7.03.01	Kidney Transplant		
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Policy Statement

Kidney transplants with either a living or cadaver donor may be considered **medically necessary** for carefully selected candidates with end-stage renal disease (ESRD).

Kidney retransplant after a failed primary kidney transplant may be considered **medically necessary** in patients who meet criteria for kidney transplantation.

Kidney transplant is considered **investigational** in all other situations.

The transplantation of Hepatitis C Virus (HCV)-viremic solid organs (kidney, lung, heart, liver, small bowel, pancreas) to a HCV non-viremic recipient with a plan to use direct-acting antiviral treatment for HCV is considered **investigational.**

Policy Guidelines

The American Society of Transplantation Consensus Conference on the use of hepatitis C viremic donors in solid organ transplantation concluded that the transplantation of organs from HCV viremic donors into HCV-negative recipients should be conducted only under monitored IRB-approved protocols and studies. (See Supplemental Information).

Contraindications
Potential contraindications to solid organ transplant (subject to the judgment of the transplant center), include the following:

- Known current malignancy, including metastatic cancer
- Recent malignancy with high risk of recurrence
- History of cancer with a moderate risk of recurrence
- Systemic disease that could be exacerbated by immunosuppression
- Untreated systemic infection making immunosuppression unsafe, including chronic infection
- Other irreversible end-stage diseases not attributed to kidney disease
- Psychosocial conditions or chemical dependency affecting ability to adhere to therapy

Renal-Specific Criteria
Both creatinine and glomerular filtration rates (GFR) are significant markers to consider. Other factors such as symptoms or comorbidities may be considered when making the decision when to begin wait listing or for transplant. Indications for renal transplant include a creatinine level of greater than 8 mg/dL, or greater than 6 mg/dL in symptomatic diabetic patients or a glomerular filtration rate (GFR) of <15; however, consideration for listing for renal transplant may start well before the creatinine or GFR levels reach this point, based on the anticipated time that a patient may spend on the waiting list.

Living donor renal transplants in patients with progressive renal failure may be indicated at creatinine or GFR levels below that typically associated with end stage chronic kidney disease (Stage 5 chronic kidney disease [CKD]). Discussions about renal transplants and other treatment options may start much earlier at Stage 3B or Stage 4.

Five Stages of Kidney Disease

- **Stage** 1: with normal or high GFR (GFR > 90 mL/min)
- **Stage** 2: Mild **CKD** (GFR = 60-89 mL/min)
- **Stage** 3A: Moderate **CKD** (GFR = 45-59 mL/min)

- **Stage** 3B: Moderate **CKD** (GFR = 30-44 mL/min)
- **Stage** 4: Severe **CKD** (GFR = 15-29 mL/min)
- **Stage 5**: End **Stage CKD** (GFR <15 mL/min)

Description

Kidney transplant, a treatment option for end-stage renal disease, involves the surgical removal of a kidney from a cadaver, living-related donor, or living-unrelated donor and transplantation into the recipient.

Related Policies

- Allogeneic Pancreas Transplant
- Chelation Therapy for Off-Label Uses

Benefit Application

Benefit determinations should be based in all cases on the applicable contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

Some state or federal mandates (e.g., Federal Employee Program [FEP]) prohibits plans from denying Food and Drug Administration (FDA)-approved technologies as investigational. In these instances, plans may have to consider the coverage eligibility of FDA-approved technologies on the basis of medical necessity alone.

Regulatory Status

Solid organ transplants are a surgical procedure and, as such, are not subject to regulation by the U.S. Food and Drug Administration (FDA).

The FDA regulates human cells and tissues intended for implantation, transplantation, or infusion through the Center for Biologics Evaluation and Research, under Code of Federal Regulation Title 21, parts 1270 and 1271. Solid organs used for transplantation are subject to these regulations.

