

Articulo Completo, Referencias y Tablas/Figuras

Long-Term Outcomes and Trends in Simultaneous Liver-Kidney

Transplantation: A Multicenter Cohort Study

Running Title: Simultaneous Liver–Kidney Transplantation in Latin America

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Study concept: SM, JM; Study design: SM, JM; Enrolment of patients and data collection: JM, VD, EH, AV, AZ, PM-C, GC, MV, JP, IR, AG, CB, BC, RR, AU, JB, FF, P-LB, MR, JHP-G, GM, WA, MM, FC, RP, MD, GA, DA, MRG, SM; Analysis and interpretation of data: SM, JM, DG; Drafting of the manuscript: SM, JM, DG; Critical revision for important intellectual content: SM, JM, DG, AG

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Abbreviations

AKD, acute kidney disease

ALEH, Latin American Association for the Study of the Liver

BMI, body mass index

CI, confidence interval

CKD, chronic kidney disease

CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration

eGFR, estimated glomerular filtration rate

HCC, hepatocellular carcinoma

HR, hazard ratio

ICU, intensive care unit

INR, international normalized ratio

IQR, interquartile range

KDIGO, Kidney Disease: Improving Global Outcomes

MASLD, metabolic dysfunction-associated steatotic liver disease

MASH, metabolic dysfunction-associated steatohepatitis

MELD-Na, Model for End-Stage Liver Disease including sodium

OPTN, Organ Procurement and Transplantation Network

SAHE, Argentine Society of Hepatology

SLKT, simultaneous liver–kidney transplantation

Abstract

Background: Long-term outcomes after simultaneous liver–kidney transplantation (SLKT) are incompletely characterized. We aimed to estimate overall survival, survival with functioning grafts, kidney graft function over time, and temporal trends in SLKT practice.

Methods: Retrospective multicenter cohort of adults undergoing SLKT between 2003 and 2025 across 21 transplant centers in 7 Latin American countries. Overall survival and survival with functioning grafts were estimated up to 10 years after transplantation. Outcomes, recipient and donor characteristics were described across transplant eras.

Results: Among 305 SLKT recipients, cirrhosis was the main liver indication (67.9%), whereas chronic kidney disease was the main renal indication (93.1%), most commonly due to polycystic kidney disease. Recipient profiles evolved over time toward greater metabolic burden, with more diabetes and MASLD, and greater use of MELD exceptions. Overall survival was 78.5% at 1 year and 57.3% at 10 years, with 1-year survival exceeding 90% in 2022–2025; survival with functioning grafts was 77.4% and 50.9%, respectively. Early mortality predominated: 64% of deaths occurred in the first year, mainly due to bacterial infections (39%). Median eGFR among survivors remained in the mid-60s through 10 years.

Conclusions: SLKT achieved acceptable long-term patient, graft, and kidney function outcomes, with improved 1-year survival in recent eras. Early mortality remained concentrated in the first year and was often infection-related, highlighting an important target for post-transplant care as recipient metabolic complexity increases. These multicenter data provide long-term benchmarks to inform counseling and program planning amid an evolving metabolic burden.

Introduction

Simultaneous liver-kidney transplantation (SLKT) is an established practice for the definitive treatment of patients with end-stage liver and kidney disease.¹ Additionally, it is indicated for patients with end-stage liver disease associated with acute kidney injury when standardized criteria for combined transplantation are met.² The selection of suitable candidates is more complex than that for single-organ transplantation and remains less well defined. Policies governing this procedure vary by country and are frequently updated.² They often depend on expert judgment, leading to diverse practices in daily care.

Over time, liver disease etiologies among SLKT recipients have shifted, with MASLD increasing in parallel with the obesity and diabetes epidemic, and hepatitis C decreasing due to effective antiviral treatments.^{3,4,5} These trends highlight the changing patient profile and the evolving landscape of SLKT candidates.⁶

Overall, survival rates after SLKT are favorable. Reports from the United States, based on a multicenter cohort including patients transplanted between 2002 and 2017, show 1-year and 3-year survival rates of 92% and 87%, respectively.⁶ Similarly, data from Australia and New Zealand, derived from registry analyses of transplants performed between 1989 and 2017, report 1-year and 5-year survival rates of 92% and 60%, respectively.⁷ However, outcomes may vary according to patient selection and regional factors, and evidence from underrepresented regions, including Latin America, remains limited.

Importantly, prognostic factors following SLKT remain poorly established, limiting the ability to optimize candidate selection and guide clinical decision-making.^{6,8} To address these gaps, we conducted this study to estimate long-term outcomes, including overall survival, graft survival, and kidney graft function, over 10 years after

SLKT, while describing temporal trends in donor and recipient profiles. As an exploratory objective, we evaluated factors associated with 10-year post-transplant mortality.

Methods

Study design

This retrospective, international, multicenter cohort study included adult patients (≥ 17 years) who underwent SLKT between January 2003 and February 2025 across seven Latin American countries: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. A total of 21 transplant centers participated in the study. Collectively, these centers have performed 15,297 liver transplants and 36,148 kidney transplants from the inception of their programs up to the end of the study inclusion period (February 2025). Among them, SLKT procedures accounted for approximately 2.8% of liver transplants and 1.2% of kidney transplants performed at participating centers. Across participating countries, the renal threshold used to indicate the kidney component of SLKT in patients with Chronic Kidney Disease (CKD) appeared broadly aligned, with minor variations, and most centers used an estimated glomerular filtration rate (eGFR) of approximately 30 mL/min. This information was gathered through direct communication with site investigators during study coordination, based on e-mail exchanges and follow-up discussions, rather than through a standardized survey. In contrast, the criteria for Acute Kidney Disease (AKD) appeared to be more heterogeneous, primarily driven by differences in dialysis duration across centers.

Data was collected locally at each transplant center and centrally managed using REDCap, hosted by the coordinating center at Hospital Italiano de Buenos Aires.

Participating centers were identified and invited by the Latin American Association for the Study of the Liver (ALEH) and the Argentine Society of Hepatology (SAHE).

All institutions that performed at least one SLKT during the study period were eligible. Allografts were procured from the same deceased donor and were ABO blood type-compatible. Ethical approval was obtained from all participating centers (coordinating center approval number 9207). All research adhered to the Declaration of Helsinki.

Outcomes

The study's main outcomes were: (1) overall survival, (2) survival with functioning grafts, and (3) kidney graft function over time, all assessed up to 10 years after transplantation. As an exploratory objective, we evaluated predictors of 10-year post-transplant mortality. Patients were followed from transplantation until death, graft loss, last clinical contact, or administrative study closure, as applicable to each outcome.

Overall survival was defined as the time from transplantation to death from any cause. Survival with functioning grafts was defined as time from transplantation to the first occurrence of death from any cause, liver graft loss, or kidney graft loss, whichever occurred first. For both time-to-event outcomes, patients without an event were censored at the last available follow-up or at administrative study closure, whichever occurred first. Liver graft loss was defined as liver re-transplantation.⁹ Kidney graft loss was defined as irreversible loss of kidney graft function, evidenced by either return to chronic dialysis or kidney re-transplantation.^{9,10}

Kidney graft function over time was assessed among patients alive at each landmark time point and reported at 1, 3, 5, and 10 years, including the median eGFR calculated with the 2021 race-free Chronic Kidney Disease Epidemiology

Collaboration (CKD-EPI)¹¹ equation and the proportion of patients at each CKD stage according to the Kidney Disease: Improving Global Outcomes (KDIGO) classification.¹² KDIGO stages were defined solely on eGFR, as albuminuria and other markers were not available. Additionally, we report the proportion of patients with an eGFR ≥ 45 mL/min/1.73 m² at 1 year. This metric was selected because it is commonly reported by large transplant registries, facilitating comparability across cohorts.¹⁰

Statistical analysis

To explore temporal trends, the cohort was stratified into six calendar periods by SLKT year: 2003–2009, 2010–2013, 2014–2016, 2017–2018, 2019–2021, and 2022–2025. Period boundaries were chosen primarily to achieve relatively balanced sample sizes across intervals and facilitate comparisons over time. Baseline characteristics and selected post-transplant outcomes were summarized descriptively across study periods.

The Kaplan–Meier method was used to estimate overall survival and survival with functioning grafts up to 10 years after transplantation. We also estimated survival in clinically relevant subgroups defined by combinations of baseline characteristics (e.g., sex and care setting at transplant; age group and care setting; transplant indication and care setting). This descriptive approach illustrates how combinations of baseline characteristics can jointly stratify long-term outcomes. Kidney graft function trajectories were described among patients alive at each time point, according to the outcome definitions specified above.¹⁰ Because follow-up differed across eras, comparisons across study periods were limited to selected descriptive outcomes, including 1-year overall survival, causes of death, and the proportion of recipients with an eGFR ≥ 45 mL/min/1.73 m² at 1 year. Predictors of 10-year

post-transplant mortality were explored using bivariate Cox regression. Results are reported as HR with 95% CI. Analyses were conducted using Stata version 14 (StataCorp, 2015, College Station, TX, USA).

Data Availability

The data that support the findings of this study are not publicly available due to patient privacy restrictions and the terms of ethical approval obtained from participating centers. De-identified data may be available from the corresponding author upon reasonable request, subject to institutional data sharing agreements and applicable regulations.

Results

A total of 305 SLKT recipients were included in this study. As shown in Table 1, the median age at transplant was 56.1 years (IQR 47.4–61.8), and 62.3% of the patients were male. Argentina contributed 47.1% of the cohort (n=141) and Brazil 21.0% (n=63). All other countries contributed less than 10%. Comorbidities were prevalent, with 53.0% of patients having arterial hypertension, 34.3% diabetes mellitus, 17.7% dyslipidemia, and 17.7% obesity. At the time of transplant, the median MELD-Na score was 23.5 (IQR 19.1–29.7), and 114 (38.0%) had a MELD exception. According to the pre-transplant care setting, 67.2% of patients (n=205) were at home, 20.4% (n=62) were admitted to general wards, and 12.3% (n=37) were in the intensive care unit (ICU).

Liver transplant indications

The most frequent indication for liver transplantation was cirrhosis, accounting for 67.9% (n=207). This was followed by polycystic liver disease at 20.7% (n=63) and liver retransplantation at 5.3% (n=16). Hepatocellular carcinoma was present in 8.6% (n=26) of the overall cohort.

Among those with cirrhosis, most patients, 85.5% (n=177), had a single etiology, while 14.5% (n=30) had mixed causes. Allowing up to two etiologies per patient, the most frequent were alcohol-related liver disease 32.4% (n=67), hepatitis C 25.6% (n=53), and Metabolic dysfunction–associated steatohepatitis (MASH) 24.6% (n=51). Table S1 details single and mixed-etiologicals separately.

Kidney transplant indications

Among kidney indications, 93.1% (n=284) of patients underwent SLKT for CKD, and 6.9% (n=21) for AKD. Among those with CKD, 56.3% (n=160) were receiving chronic renal replacement therapy. Of the 284 patients with CKD, 83.5% (n=237) had a single identifiable etiology and 16.5% (n=47) had mixed causes. Allowing up to two etiologies per patient, the most frequent were polycystic kidney disease 25.0% (n=71), diabetes 23.2% (n=66), glomerulonephritis 12.3% (n=35), and hypertension 9.5% (n=27).

Donor characteristics and immunosuppression

Most donors were male 62.7% (n=191), with a median age of 34 years and a median BMI of 25.0 kg/m²; 9.2% (n=28) met criteria for obesity. The leading causes of death were trauma 51.9% (n=159) and stroke 40.7% (n=124). Additional characteristics are provided in Table S2.

Induction therapy most commonly consisted of methylprednisolone plus basiliximab 56.0% (n=167), followed by methylprednisolone alone 27.0% (n=81), methylprednisolone plus thymoglobulin 15.5% (n=45), and the triple regimen of methylprednisolone, basiliximab, and thymoglobulin 2.4% (n=7). At 1 year, the most common maintenance regimen was tacrolimus, mycophenolate, and steroids, 55.0% (n=131); regimens including an mTOR inhibitor were used in approximately 6% of cases.

Clinical and surgical complications

At least one episode of biopsy-proven acute liver graft rejection occurred in 7.6% (n=22) of recipients, while acute kidney graft rejection was observed in 11.0% (n=32). Diabetes occurred in 38.9% (n=112) of recipients, major cardiovascular events in 11.7% (n=34), and arterial hypertension in 51.0% (n=149). Oncologic complications were recorded in 7% (n=19) of recipients; among those, prostate cancer 15.8% (n=3), melanoma 10.5% (n=2) and lung cancer 10.5% (n=2) were the most frequently specified malignancies, while colon/rectum (n=1), hepatocellular carcinoma (n=1), non-Hodgkin lymphoma (n=1) and breast cancer (n=1) each represented 5.3% of cases; other malignancies accounted for the remainder. Surgical complications are summarized in Table S3.

