018	1.014	1.008	1.02	1.011	1.01	1.017	0.982	0.976	0.987	1.011	0.994	1.029

*Adjusted for donor:recipient age pairs, functional status at transplant, recipient diabetes, transplant indication, LDLT vs. DDLT, MELD/PELD

Supplementary Table 5 Summary statistics of immunosuppression regimen stratified by causes of death

-	*Cardioneurovascular (N=3,456)*	*Graft (N=2,686)*	*Infection (N=3,055)*	*Malignancy (N=4,568)*	*Renal (N=476)*
Steroids	3204 (92.71%)	2475 (92.14%)	2821 (92.34%)	4228 (92.56%)	437 (91.81%)
Missing	692 (16.68%)	178 (6.22%)	181 (5.59%)	9 (0.20%)	9 (1.86%)
Imuran (AZA)	53 (1.53%)	66 (2.46%)	55 (1.80%)	85 (1.86%)	9 (1.89%)
Missing	692 (16.68%)	178 (6.22%)	181 (5.59%)	9 (0.20%)	9 (1.86%)
Orthoclone, muromonab	8 (0.23%)	12 (0.45%)	11 (0.36%)	3 (0.07%)	2 (0.42%)
Missing	692 (16.68%)	178 (6.22%)	181 (5.59%)	9 (0.20%)	9 (1.86%)
Tacrolimus	2230 (64.53%)	1995 (74.27%)	2114 (69.20%)	3299 (72.22%)	344 (72.27%)
Missing	692 (16.68%)	178 (6.22%)	181 (5.59%)	9 (0.20%)	9 (1.86%)
MMF	1662 (48.09%)	1432 (53.31%)	1621 (53.06%)	2335 (51.12%)	261 (54.83%)
Missing	692 (16.68%)	178 (6.22%)	181 (5.59%)	9 (0.20%)	9 (1.86%)