Rationale

Background
Solid organ transplantation offers a treatment option for patients with different types of end-stage organ failure that can be lifesaving or provide significant improvements to a patient's quality of life.[1] Many advances have been made in the last several decades to reduce perioperative complications. Available data supports improvement in long-term survival as well as improved quality of life particularly for liver, kidney, pancreas, heart, and lung transplants. Allograft rejection remains a key early and late complication risk for any organ transplantation. Transplant recipients require life-long immunosuppression to prevent rejection. Patients are prioritized for transplant by mortality risk and severity of illness criteria developed by Organ Procurement and Transplantation Network (OPTN) and United Network of Organ Sharing (UNOS).

Kidney Transplant
In 2019, 39719 transplants were performed in the United States procured from almost 11900 deceased donors and 7400 living donors.[2] Kidney transplants were the most common

procedure with 23401 transplants performed from both deceased and living donors in 2019. Since 1988, the cumulative number of kidney transplants is over 478000.[3] Of the cumulative total, 66.5% of the kidneys came from deceased donors and 33.5% from living donors.

Kidney transplant, using kidneys from deceased or living donors, is an accepted treatment of end-stage renal disease (ESRD). ESRD refers to the inability of the kidneys to perform their functions (i.e., filtering wastes and excess fluids from the blood). ESRD, which is life-threatening, is also known as chronic kidney disease stage 5 and is defined as a glomerular filtration rate (GFR) less than 15 mL/min/1.73 m^2.[4] Patients with advanced chronic kidney disease, mainly stage 4 (GFR 15 to 29 mL/min/1.73 m^2) and stage 5 (GFR <15 mL/min/1.73 m^2), should be evaluated for transplant.[5] Being on dialysis is not a requirement to be considered for kidney transplant. Severe non-compliance and substance abuse serve as contraindications to kidney transplantation but even those could be overcome with clinician support and patient motivation. All kidney transplant candidates receive organ allocation points based on waiting time, age, donor-recipient immune system compatibility, prior living donor status, distance from donor hospital, and survival benefit.[6,7]

Combined kidney and pancreas transplants and management of acute rejection of kidney transplant using either intravenous immunoglobulin or plasmapheresis are discussed in separate evidence reviews.

Literature Review

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the length of life, quality of life, and ability to function-including benefits and harms. Every clinical condition has specific outcomes that are important to patients and managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, two domains are examined: the relevance, and quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. Randomized controlled trials are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

Kidney Transplant

Clinical Context and Test Purpose

The purpose of a kidney transplant in patients who have end-stage renal disease (ESRD) without contraindications to a kidney transplant is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does kidney transplantation improve the net health outcome in individuals with ESRD without contraindications to kidney transplant?

The following PICO was used to select literature to inform this review.

Patients

The relevant population of interest is individuals with ESRD without contraindications to a kidney transplant. ESRD refers to the inability of the kidneys to perform their functions (i.e., filtering wastes

and excess fluids from the blood). ESRD, which is life-threatening, is also known as stage 5 chronic renal failure and is defined as a glomerular filtration rate less than 15 mL/min/1.73 m^2.[4,]

Interventions
The therapy being considered is kidney transplant from a living or cadaveric donor which is provided in a hospital setting by specialized staff who are equipped to perform the surgical procedure and manage postsurgical care.

Comparators
The following therapies and practices are currently being used to make decisions about managing ESRD: medical management, including dialysis and medications to control symptoms. Dialysis is an artificial replacement for some kidney functions. Dialysis is used as a supportive measure in patients who do not want kidney transplants or who are not transplant candidates; it can also be used as a temporary measure in patients awaiting a kidney transplant.

Outcomes
The general outcomes of interest are overall survival (OS), elimination of the need for dialysis, and treatment-related adverse events (e.g., immunosuppression, graft failure, surgical complications, infections),with follow-up ranging from 30 days posttransplantation up to 10 years or more. See the Potential Contraindications section for detailed discussion.

Review of Evidence
Registry Studies
According to data analysis from the OPTN , between 2008 and 2015, the 1-year survival of patients undergoing an initial kidney transplant was 97.1 % (95% confidence interval [CI], 96.9 % to 97.2 %).[3,] Five-year survival was 86.3 % (95% CI, 86.0 % to 86.6 %).