Overall Survival and Survival with Functioning Grafts

Within 10 years of follow-up, 98 patients died, 20 experienced kidney graft loss, and 12 experienced liver graft loss; events were not mutually exclusive. Most deaths occurred early after SLKT, with 64% occurring within the first post-transplant year, whereas events beyond year 1 were less frequent and distributed across the remainder of follow-up (Figure 1). Bacterial infections were the leading cause of death (39%), followed by cardiovascular causes (14%) and neoplastic disease (7%). Viral 6% and fungal 2% infections were less frequent. Hemorrhagic events accounted for 5% of deaths, cerebrovascular causes for 2%, and the cause remained unknown in 18%; other causes accounted for 7%.

For overall survival, the median follow-up time was 3.3 years (IQR 0.47–7.06 years). Over 1,206 person-years of observation, 98 deaths occurred, corresponding to a mortality rate of 8.1 per 100 person-years (95% CI 6.7–9.9). Overall survival at 1, 5,

and 10 years was 78.5% (95% CI 73.3–82.8), 68.2% (95% CI 62.0–73.6), and 57.3% (95% CI 49.4–64.3), respectively (Figure 2).

When stratifying survival by prespecified baseline characteristics, 10-year survival estimates showed heterogeneity across clinically relevant subgroups. Among men, 10-year survival was lower for those transplanted from the ICU: 27% (95% CI 6–54) vs 57% (95% CI 47–66) for those transplanted from home or the general ward. Similarly, among recipients aged ≥ 60 years, 10-year survival was 19% (95% CI 1–57) for those transplanted from the ICU vs 47% (95% CI 32–60) for those transplanted from home/ward. These and other patterns are detailed in Table S4.

For survival with functioning grafts, the median follow-up time was 3.1 years (IQR 0.35–7.04). Over 1,176.7 person-years of observation, 110 events occurred (a composite of death from any cause, liver graft loss, or kidney graft loss), corresponding to an event rate of 9.3 per 100 person-years (95% CI 7.8–11.3). Survival with functioning grafts at 1, 5, and 10 years was 77.4% (95% CI 72.1–81.7), 64.9% (95% CI 58.6–70.5), and 50.9% (95% CI 42.9–58.5), respectively (Figure 3).

Kidney graft function

The median post-transplant eGFR (mL/min/1.73 m²) was 63.3 (IQR 48.7–82.5) at 1 year, 67.8 (53.7–82.6) at 3 years, 67.7 (51.5–88.4) at 5 years, and 66.4 (57.7–85.7) at 10 years. The distribution of KDIGO CKD stages was stable over time, with most patients classified as G2–G3a (eGFR 45–89 mL/min/1.73 m²) and $<10\%$ as G4–G5 (Table S5).

Predictors of ten-year post-transplant mortality

In bivariate analyses restricted to a 10-year follow-up, older recipient age (HR 1.03, 95% CI 1.01–1.05, $p=0.006$), male sex (HR 1.54, 95% CI 1.00–2.37, $p=0.048$), higher bilirubin (HR 1.03, 95% CI 1.01–1.04, $p=0.001$), international normalized ratio

(INR) (HR 1.43, 95% CI 1.12–1.83, $p=0.004$), and MELD-Na (HR 1.05, 95% CI 1.02–1.08, $p=0.001$) at transplantation were significantly associated with increased post-transplant mortality. Patients with an MELD exception had a 45% lower risk of post-transplant mortality (HR 0.55, 95% CI 0.35–0.87, $p=0.010$). Additionally, at the time of transplant, patients in the ICU had an 84% higher mortality compared with those at home or in the general ward (HR 1.84, 95% CI 1.02–3.32, $p=0.042$). Other predictors explored and found not to be significantly associated with post-transplant mortality are shown in Table S6.

Temporal trends across study periods

Temporal trends across study periods are summarized in Table S7 and Figures S1–S24. Over time, pre-transplant median MELD-Na declined, while the use of MELD exceptions increased from 32.2% to 53.5%. The proportion of recipients with diabetes also increased, from 17.2% to 33.3%, peaking at 45.6% in 2019–2021. Among liver disease etiologies, HCV-related cirrhosis decreased from 37.0% in 2003–2009 to 18.8% in 2022–2025, whereas MASLD increased from 11.1% to 37.5%; alcohol-related liver disease remained a leading indication across eras without a consistent trend. Among kidney disease etiologies, diabetic nephropathy increased from 7.1% in 2003–2009 to 28.3% in 2019–2021 and remained high thereafter.

Regarding outcomes, 1-year overall survival was highest in the most recent era, exceeding 90% in 2022–2025. In parallel, the proportion of deaths attributed to bacterial infection appeared to increase across eras, becoming the predominant cause of death in the most recent period. Across eras, the proportion of recipients achieving an eGFR ≥ 45 mL/min/1.73 m² at 1 year remained above 65% in all study periods.

Discussion

This multicenter cohort provides the largest regional evidence base to date on SLKT in Latin America, including 305 recipients from seven countries. Beyond characterizing recipient and transplant features, we report clinically meaningful long-term outcomes and explore predictors of 10-year mortality.

Post-transplant survival across the entire study period was 78.5% at 1 year and 57.3% at 10 years. However, outcomes improved markedly in the most recent era (2022–2025), with 1-year survival exceeding 90%. These results are consistent with those reported by the US SLKT Consortium, which documented an improvement in 1-year survival from 89% in 2002 to 96% in 2017.⁶ Similarly, in liver-alone transplantation, the OPTN/SRTR 2022 report documented 1- and 5-year survival rates of 93.2% and 80.2%, respectively.¹³

The improvement observed over time likely reflects the combined effects of increasing center experience, the systematic use of MELD-Na for candidate prioritization, and the potential protective impact of MELD exceptions^{14,15} In fact, in our exploratory analysis, patients granted MELD exception had a 45% lower risk of post-transplant mortality.

Survival estimates varied substantially across clinically relevant recipient profiles. For example, men transplanted from the ICU had a 10-year survival of 27% versus 57% among those transplanted from home or the general ward. Similarly, among recipients aged ≥ 60 years, 10-year survival was 19% for those transplanted from the ICU compared with 47% for those transplanted from home or the general ward. These patterns, detailed in Table S4, may help inform patient counseling and support risk stratification and perioperative planning.

A key finding of our study is that post-transplant mortality was strongly concentrated in the early period. Among all deaths observed during follow-up, 64% occurred within the first post-transplant year. Importantly, bacterial infections were the leading cause of death, accounting for 39% of overall mortality. Notably, the contribution of bacterial infection to mortality increased over time across transplant eras, suggesting that infections remain a persistent, and possibly growing, component of the post-SLKT risk profile.^{16,17}

We also examined kidney graft function over time. Cross-sectional summaries at each follow-up time point showed median post-transplant eGFR in the mid-60 mL/min/1.73 m² range from year 1 through year 10 among surviving recipients, with kidney function predominantly within KDIGO stages G2–G3a. Advanced CKD (KDIGO G4–G5) affected fewer than 10% of recipients at all time points. By contrast, two large SLKT series reported a higher burden of advanced CKD over time, with post-transplant CKD stage 4–5 observed in 10% of recipients at 1 year and 25% at 10 years.^{6,18} Using another commonly reported benchmark to facilitate cross-cohort comparisons, we found that 79% of recipients achieved an eGFR $\geq$ 45 mL/min/1.73 m² at 1 year, a metric associated with improved long-term graft survival and better patient outcomes.¹⁰ For context, the OPTN 2023 kidney-alone transplant report includes the same metric and shows that 65% of deceased-donor and 81% of living-donor kidney transplant recipients reached this threshold at 12 months.¹³ These comparisons should be interpreted cautiously, given differences in recipient case mix, follow-up structure, and outcome definitions.

When exploring predictors of 10-year post-transplant mortality, older recipient age, male sex, greater liver disease severity at transplantation, and ICU status at transplant were associated with a higher risk. This is consistent with the limited prior

evidence available in SLKT populations.^{6,19} We also observed a trend toward higher risk among recipients transplanted for cirrhosis than for polycystic disease, whereas MELD exception status was associated with lower mortality, consistent with prior reports.^{20,21}

Recipients in our cohort had a high metabolic burden, with diabetes (34.3%), hypertension (53.0%), and obesity (17.7%) all being highly prevalent. Published SLKT cohorts report wide variability in cardiometabolic comorbidity, with diabetes and obesity prevalence ranging from 20–43% and 15–51%, respectively.¹⁸ Importantly, we documented clear temporal shifts across transplant eras, with an increasing prevalence of diabetes, a sustained rise in MASLD, and a marked decline in HCV-related cirrhosis (Figures S5,S11). These findings should be interpreted in the broader epidemiological context of Latin America, a region undergoing a rapid metabolic transition. The Global Burden of Disease Study 2021 projects that age-adjusted diabetes prevalence in Latin America and the Caribbean will reach 11.3% by 2050, with nearly half of this increase attributable to obesity trends.²² Consistently, the NCD Risk Factor Collaboration (NCD-RisC) reported a near tripling of obesity prevalence among Latin American men between 1990 and 2021.²³ These trends have important implications for post-transplant management, including aggressive control of cardiometabolic risk factors, structured metabolic monitoring, and potential tailoring of immunosuppressive regimens to mitigate long-term cardiovascular risk.

Strengths of this study include the collaborative, multicenter design spanning 21 transplant programs across seven Latin American countries and the largest SLKT cohort reported from Latin America to date. Importantly, data were collected locally using a prespecified and detailed study protocol and centrally managed in a

dedicated REDCap database, rather than derived from administrative or secondary datasets. The participating centers represent most programs performing SLKT in the study countries during the inclusion period, thereby supporting the cohort's representativeness of regional practice patterns. In addition, the long-term follow-up available in this cohort helps define clinically meaningful 10-year benchmarks for patient survival, survival with functioning grafts, and post-transplant kidney function.

However, some limitations should be acknowledged. First, the observational design is subject to bias and center-level heterogeneity in candidate selection, perioperative management, and follow-up practices. Second, analyses of predictors, stratified analyses, and temporal trends were exploratory and descriptive. Third, cross-sectional kidney function summaries at later time points are influenced by survivor bias, which may underestimate the burden of advanced CKD among the full transplanted population.

Overall, this study shows that long-term outcomes after SLKT were generally favorable, with marked improvements in early post-transplant survival over time. Nonetheless, mortality remained heavily concentrated in the first year and was frequently driven by infections. In a changing epidemiologic landscape marked by rising rates of diabetes and MASLD, these findings may inform patient counseling, program planning, and future efforts to refine risk stratification and improve early post-transplant care.

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Tables

Table 1. Baseline recipient characteristics (N=305)		
Variable	Result (N=305)	No. of patients with complete data
Age, median (IQR)	56.1 (47.4–61.8)	305
Male sex, n (%)	190 (62.3%)	305
Country, n (%)		
Argentina	141 (47.1%)	299
Brazil	63 (21.0%)	
Colombia	26 (8.7%)	
Chile	26 (8.7%)	
Mexico	19 (6.3%)	
Peru	13 (4.3%)	
Uruguay	11 (3.6%)	
Prior transplantation, n (%)	44 (4.4%)	301
Weight, kg (IQR)	66.5 (58.0-79.5)	300
Height, cm (IQR)	166.0 (160.0-172.0)	300
BMI, kg/m ² (IQR)	24.0 (22.0-28.0)	300
BMI >29 kg/m ² , n (%)	52 (17.7%)	260
Arterial hypertension, n (%)	159 (53.0%)	300
Diabetes, n (%)	103 (34.3%)	300
Dyslipidemia, n (%)	53 (17.7%)	300
Total bilirubin, mg/dL (IQR)	1.2 (0.6-3.2)	298
INR at transplantation (IQR)	1.2 (1.1-1.6)	293
Serum creatinine, mg/dL (IQR)	3.6 (2.1-6.0)	299
Serum sodium, mmol/L (IQR)	136.0 (133.0-139.0)	301
MELD-Na score (IQR)	23.5 (19.1-29.7)	291
MELD exception, n (%)	114 (38.0%)	300
Chronic renal replacement therapy, n (%)	170 (56.0%)	305
Patient status at the time of SLKT, n (%)		

Table 1. Baseline recipient characteristics (N=305)		
Home	191 (67.2%)	284
General ward	58 (20.4%)	
ICU	35 (12.3%)	
Pre-transplant mechanical ventilation, n (%)	43 (14.6%)	294

Data are presented as median (IQR) or n (%).

Among the 43 patients with a history of prior transplantation, 23 (54%) had undergone isolated kidney transplantation and 20 (46%) isolated liver transplantation. Data regarding the type of prior transplant were unavailable for 1 patient.

Abbreviations: IQR, interquartile range; BMI, body mass index; INR, international normalized ratio; MELD-Na, Model for End-Stage Liver Disease–Sodium; SLKT, simultaneous liver–kidney transplantation; ICU, intensive care unit.

Figure Legends

Figure 1. Distribution of deaths over time after SLKT (n=98).

Absolute number of deaths by time interval since transplantation (years).

Figure 2. Kaplan–Meier estimates of overall survival after SLKT (n=305).

Overall survival was defined as time from transplantation to death from any cause. Patients without an event were censored at last follow-up or administrative study closure. Shaded areas represent 95% confidence intervals. Numbers at risk are displayed below the plot.

Figure 3. Kaplan–Meier estimates of survival with functioning grafts after SLKT (n=305).

Survival with functioning grafts was defined as time from transplantation to the first occurrence of death from any cause, liver graft loss, or kidney graft loss, whichever occurred first. Liver graft loss was defined as liver retransplantation. Kidney graft loss was defined as irreversible loss of kidney function, evidenced by return to chronic dialysis or kidney retransplantation. Patients without an event were censored at last follow-up or administrative study closure. Shaded areas represent 95% confidence intervals. Numbers at risk are displayed below the plot.

Figure 1.

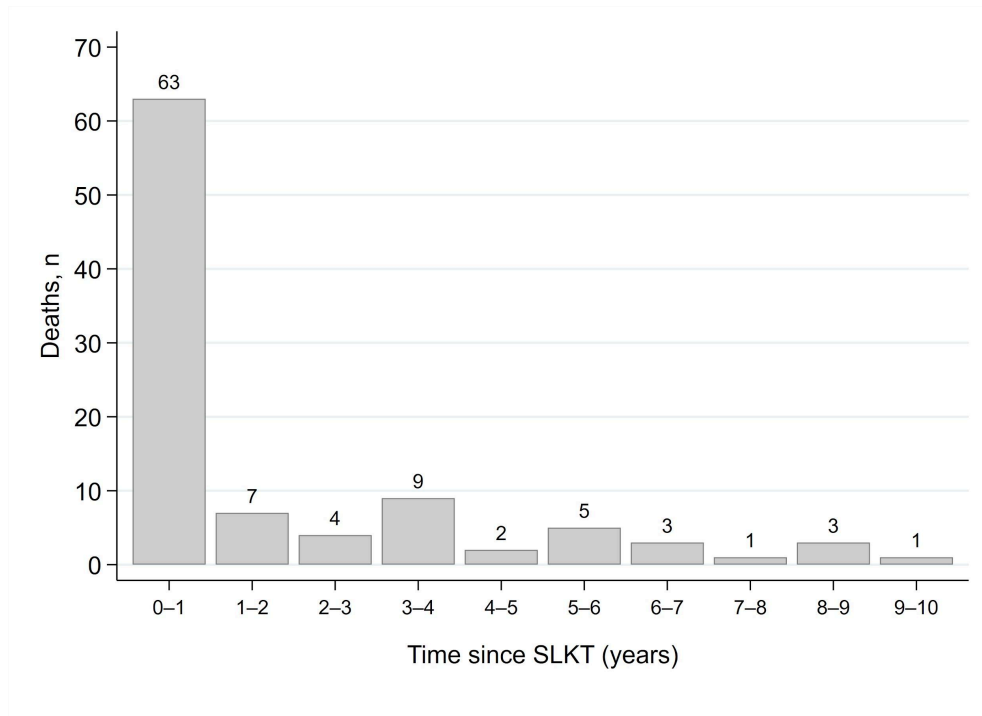


Figure 2.

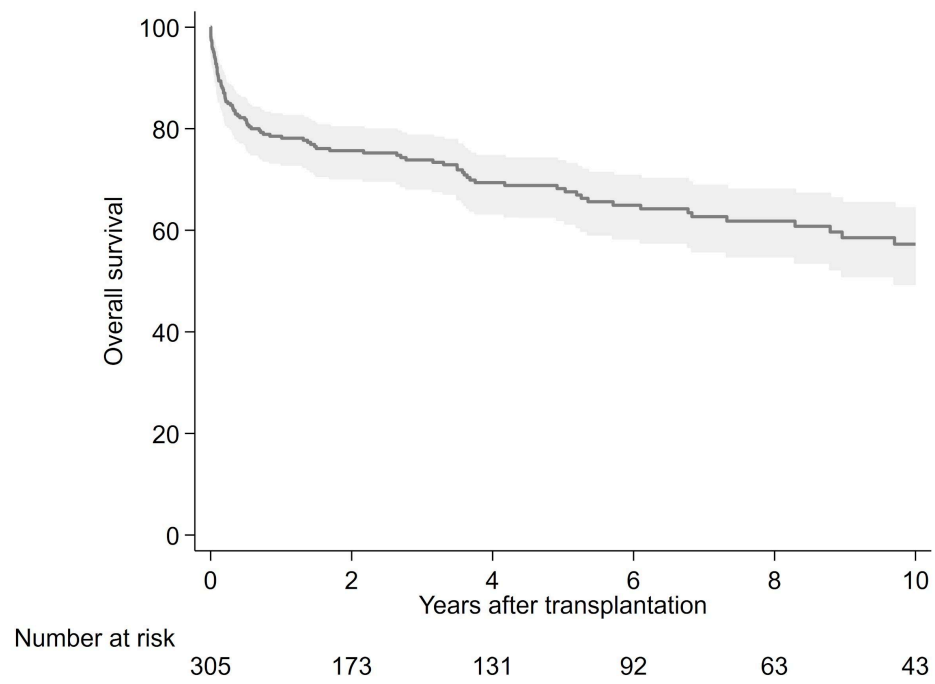
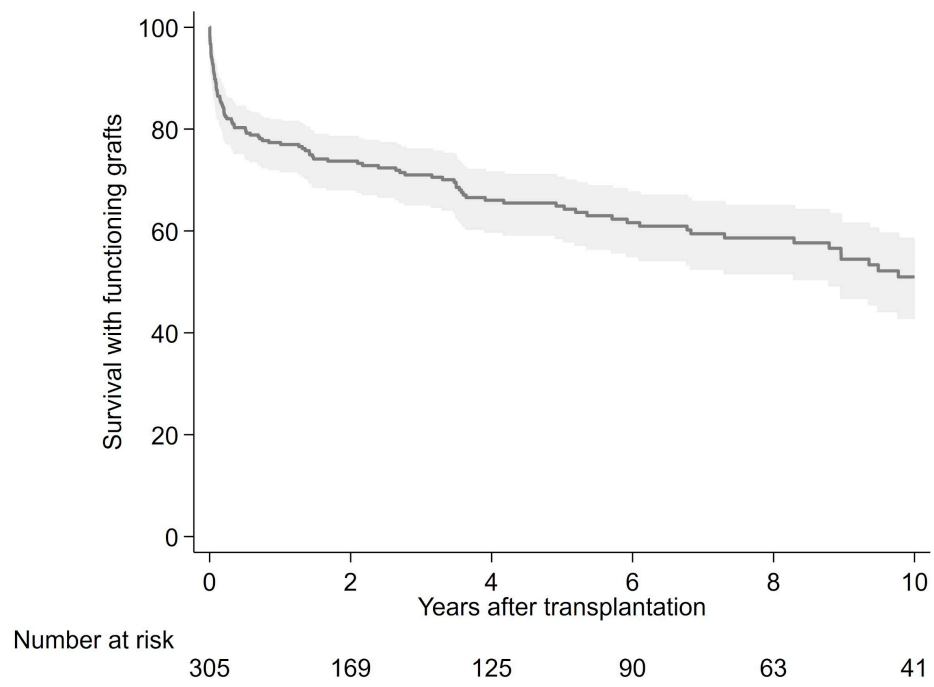


Figure 3.



Material Suplementario

Supplementary Tables and Figures

Supplementary Tables

Table S1. Etiology of cirrhosis among liver transplant recipients, categorized as single or mixed etiologies (n=207)	2
Table S2. Baseline characteristics and transplant variables associated with overall survival after SLKT (n=305)	3
Table S3. Post-transplant surgical complications (n=305)	5
Table S4. Ten-year overall survival according to prespecified baseline characteristics and care setting at transplantation	6
Table S5. Distribution of KDIGO stages and median eGFR over time	7
Table S6. Predictors of 10-year overall survival (n=305)	8
Table S7. Temporal trends in SLKT (N=305)	9

Supplementary Figures

Figure S1. Age: temporal trends in median (IQR)	11
Figure S2. Male sex: temporal trends	11
Figure S3. Body mass index: temporal trends in median (IQR)	12
Figure S4. Hypertension: temporal trends	12
Figure S5. Diabetes: temporal trends	13
Figure S6. Dyslipidemia: temporal trends	13
Figure S7. Pre-transplant renal replacement therapy: temporal trends	14
Figure S8. MELD-Na temporal trends in median (IQR)	14
Figure S9. MELD exception: temporal trends	15
Figure S10. Liver transplant indication: temporal trends	15
Figure S11. Cirrhosis etiology: temporal trends	16
Figure S12. Chronic kidney disease (vs acute): temporal trends in transplant indication	16
Figure S13. Chronic kidney disease etiology: temporal trends	17
Figure S14. Induction regimen: temporal trends	17
Figure S15. Maintenance immunosuppression at 1 year: temporal trends	18
Figure S16. One-year post-transplant survival: temporal trends	18
Figure S17. eGFR ≥ 45 mL/min/1.73 m ² at 1 year: temporal trends	19
Figure S18. Cause of death: temporal trends	19
Figure S19. Donor age: temporal trends in median (IQR)	20
Figure S20. Donor male sex: temporal trends	20
Figure S21. Donor body mass index: temporal trends in median (IQR)	21
Figure S22. Donor creatinine: temporal trends in median (IQR)	21
Figure S23. Donor natremia: temporal trends in median (IQR)	22
Figure S24. Donor cause of death: temporal trends	22

Table S1. Etiology of cirrhosis among liver transplant recipients, categorized as single or mixed etiologies (n=207)		
Single etiology (n=177), n (%)		
Alcohol	53 (29.9%)	177
Hepatitis C virus	39 (22.0%)	
MASH	36 (20.3%)	
Hepatitis B virus	10 (5.6%)	
Autoimmune hepatitis	8 (4.5%)	
Primary biliary cholangitis	7 (3.4%)	
Hemochromatosis	3 (1.6%)	
Primary sclerosing cholangitis	1 (0.5 %)	
Secondary biliary cholangitis	1 (0.5 %)	
Other	20 (11.3%)	
Mixed etiology (n=30), n (%)		
Alcohol + Hepatitis C virus	7 (23.3%)	30
Hepatitis C virus + MASH	5 (16.7%)	
Alcohol + MASH	4 (13.3%)	
Autoimmune hepatitis + Primary biliary cholangitis	3 (10.0%)	
MASH + Hemochromatosis	3 (10.0%)	
Alcohol + Primary biliary cholangitis	2 (6.7%)	
Hepatitis C virus + Hepatitis B virus	2 (6.7%)	
Alcohol + Hepatitis B virus	1 (3.3%)	
MASH + Hepatitis B virus	1 (3.3%)	
MASH + Autoimmune hepatitis	1 (3.3%)	
MASH + alpha-1 antitrypsin deficiency	1 (3.3%)	

This table summarizes the etiology of cirrhosis among liver transplant recipients, categorized as single or mixed etiologies. In patients with mixed etiologies, up to two causes of cirrhosis could be assigned to a single patient. Therefore, categories are not mutually exclusive and percentages may not sum to 100%.

Abbreviations: MASH (Metabolic dysfunction–associated steatohepatitis).