Krishnan et al (2015) published a study of 17681 patients in a U.K. transplant database who received a kidney transplant or were on a list to receive a kidney transplant.[8,] Authors found significantly higher 1- and 5-year survival rates in patients who underwent a kidney transplant than in those who remained on dialysis (exact survival rates not reported).

Transplants Stratified by Donor Source
The UNOS proposed an Expanded Criteria Donor (ECD) approach in 2002 to include brain-dead donors over 60 years or between 50 and 59 years old with 2 or more of the following criteria: serum creatinine level greater than 1.5 mg/dL, death caused by cerebrovascular accident, or history of high blood pressure.[9,]

Querard et al (2016) conducted a systematic review and meta-analysis of studies comparing survival outcomes with ECD vs Standard Criteria Donor (SCD) kidney transplant recipients.[9,] Reviewers identified 32 publications, 5 of which adjusted for potential confounding factors. A pooled analysis of 2 studies reporting higher rates of patient-graft failure for ECD kidney recipients found a significantly higher adjusted hazard ratio (HR) for patient-graft survival (HR=1.68; 95% CI; 1.32 to 2.12). Meta-analyses were not conducted for patient survival outcomes; however, 1 study (N =189) found a higher but nonsignificant difference in patient survival with ECD than with SCD (HR=1.97; 95% CI, 0.99 to 3.91) and another study (N =13833) found a significantly increased risk of death with ECD than with SCD (HR=1.25; 95% CI, 1.12 to 1.40).

Pestana (2017) published a retrospective, single-center analysis of kidney transplants performed between 1998 and 2015 at a hospital in Brazil.[10,] Of the 11436 transplants analyzed, 31% (n=3614) were performed under SCD, while 14% (n=1618) were performed under ECD. The number of ECD recipients increased over time, from 29 transplants in 1998-2000 to 450 transplants from 2013-2014. Patient survival with ECD increased from 1998-2002 to 2011-2014 (from 79.7% to 89.2%, $p<0.001$); a similar increase was noted in patient survival with SCD over the same time periods (from 73.1% to 85.2%, $p<0.001$). The study was limited by reliance on limited registry data.

Several studies have reported long-term outcomes in live kidney donors. The most appropriate control group to evaluate whether donors have increased risks of morbidity and mortality are individuals who meet the criteria for kidney donation but who did not undergo the procedure. These types of studies have provided mixed findings. For example, Segev et al (2010) found that donors had an increased mortality risk.[11] The authors analyzed data from a national registry of 80347 live donors in the U. S. who donated organs between April 1994 and March 2009 and compared their data with data from 9364 participants of the National Health and Nutrition Examination Survey (excluding those with contraindications to kidney donation). There were 25 deaths within 90 days of live kidney donation during the study period. Surgical mortality from live kidney donors was 3.1 per 10000 donors (95% CI, 2.0 to 4.6) and did not change over times, despite differences in practice and selection. Long-term risk of death was no higher for live donors than for age- and comorbidity-matched National Health and Nutrition Examination Survey III participants for all patients and also stratified by age, sex, and race.

Potential Contraindications to Kidney Transplant

Human Immunodeficiency Virus Infection

Patients infected with human immunodeficiency virus (HIV) may receive organs from HIV-positive donors under approved research protocols through the HIV Organ Policy Equity Act. As of November 2017, 6 hospitals performed 34 such transplants (23 kidney and 11 liver transplants), involving organs from 14 deceased donors. In a prospective, nonrandomized study, Muller et al (2015) noted that HIV-positive patients transplanted with kidneys from donors testing positive for HIV showed a 5-year survival rate of 74%.[12] Researchers noted that the HIV infection remained well-controlled and the virus was undetectable in the blood after transplantation.