Table S2. Baseline characteristics and transplant variables associated with overall survival after SLKT (n=305)				
Variable	Alive	Death	HR (95% CI)	p-value
Age, years, median (IQR)	54.5 (45.4–60.9)	59.3 (51.7–62.8)	1.01 (1.00–1.03)	0.098
Male sex, n (%)	120 (58.5%)	70 (70.0%)	1.51 (1.00–2.26)	0.048
Weight at transplant, kg	66.0 (56.0–80.0)	69.0 (60.0–79.0)	1.00 (0.99–1.01)	0.686
Height at transplant, cm	166.0 (159.0–171.0)	167.0 (162.0–173.0)	1.02 (1.00–1.04)	0.086
BMI at transplant, kg/m ²	24.0 (22.0–28.0)	24.0 (22.0–27.0)	0.99 (0.96–1.03)	0.723
Hypertension, n (%)	105 (51.5%)	54 (56.2%)	1.11 (0.75–1.62)	0.607
Diabetes, n (%)	65 (31.9%)	38 (39.6%)	1.19 (0.80–1.77)	0.387
Dyslipidemia, n (%)	37 (18.1%)	16 (16.7%)	0.96 (0.58–1.58)	0.871
Year of SLKT	2018.0 (2013.0–2022.0)	2015.0 (2012.0–2018.0)	0.99 (0.95–1.03)	0.531
Total bilirubin at SLKT, mg/dL	1.1 (0.6–2.2)	1.4 (0.7–7.2)	1.03 (1.01–1.04)	0.002
INR at SLKT	1.2 (1.1–1.6)	1.4 (1.2–1.8)	1.33 (1.04–1.69)	0.024
Serum creatinine at SLKT, mg/dL	3.5 (2.0–6.0)	3.9 (2.4–6.2)	1.03 (0.96–1.10)	0.393
Serum sodium at SLKT, mmol/L	136.0 (133.0–139.0)	136.0 (133.0–139.0)	1.02 (0.98–1.06)	0.392
MELD-Na score at transplant	22.6 (18.3–27.8)	24.6 (20.9–32.8)	1.04 (1.01–1.06)	0.008
MELD exception, n (%)	87 (43.3%)	27 (27.3%)	0.58 (0.38–0.88)	0.011
Country, n (%)				
Argentina	88 (43.6%)	53 (54.2%)	ref	-
Brazil	37 (18.4%)	26 (26.5%)	0.95 (0.60–1.52)	0.843
Colombia	19 (9.5%)	7 (7.1%)	0.45 (0.20–0.98)	0.044
Chile	20 (10.0%)	6 (6.1%)	0.55 (0.25–1.20)	0.131
Mexico	15 (7.5%)	4 (4.1%)	0.88 (0.35–2.20)	0.789
Peru	11 (5.5%)	2 (2.0%)	0.26 (0.06–1.06)	0.060
Uruguay	11 (5.5%)	-	0.33 (0.08–1.37)	0.128
Pre-transplant renal replacement therapy, n (%)	108 (52.7%)	62 (62.0%)	1.23 (0.84–1.80)	0.289
Previous transplant, n (%)	27 (13.3%)	17 (17.4%)	1.41 (0.86–2.31)	0.175
Pre-transplant mechanical ventilation, n (%)	27 (13.6%)	16 (16.8%)	1.00 (0.59–1.68)	0.986
Cirrhosis vs PKD	-	-	0.70 (0.42–1.17)	0.170
Indication for kidney transplantation				
Indication for kidney transplantation	-	-	1.00 (0.49–2.06)	0.995
CKD	191 (93.2%)	93 (93.0%)	-	-
AKD	14 (6.8%)	7 (7.0%)	-	-

Induction regimen				
Methylprednisolone + Thymoglobulin	-	-	ref	-
Methylprednisolone + Basiliximab	-	-	1.42 (0.77–2.62)	0.266
Methylprednisolone	-	-	1.42 (0.67–3.04)	0.363
Other	-	-	1.08 (0.50–2.32)	0.842
Recipient status at the time of SLKT				
Home	-	-	ref	-
General ward	-	-	1.35 (0.85–2.14)	0.206
Intensive Care Unit (ICU)	-	-	1.50 (0.84–2.69)	0.167
Home vs Hospitalized	-	-	1.40 (0.94–2.09)	0.098
Donor variables				
Sex	-	-	1.05 (0.71–1.56)	0.802
Age	34.0 (24.0–46.0)	34.0 (24.0–48.0)	1.01 (0.99–1.02)	0.329
Weight in Kg.	70.0 (61.0–80.0)	72.5 (65.0–80.0)	1.01 (0.99–1.03)	0.223
Height in cm.	170.0 (160.0–175.0)	170.0 (164.0–175.0)	1.00 (0.98–1.03)	0.671
Body Mass Index	25.0 (23.0–28.0)	25.0 (24.0–27.0)	1.02 (0.96–1.08)	0.510
Donor obesity	-	-	-	-
Sodium	151.0 (144.0–159.0)	152.0 (147.0–160.0)	1.01 (1.00–1.03)	0.173
Creatinine	0.9 (0.7–1.2)	1.1 (0.8–1.4)	1.16 (0.90–1.49)	0.258
Cause of donor death				
Stroke	-	-	ref	-
Anoxia	-	-	0.84 (0.26–2.71)	0.775
Trauma	-	-	0.73 (0.50–1.08)	0.119
Other	-	-	0.18 (0.03–1.33)	0.093

Data are presented as median (interquartile range) for continuous variables and n (%) for categorical variables. Hazard ratios (HRs) with 95% confidence intervals (CI) were derived from univariate Cox proportional hazards models.

Abbreviations: SLKT, simultaneous liver–kidney transplantation; MELD, Model for End-Stage Liver Disease; INR, international normalized ratio; CKD, chronic kidney disease; AKD, acute kidney disease; ICU, intensive care unit.

Table S3. Post-transplant surgical complications (n=305)		
Category	Complication	n (%)
Early abdominal reoperation within 7 days	No	242 (79.3%)
	Yes	51 (16.7%)
Liver surgery–related complications (n=70)	Hepatic or perihepatic hematoma	26 (37.1%)
	Biliary anastomotic stricture	19 (27.1%)
	Hepatic artery thrombosis	9 (12.9%)
	Biliary fistula	8 (11.4%)
	Biloma	4 (5.7%)
	Portal vein thrombosis	3 (4.3%)
	Inferior vena cava thrombosis	1 (1.4%)
	Hepatic vein thrombosis	0 (0.0%)
Kidney surgery–related complications (n=31)	Renal or perirenal hematoma	11 (35.5%)
	Ureteral fistula	6 (19.4%)
	Renal vein thrombosis	6 (19.4%)
	Renal artery stenosis	5 (16.1%)
	Ureteral anastomotic stricture	2 (6.5%)

Data are presented as n (%).

Liver and kidney surgery–related complication categories are not mutually exclusive; more than one complication could be recorded per recipient. Percentages are calculated using the total number of recipients with liver (n=70) or kidney (n=31) surgery–related complications as the denominator.

Table S4. Ten-year overall survival according to prespecified baseline characteristics and care setting at transplantation			
	Combination of variables	10-Year Survival (%)	95% CI
Sex and Care Setting	Female – Home / General Ward (n=91)	55%	39.4–67.9
	Female – Intensive care unit (n=15)	78%	45.9–92.3
	Male – Home / General Ward (n=158)	48%	37.0–58.8
	Male – Intensive care unit (n=20)	28%	6.2–55.7
Age and Care Setting	<60 – Home / General Ward (n=163)	53%	42.3–63.3
	<60 – Intensive care unit (n=21)	63%	25.9–85.6
	≥60 – Home / General Ward (n=86)	47%	31.9–60.2
	≥60 – Intensive care unit (n=14)	19%	1.4–51.3
Indication and Care Setting	Cirrhosis – Home / General Ward (n=166)	52%	40.9–61.8
	Cirrhosis – Intensive care unit (n=25)	37%	15.0–60.1
	Polycystic disease – Home / General Ward (n=57)	51%	31.0–68.1
	Polycystic disease – Intensive care unit (n=2)	-	-

Data are Kaplan–Meier estimates of 10-year overall survival with 95% confidence intervals (CIs). Numbers in parentheses indicate subgroup sample size. Care setting refers to patient location at the time of transplantation (intensive care unit vs home/general ward).

Table S5. Distribution of KDIGO stages and median eGFR over time				
	1 year (n=196)	3 years (n=149)	5 years (n=98)	10 years (n=33)
Median eGFR, mL/min/1.73 m ² (IQR)	63.2 (48.7–82.5)	67.8 (53.6–82.5)	67.6 (51.5–88.4)	66.3 (57.7–85.7)
KDIGO stages, n (%)^a				
G1 (>90)	31 (15.8%)	29 (19.4%)	21 (21.4%)	7 (21.2%)
G2 (60–89)	79 (40.3%)	66 (44.3%)	44 (44.9%)	16 (48.4%)
G3a (45–59)	45 (22.9%)	25 (16.7%)	15 (15.3%)	5 (15.1%)
G3b (30–44)	32 (16.3%)	20 (13.4%)	11 (11.2%)	3 (9.0%)
G4–G5 (<30)	9 (4.5%)	9 (6.0%)	7 (7.1%)	2 (6.0%)

^aKDIGO stages were defined based on estimated glomerular filtration rate (eGFR) only, as albuminuria and other markers of kidney damage were not available.

Abbreviations: eGFR, estimated glomerular filtration rate; IQR, interquartile range; KDIGO, Kidney Disease: Improving Global Outcomes.

Table S6. Predictors of 10-year overall survival (n=305)		
	HR (95% CI)	p-value
Age at transplantation (per year)	1.03 (1.01–1.05)	0.006
Male sex	1.54 (1.00–2.37)	0.048
Hypertension	1.15 (0.77–1.73)	0.493
Diabetes	1.28 (0.84–1.94)	0.249
Dyslipidemia	0.91 (0.53–1.57)	0.743
BMI at transplantation, kg/m ²	0.99 (0.96–1.04)	0.942
Hepatitis C virus	1.44 (0.90–2.29)	0.125
Year of SLKT	0.98 (0.94–1.02)	0.310
Total bilirubin at transplantation, mg/dL	1.03 (1.01–1.04)	0.001
INR at transplantation	1.43 (1.12–1.83)	0.004
Serum creatinine at transplantation, mg/dL	1.02 (0.95–1.09)	0.618
Serum sodium at transplantation, mg/dL	1.01 (0.97–1.09)	0.610
MELD-Na at transplantation	1.05 (1.02–1.08)	0.001
MELD exception at transplantation	0.55 (0.35–0.87)	0.010
Pre-transplant clinical status		
Pre-transplant renal replacement therapy	1.28 (0.85–1.93)	0.231
Previous transplant	1.39 (0.82–2.35)	0.219
Pre-transplant mechanical ventilation	0.99 (0.57–1.73)	0.979
Indication for liver transplantation^A		
Polycystic liver disease	Ref	-
Cirrhosis	1.66 (0.95–2.89)	0.075
Recipient status at transplantation		
Home	Ref	-
General ward	1.50 (0.92–2.45)	0.101
Intensive care unit (ICU)	1.84 (1.02–3.31)	0.042
Donor characteristics		
Male sex	1.13 (0.74–1.72)	0.565
Age (per year)	1.01 (0.99–1.02)	0.465
Weight, kg	1.01 (1.00–1.03)	0.134
Height, cm	1.01 (0.99–1.03)	0.484
BMI, kg/m ²	1.03 (0.97–1.10)	0.332
Serum Sodium, mg/dL	1.01 (1.00–1.03)	0.106
Serum creatinine, mg/dL	1.24 (0.97–1.58)	0.080

^AThis analysis was restricted to 270 patients whose indication for liver transplantation was cirrhosis or polycystic liver disease; patients with other etiologies were excluded.

Abbreviations: HR, hazard ratio; CI, confidence interval; SLKT, simultaneous liver–kidney transplantation; BMI, body mass index; MELD-Na, Model for End-Stage Liver Disease–Sodium; INR, international normalized ratio; ICU, intensive care unit.

Table S7. Temporal trends in SLKT (N=305)						
	2003–2009 (n=33)	2010–2013 (n=59)	2014–2016 (n=51)	2017–2018 (n=48)	2019–2021 (n=57)	2022–2025 (n=57)
Age, years, median (IQR)	55.2 (45.5–59.8)	56.6 (48.6–61.6)	56.2 (48.6–62.0)	54.6 (46.3–62.0)	58.8 (50.1–64.9)	54.2 (42.8–60.2)
Male sex, n (%)	22 (66.6%)	33 (55.9%)	31 (60.7%)	31 (64.5%)	41 (71.9%)	32 (56.1%)
BMI, kg/m ² , median (IQR)	23.0 (22.0–27.0)	24.0 (22.0–27.0)	24.0 (22.0–30.0)	24.0 (22.0–28.0)	26.0 (24.0–29.0)	24.0 (21.0–25.0)
Hypertension, n (%)	15.0 (51.7%)	35.0 (60.3%)	20.0 (39.2%)	25.0 (52.0%)	32.0 (56.1%)	32.0 (56.1%)
Diabetes, n (%)	5.0 (17.2%)	22.0 (37.9%)	17.0 (33.3%)	14.0 (29.1%)	26.0 (45.6%)	19.0 (33.3%)
Dyslipidemia, n (%)	4.0 (13.7%)	11.0 (18.9%)	9.0 (17.6%)	6.0 (12.5%)	13.0 (22.8%)	10.0 (17.5%)
Pre-transplant renal replacement therapy, n (%)	21.0 (63.6%)	30.0 (50.8%)	30.0 (58.8%)	28.0 (58.3%)	26.0 (45.6%)	35.0 (61.4%)
MELD-Na score, median (IQR)	28.0 (23.8–33.2)	23.7 (20.2–30.7)	24.0 (19.6–31.5)	22.5 (20.1–27.3)	21.3 (16.9–27.0)	22.5 (18.7–27.5)
MELD exception, n (%)	10.0 (32.2%)	20.0 (33.8%)	16.0 (32.0%)	17.0 (36.1%)	21.0 (36.8%)	30.0 (53.5%)
Indication for liver transplantation, n (%)						
Cirrhosis	27 (81.8%)	37 (62.7%)	35 (68.6%)	35 (72.9%)	41 (71.9%)	32 (56.1%)
PKD	4 (12.1%)	16 (27.1%)	12 (23.5%)	9 (18.7%)	7 (12.2%)	15 (26.3%)
Other	2 (6.0%)	6 (10.1%)	4 (7.8%)	4 (8.3%)	9 (15.7%)	10 (17.5%)
Cirrhosis etiology, (%) ^A						
MASLD	11.1%	18.9%	31.4%	17.1%	29.3%	37.5%
Alcohol	25.9%	32.4%	11.4%	48.6%	46.3%	25.0%
HCV	37.0%	37.8%	22.9%	20.0%	19.5%	18.8%
HBV	7.4%	2.7%	0.0%	14.3%	7.3%	9.4%
PBC	0.0%	5.4%	11.4%	5.7%	2.4%	6.3%
AIH	3.7%	5.4%	8.6%	5.7%	4.9%	6.3%
Indication for kidney transplantation, n (%)						
CKD	28 (84.8%)	55 (93.2%)	48 (94.1%)	44 (91.6%)	53 (92.9%)	56 (98.2%)
AKD	5 (15.2%)	4 (6.8%)	3 (5.9%)	4 (8.4%)	4 (7.1%)	1 (1.8%)
CKD etiology, % ^B						
Diabetic nephropathy	7.1%	23.6%	25.0%	20.5%	28.3%	26.8%
Hypertensive nephropathy	3.6%	16.4%	2.1%	9.1%	7.5%	14.3%
Glomerulonephritis	17.9%	14.5%	14.6%	20.5%	5.7%	5.4%
PKD	17.9%	30.9%	25.0%	22.7%	17.0%	32.1%
Other/Unknown	64.3%	36.4%	50.0%	38.6%	49.1%	41.1%
Induction regimen, n (%)						
Methylprednisolone + Thymoglobulin	2 (6.0%)	9 (15.2%)	7 (13.7%)	4 (8.3%)	10 (17.5%)	13 (22.8%)
Methylprednisolone + Basiliximab	10 (30.3%)	29 (49.1%)	34 (66.6%)	31 (64.5%)	37 (64.9%)	26 (45.6%)

Methylprednisolone + Thymoglobulin + Basiliximab	0 (0.0%)	2 (3.3%)	2 (3.9%)	3 (6.2%)	0 (0.0%)	0 (0.0%)
Methylprednisolone alone	18 (54.5%)	18 (30.5%)	7 (13.7%)	10 (20.8%)	10 (17.5%)	18 (31.5%)
Maintenance immunosuppression at 1 year (N=238)^c						
Tac + MMF + Steroids (n=131)	16 (48.4%)	22 (37.2%)	20 (39.2%)	28 (58.3%)	25 (43.8%)	20 (35.0%)
Tac + MMF (n=40)	3 (9.0%)	13 (22.0%)	3 (5.8%)	7 (14.5%)	6 (10.5%)	8 (14.0%)
Tac + Steroids (n=12)	1 (3.0%)	1 (1.6%)	3 (5.8%)	3 (6.2%)	1 (1.7%)	3 (5.2%)
Tac + MMF + Steroids + mTOR (n=2)	0 (0.0%)	0 (0.0%)	1 (1.9%)	0 (0.0%)	0 (0.0%)	1 (1.7%)
Tac + Steroids + mTOR (n=11)	0 (0.0%)	1 (1.6%)	6 (11.7%)	1 (2.0%)	3 (5.2%)	0 (0.0%)
Other combinations (n=42)	5 (15.1%)	16 (27.1%)	6 (11.7%)	3 (6.2%)	6 (10.5%)	6 (10.5%)
One-year post-transplant survival, % (95% CI)	65.8% (95% CI 49.3–82.1)	79.6% (95% CI 69.3–89.9)	76.4% (95% CI 64.8–88.1)	85.2% (95% CI 75.1–95.3)	70.1% (95% CI 58.3–82.0)	91.9% (95% CI 84.2–99.6)
eGFR ≥45 mL/min/1.73 m ² at 1 year, n (%)	13 (72.2%)	33 (73.3%)	30 (78.9%)	36 (90.0%)	29 (74.4%)	18 (72.0%)
Cause of death, n (%)						
Infectious	7 (53.8%)	13 (50.0%)	7 (31.8%)	8 (50.0%)	9 (47.3%)	3 (75.0%)
Cardiovascular	1 (7.6%)	3 (11.5%)	5 (22.7%)	1 (6.2%)	6 (31.5%)	0 (0.0%)
Neoplastic	0 (0.0%)	2 (7.6%)	2 (9.0%)	2 (12.5%)	1 (5.2%)	0 (0.0%)
Other	4 (30.7%)	8 (30.7%)	8 (36.3%)	4 (25.0%)	3 (15.7%)	1 (25.0%)
Donor characteristics						
Age, years, median (IQR)	32.0 (20.0–46.0)	32.5 (21.5–42.5)	34.0 (27.0–50.0)	32.0 (20.5–42.0)	41.0 (27.0–53.0)	34.0 (25.0–46.0)
Male sex, n (%)	21 (65.6%)	32 (59.3%)	35 (68.6%)	36 (75.0%)	33 (57.9%)	30 (53.6%)
BMI, kg/m ² , median (IQR)	24.0 (22.5–27.0)	24.0 (23.0–28.0)	25.0 (24.0–26.5)	24.5 (23.0–26.0)	26.0 (23.0–28.0)	25.0 (23.0–27.0)
Serum creatinine, mg/dL, median (IQR)	1.0 (0.6–1.2)	1.0 (0.7–1.1)	0.9 (0.7–1.1)	0.9 (0.8–1.2)	1.0 (0.6–1.3)	0.9 (0.7–1.1)
Serum sodium, mmol/L, median (IQR)	152.5 (141.0–164.0)	151.0 (145.0–158.0)	151.0 (149.0–157.0)	150.0 (145.0–161.0)	150.0 (144.0–157.0)	151.5 (145.5–160.0)
Donor cause of death, n (%)						
Stroke	31.0%	43.6%	42.0%	25.0%	45.6%	50.0%
Anoxia	0.0%	1.8%	2.0%	6.3%	3.5%	3.6%
Trauma	69.0%	50.9%	56.0%	62.5%	45.6%	37.5%
Other	0.0%	3.6%	0.0%	6.3%	5.3%	8.9%

This table summarizes temporal trends in recipient, donor, transplant, and outcome characteristics among 305 patients who underwent SLKT across six eras (2003–2025). Data are presented as n (%) for categorical variables and median (interquartile range) for continuous variables. Percentages are calculated using the number of patients transplanted in each time period as the denominator, unless otherwise specified. One-year post-transplant survival is reported as Kaplan–Meier estimates with 95% confidence intervals (CI). eGFR ≥45 mL/min/1.73 m² at 1 year was calculated among patients alive at that time point. Causes of death are expressed as percentages of all deaths observed in each period.

^A Cirrhosis etiology is reported only for the 207 patients transplanted for cirrhosis, of whom 177 (85.5%) had a single etiology and 30 (14.5%) had mixed etiologies. Only percentages are presented for these variables since denominators vary.

^B CKD etiology is reported only for the 284 patients with CKD, of whom 237 (83.5%) had a single identifiable etiology and 47 (16.5%) had mixed etiologies. CKD categories were grouped into five clinically meaningful subgroups: diabetes, hypertension, glomerulonephritis, polycystic kidney disease, and other/unknown causes. Percentages in these subsections do not sum to 100% for this reason.

^C Maintenance immunosuppression at 1 year was calculated among patients alive at that time point.

Abbreviations: SLKT, simultaneous liver–kidney transplantation; BMI, body mass index; RRT, renal replacement therapy; MELD-Na, Model for End-Stage Liver Disease–Sodium; MASLD, metabolic dysfunction-associated steatotic liver disease; HCV, hepatitis C virus; HBV, hepatitis B virus; PBC, primary biliary cholangitis; AIH, autoimmune hepatitis; CKD, chronic kidney disease; AKD, acute kidney disease; PKD, polycystic kidney disease; eGFR, estimated glomerular filtration rate; Tac, tacrolimus; MMF, mycophenolate mofetil; mTOR, mechanistic target of rapamycin; CI, confidence interval.

Figure S1. Age: temporal trends in median (IQR)

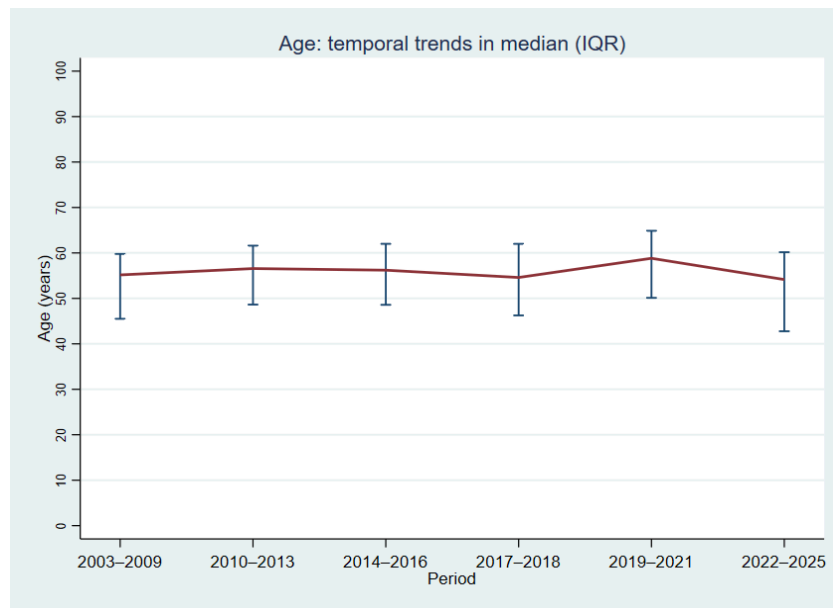


Figure S2. Male sex: temporal trends

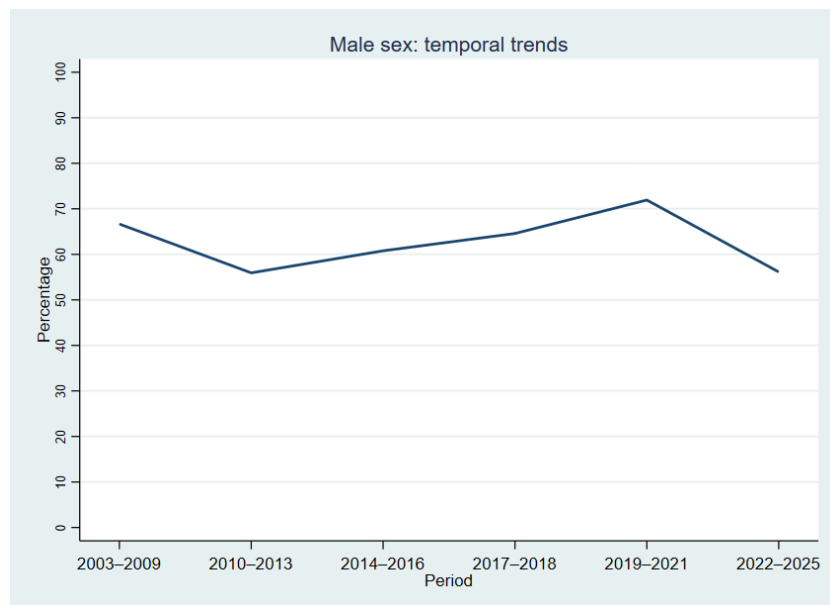


Figure S3. Body mass index: temporal trends in median (IQR)