Locke et al (2015) examined outcomes in 499 HIV-positive kidney transplant recipients identified in the Scientific Registry of Transplant Recipients.[13] Compared with early era transplants (2004-2007), patients transplanted more recently (2008-2011) had a significantly lower risk of death (HR=0.59; 95% CI, 0.39 to 0.90). The 5-year patient survival rate was 78.2% for patients transplanted in the early era and 85.8% for more recent transplants. In another study, Locke et al (2015) compared outcomes in 467 adult kidney transplant recipients with 4670 HIV-negative controls, matched on demographic characteristics.[14] Compared with HIV-negative controls, survival among HIV-positive transplant recipients was similar at 5 years posttransplant (83.5% vs 86.2%, p=0.06). At 10 years, HIV-positive transplant recipients had a significantly lower survival rate (51.6%) than HIV-negative patients (72.1%; p<0.001). The lower 10-year survival rate was likely due to HIV and hepatitis C virus (HCV) coinfection; survival rates at 10 years in HIV-monoinfected patients and HIV-negative patients were similar (88.7% vs 89.1%, p=0.50). Locke et al (2017) found significantly lower 5-year mortality rates in HIV-infected patients with ESRD who had kidney transplants compared with continued dialysis (adjusted relative risk [RR], 0.21; 95% CI, 0.10 to 0.42; p<0.001).[15]

In addition, Sawinski et al (2015) analyzed survival outcomes in patients infected with HIV, HCV, or HIV plus HCV.[16] The analysis included 492 HIV-infected patients, 5605 HCV-infected patients, 147 coinfected patients, and 117,791 noninfected patients. In a multivariate analysis, compared with noninfected patients, HIV-infected patients did not have an increased risk of death (HR=0.90; 95% CI, 0.66 to 1.24). However, HCV infection (HR=1.44; 95% CI, 1.33 to 1.56) and HIV and HCV coinfection (HR=2.26; 95% CI, 1.45 to 3.52) were both significantly associated with an increased risk of death.

Zheng et al (2019) performed a meta-analysis of 27 cohort studies, accounting for 1670 cases, to analyze various outcomes among HIV-positive patients who underwent kidney transplantation.[17] The results revealed 97% (95% CI, 95% to 98%) survival at 1 year and 94% (95% CI, 90% to 97%) survival at 3 years. Other outcomes comprised 91% (95% CI, 88% to 94%) graft survival at 1 year, 81% (95% CI, 74% to 87%) graft survival at 3 years, 33% (95% CI, 28% to 38%) with acute rejections at 1 year, and 41% (95% CI, 34% to 50%) with infectious complications at 1 year.

Current OPTN policy permits HIV-positive transplant candidates.[18]

The British HIV Association and the British Transplantation Society (2017) updated their guidelines on kidney transplantation in patients with HIV disease.[19] These criteria may be extrapolated to other organs:

- Adherent with treatment, particularly antiretroviral therapy
- Cluster of differentiation 4 count greater than 100 cells/mL (ideally >200 cells/mL) for at least 3 months
- Undetectable HIV viremia (<50 HIV-1 RNA copies/mL) for at least 6 months
- No opportunistic infections for at least 6 months
- No history of progressive multifocal leukoencephalopathy, chronic intestinal cryptosporidiosis, or lymphoma.

Hepatitis C Infection

A meta-analysis by Fabrizi et al (2014) identified 18 observational studies comparing kidney transplant outcomes in patients with and without HCV infection.[20] The studies included 133350 transplant recipients. In an adjusted analysis, the risk of all-cause mortality was significantly higher in HCV-positive vs HCV-negative patients (RR=1.85; 95% CI, 1.49 to 2.31). Risks were elevated in various study subgroups examined by investigators. When the analysis was limited to the 4 studies from the U. S., the adjusted RR was 1.29 (95% CI, 1.15 to 1.44). In an analysis of 10 studies published since 2000, the RR was 1.84 (95% CI, 1.45 to 2.34). An analysis of disease-specific mortality suggested that at least part of the increased risk in mortality among HCV-positive individuals must have been due to chronic liver disease. In a meta-analysis of 9 studies, the risk of liver disease-related mortality was considerably elevated in patients infected with HCV than in those uninfected (odds ratio, 11.6; 95% CI, 5.54 to 24.4).