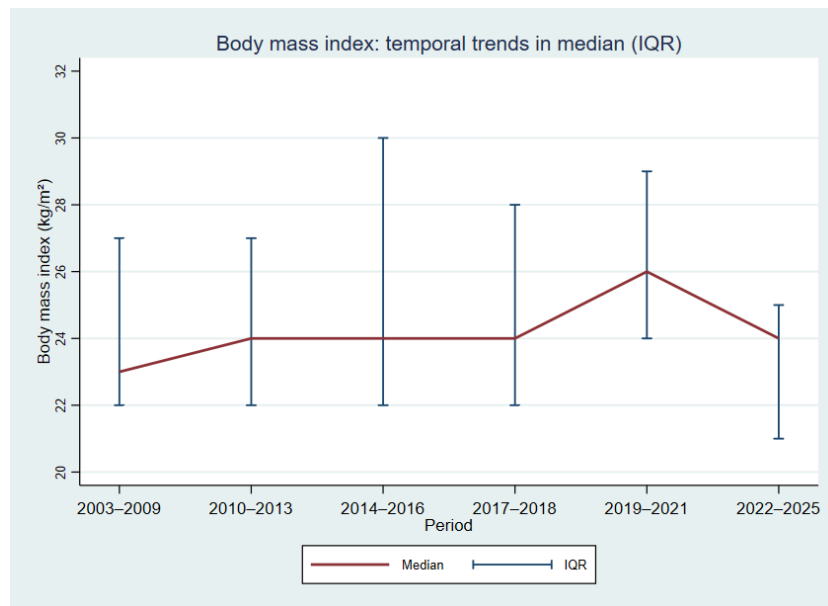


Figure S4. Hypertension: temporal trends

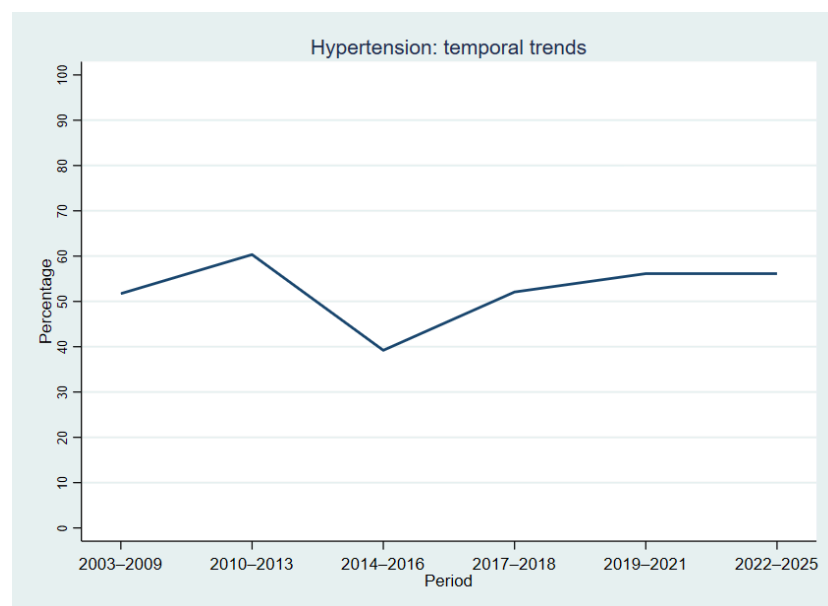


Figure S5. Diabetes: temporal trends

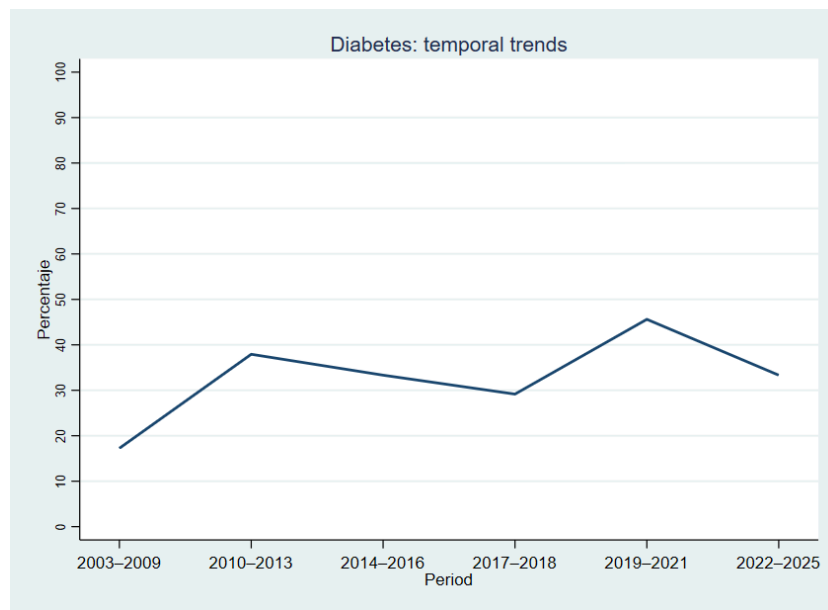


Figure S6. Dyslipidemia: temporal trends

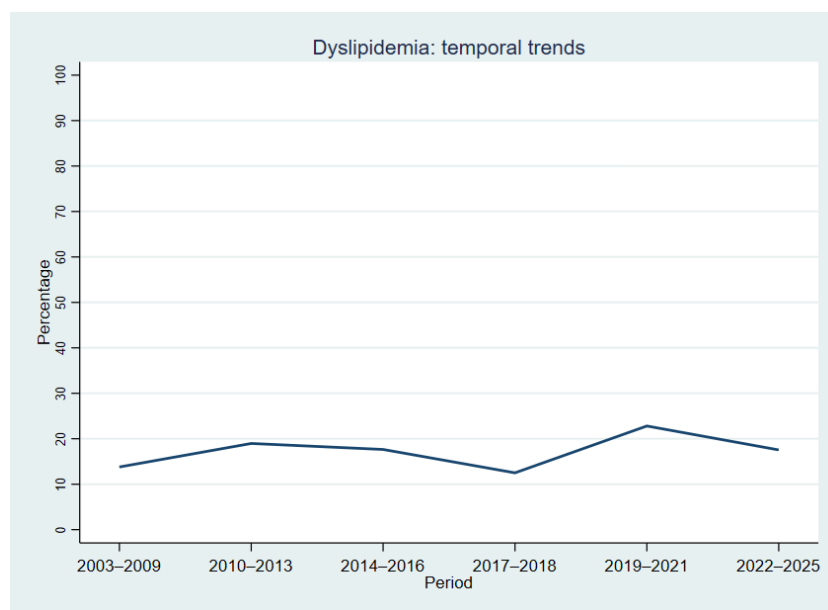


Figure S7. Pre-transplant renal replacement therapy: temporal trends

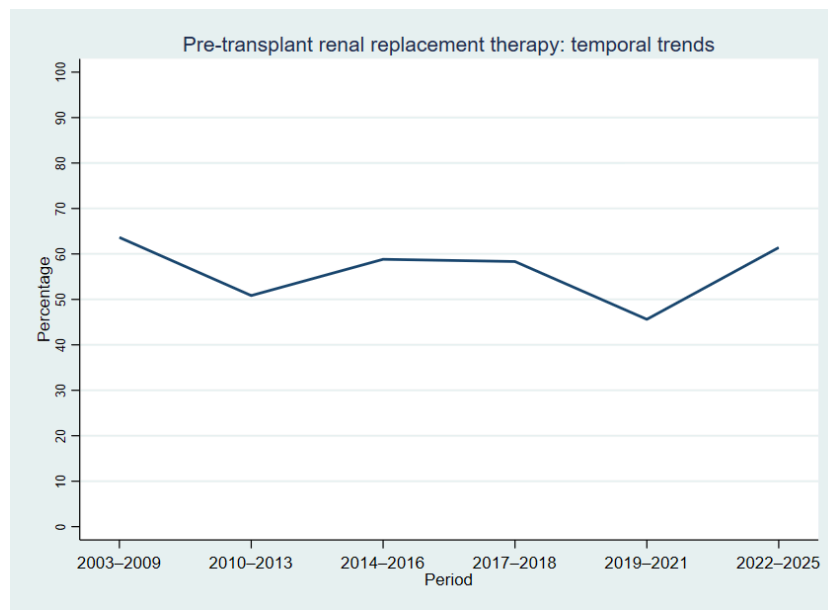


Figure S8. MELD-Na temporal trends in median (IQR)

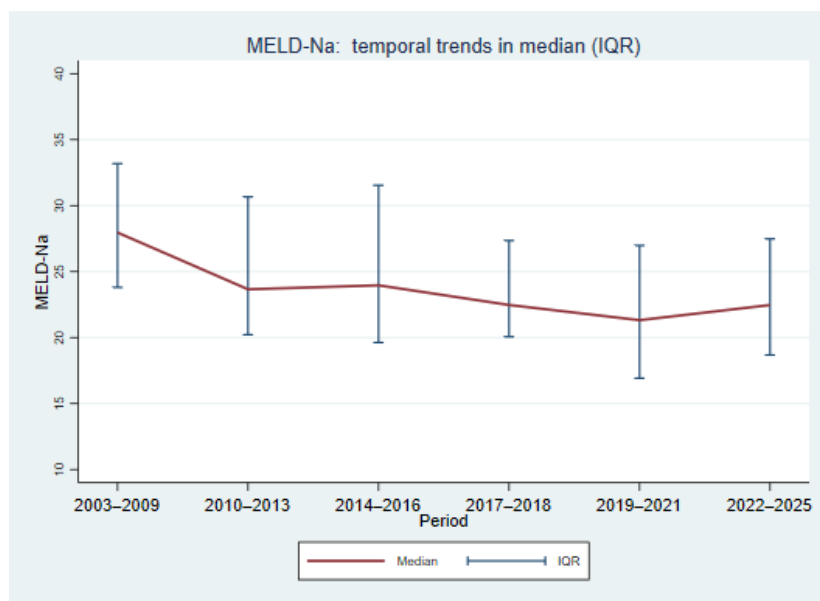


Figure S9. MELD exception: temporal trends

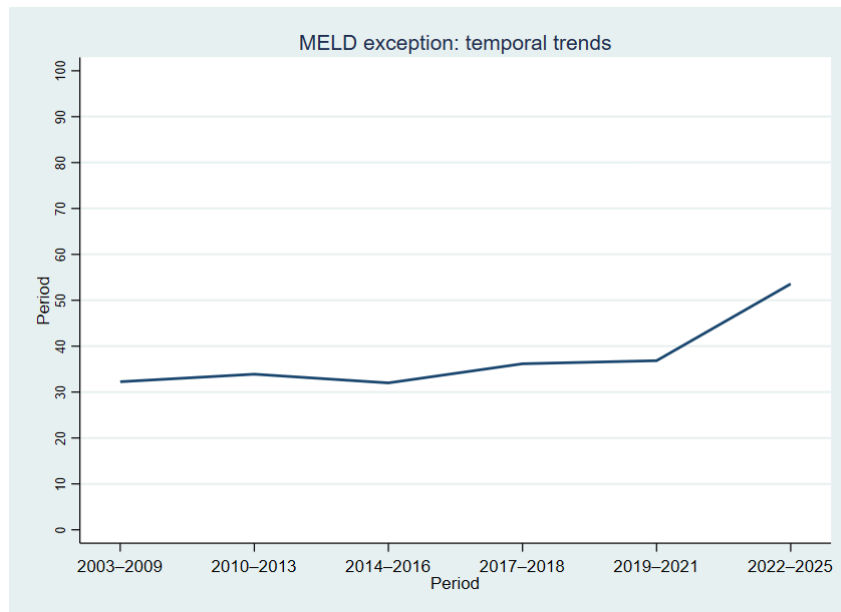


Figure S10. Liver transplant indication: temporal trends

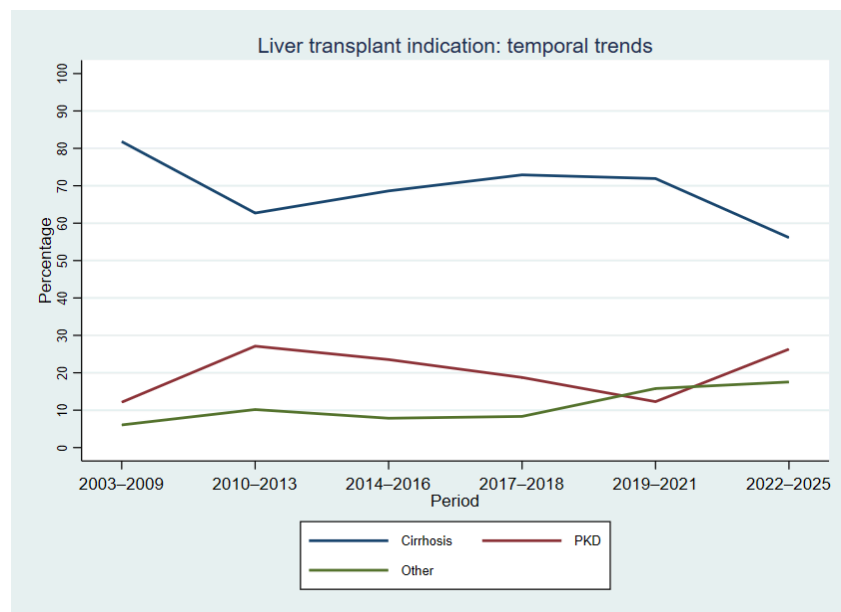


Figure S11. Cirrhosis etiology: temporal trends

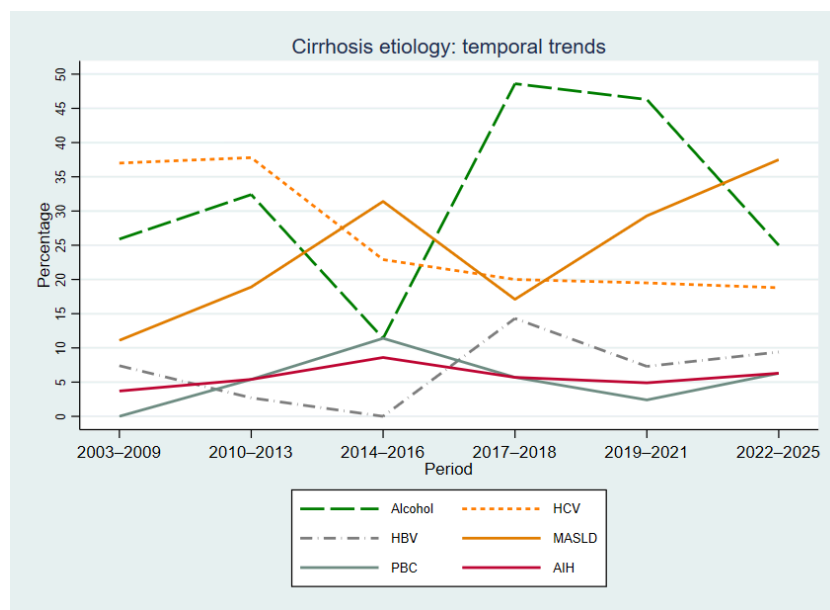


Figure S12. Chronic kidney disease (vs acute): temporal trends in transplant indication

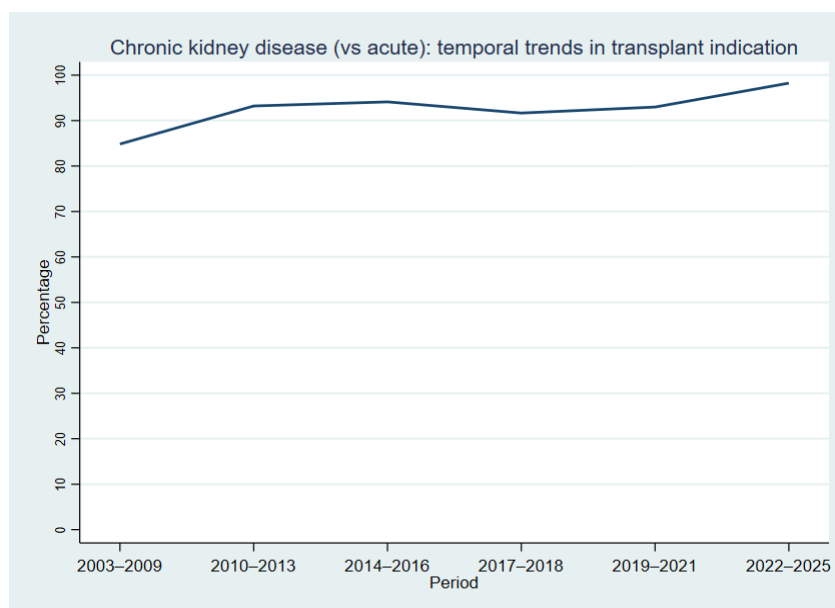


Figure S13. Chronic kidney disease etiology: temporal trends

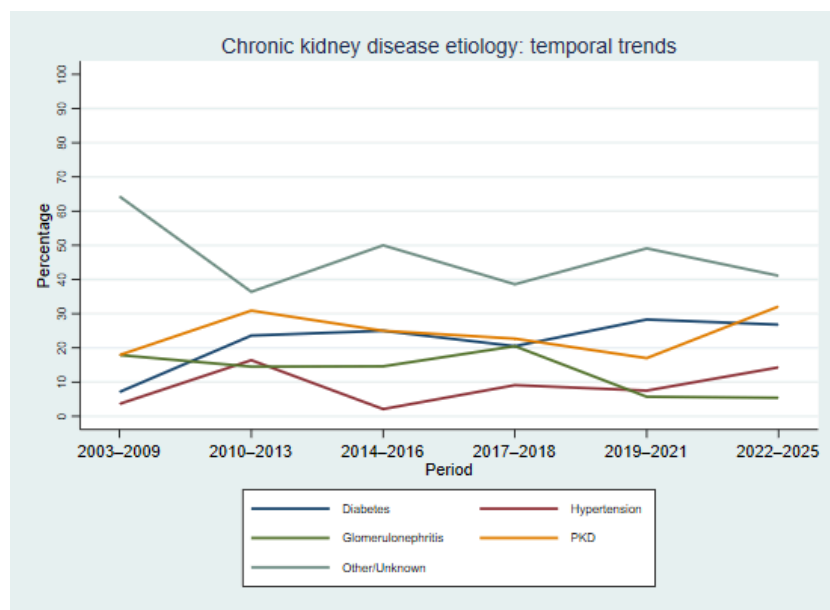


Figure S14. Induction regimen: temporal trends

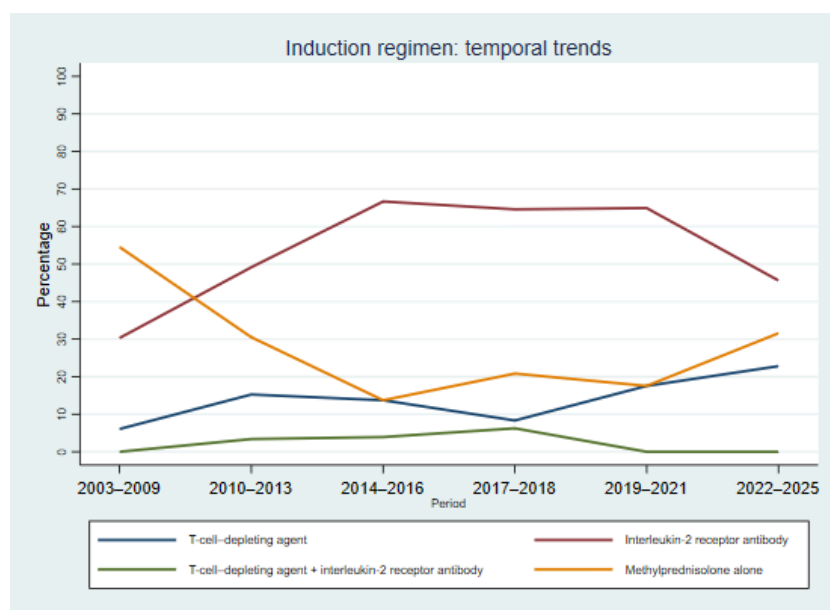


Figure S15. Maintenance immunosuppression at 1 year: temporal trends

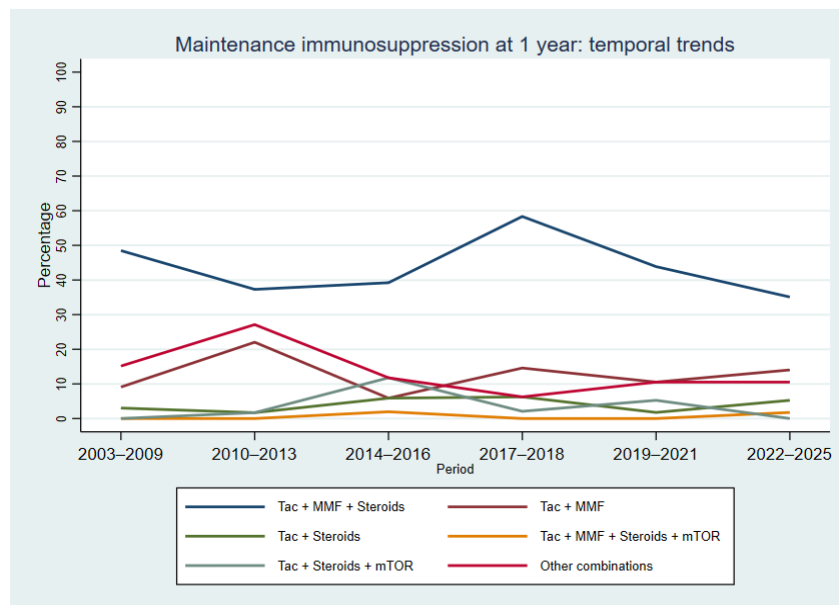


Figure S16. One-year post-transplant survival: temporal trends

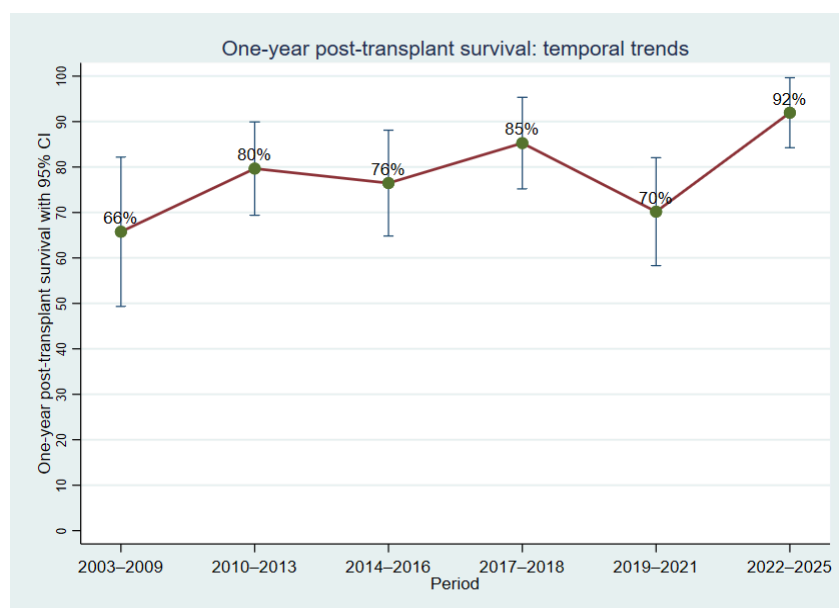


Figure S17. eGFR ≥ 45 mL/min/1.73 m² at 1 year: temporal trends

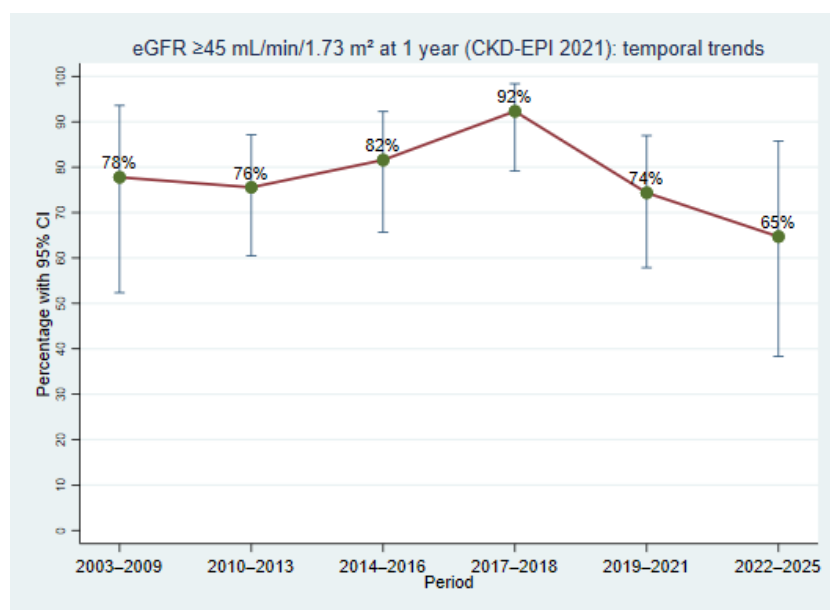


Figure S18. Cause of death: temporal trends

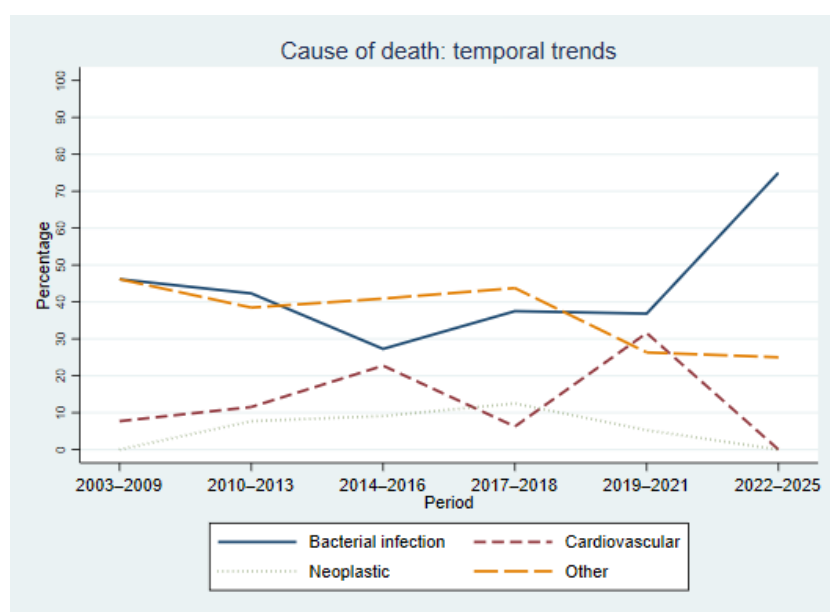


Figure S19. Donor age: temporal trends in median (IQR)

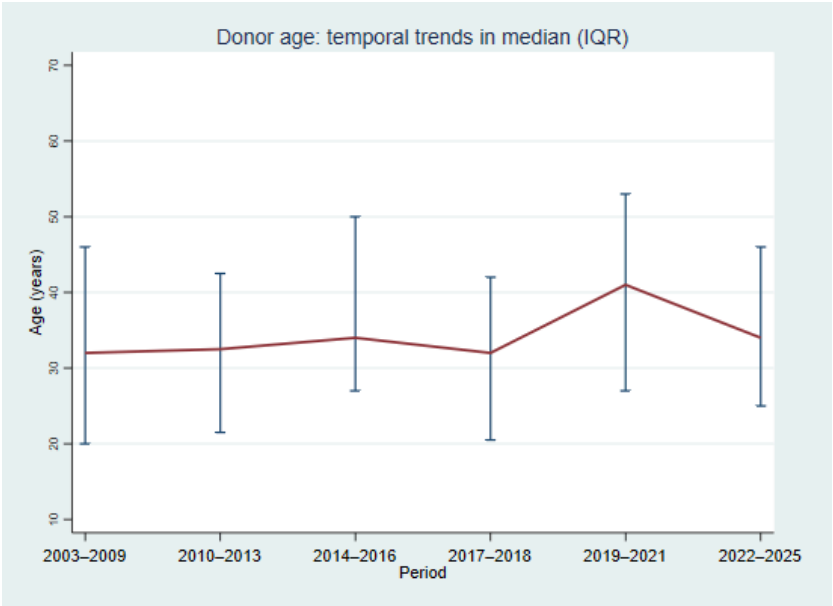


Figure S20. Donor male sex: temporal trends

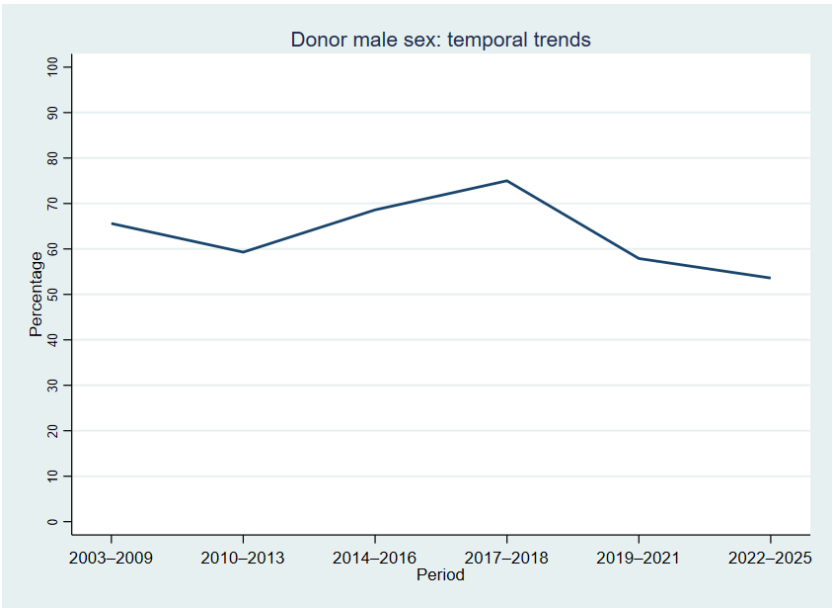


Figure S21. Donor body mass index: temporal trends in median (IQR)

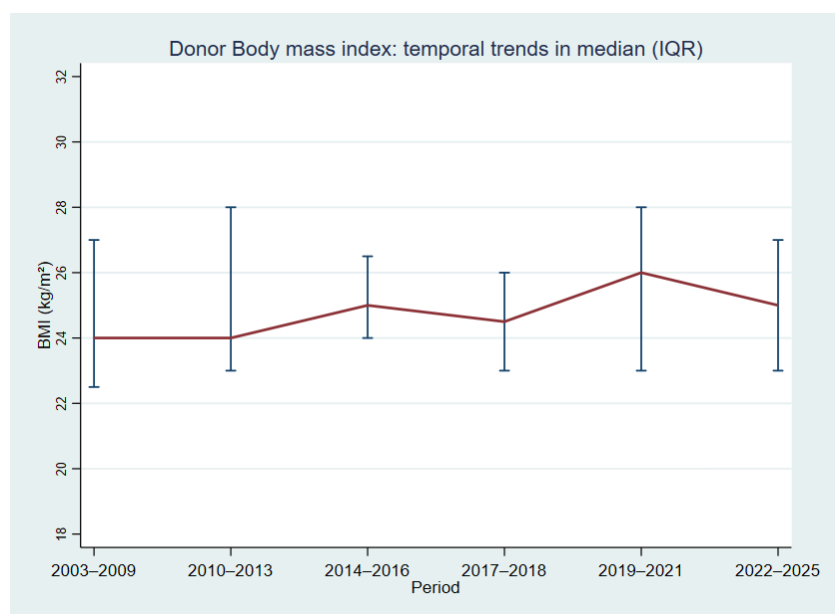


Figure S22. Donor creatinine: temporal trends in median (IQR)

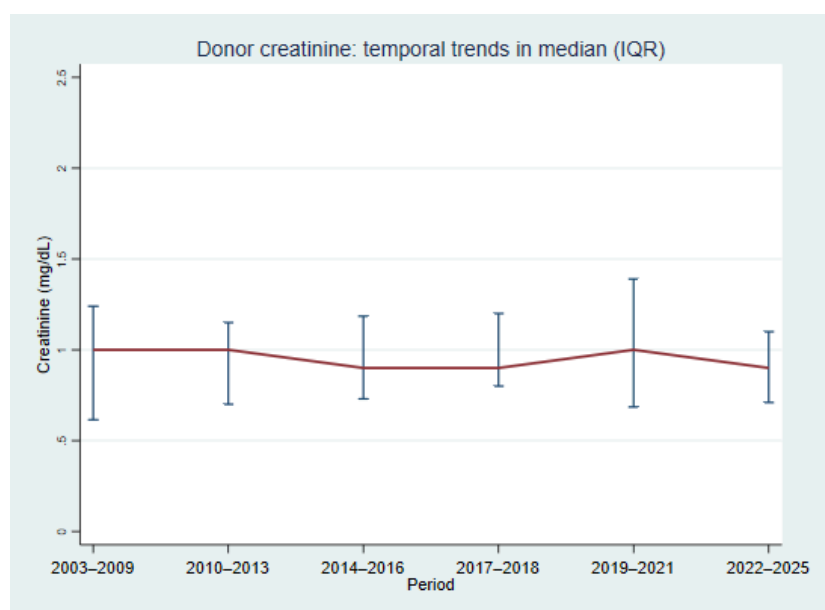


Figure S23. Donor natremia: temporal trends in median (IQR)

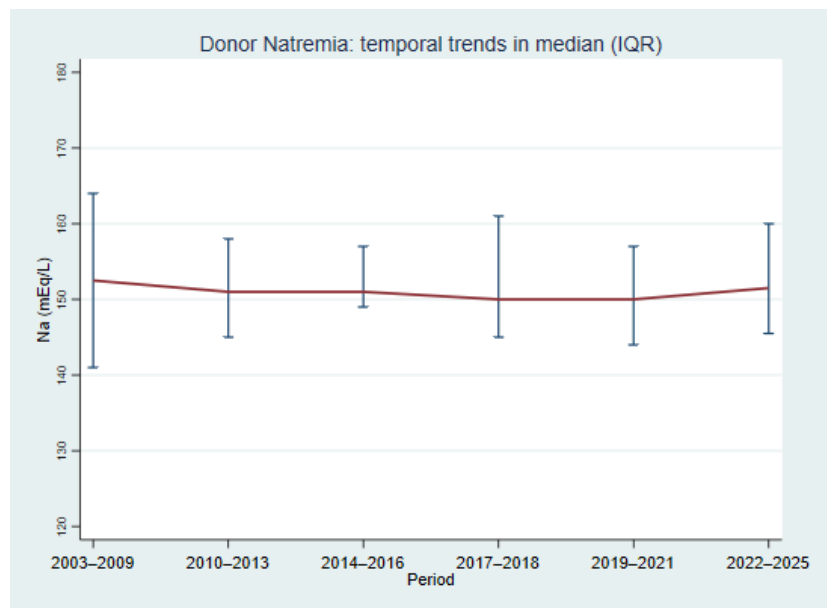
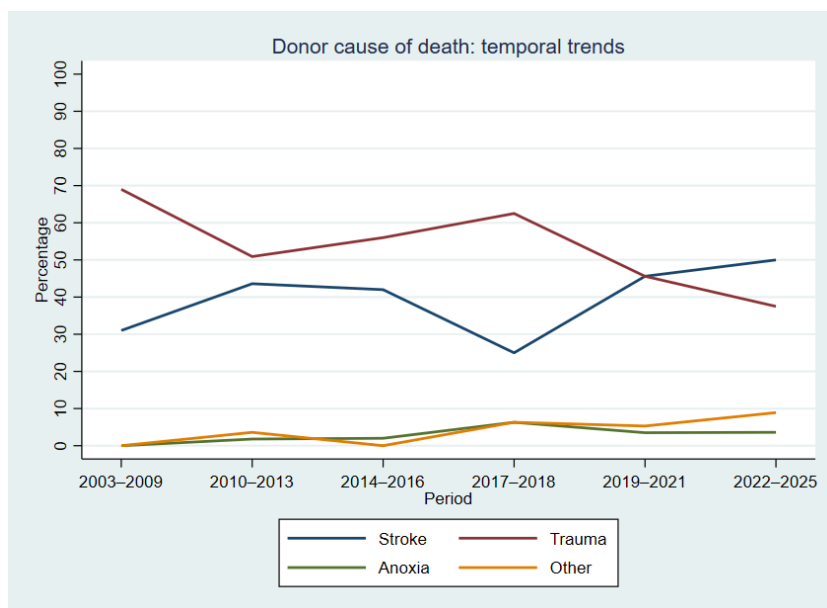


Figure S24. Donor cause of death: temporal trends



Figuras:

Figuras:

Figure 1. Distribution of deaths over time since SLKT (n=98)

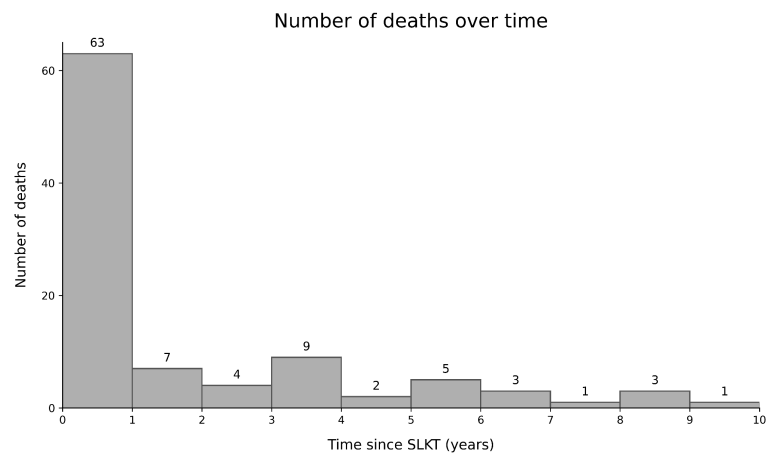
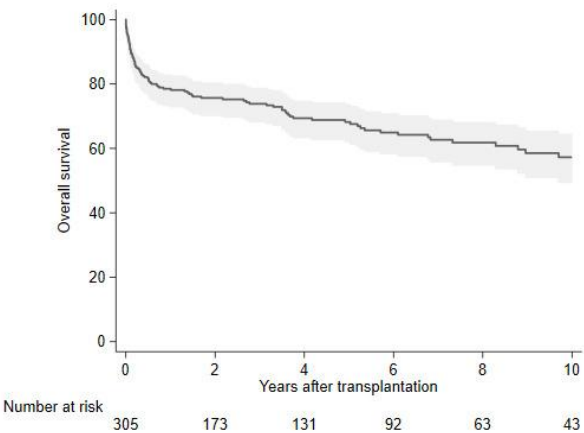


Figure 2. Kaplan–Meier estimates of survival after SLKT (n=305)

2A. Overall survival



2B. Survival with functioning grafts