In the analysis by Sawinski et al (2015), described above, HCV infection was associated with an increased risk of mortality in kidney transplant patients compared with noninfected patients.[16]

Obesity

Several studies have found that obese kidney transplant patients have improved outcomes compared with patients on a waiting list matched by body mass index (BMI). Study results on whether morbid obesity is associated with an increased risk of adverse events after kidney transplant are conflicting.

In an analysis of kidney transplant data from the U.K., Krishnan et al (2015) reported on BMI data were available for 13536 patients.[8] They devised several BMI categories (i.e., <18.5 kg/m^2, 18.5 to <25 kg/m^2, 25 to <30 kg/m^2, 30 to <35 kg/m^2, and 35 to <40 kg/m^2). For each BMI category, patient survival was significantly higher in those who underwent kidney transplants compared with those who remained on a waiting list. In a similar analysis of U.S. data, Gil et al (2013) noted that the risk of mortality at 1 year was significantly lower in patients who underwent transplantation than in those who remained on the waiting list for all BMI categories.[21] For example, the risk was lower for patients with a BMI of at least 40 kg/m^2 who received organs from donors who met standard criteria (HR=0.52; 95 CI, 0.37 to 0.72) and for patients with BMI 35 to 39 kg/m^2 who received organs from SCD donors (HR=0.34; 95% CI, 0.26 to 0.46).

Pieloch et al (2014) retrospectively reviewed data from the OPTN database.[22] The sample included 6055 morbidly obese patients (i.e., BMI, 35-40 kg/m^2) and 24077 normal-weight individuals who underwent kidney transplant between 2001 and 2006. After controlling for potentially confounding factors, the overall 3-year patient mortality did not differ significantly between obese and normal-weight patients (HR=1.03; 05% CI, 0.96 to 1.12). Similar results were found for 3-year graft failure (HR=1.04; 95% CI, 0.98 to 1.11). In subgroup analyses, obese patients who were non-dialysis-dependent, nondiabetic, younger, receiving living donor transplants, and needing no assistance with daily living activities had significantly lower 3-year mortality rates than normal-weight individuals. For example, the odds for mortality between nondiabetic obese and normal-weight patients was 0.53 (95% CI, 0.44 to 0.63).

A multivariate analysis of the effect of obesity on transplant outcomes by Kwan et al (2016) included 191091 patients from the Scientific Registry of Transplant Recipients database.[23] Covariates in the analysis included age, sex, graft type, ethnicity, diabetes, peripheral vascular disease, dialysis time, and time period of transplantation. Multivariate regression analysis indicated that obese patients had a significantly increased risk of adverse transplant outcomes including delayed graft function, urine protein, acute rejection, and graft failure (p<0.001 for all outcomes). The risk of adverse outcomes of obesity increased with increasing BMI (e.g., see Table 1), and was independent of the effect of diabetes.

Table 1. Hazard Ratio of Graft Failure Relative to a Body Mass Index of 18.5 to 24.9 kg/m²

Body Mass Index, kg/m²	Hazard Ratio	95% Confidence Interval	p
25 to 29.9	1.015	0.983 to 1.047	0.416
30 to 34.9	1.104	1.065 to 1.145	<0.001
35 to 39.9	1.216	1.158 to 1.276	<0.001
40+	1.248	1.156 to 1.348	<0.001

Type 2 Diabetes

Kervinen et al (2018) looked at the probability of receiving renal transplantation and survival after transplantation for patients with type 2 diabetes mellitus (T2DM).[24] Using the Finnish Registry for Kidney Diseases, which included 5419 patients between the years 2000 and 2010, 1065 individuals with T2DM were identified, of which 105 received a kidney transplant during follow-up. The relative probability of renal transplantation was 0.25 (95% CI 0.20–0.30, p<0.001) for T2DM patients compared with non-diabetic patients. Survival probabilities at 5 years after transplantation were 88% for T2DM and 93% for non-diabetic patients (adjusted HR for death 1.39, 95% CI 0.82–2.35, p=0.227). The limitations of this study were the relatively small number of T2DM patients receiving kidney transplantation and almost all of these were from deceased donors. Also, the transplantation criteria for T2DM patients in Finland may give better survival rates in the study.

Lim et al (2017) evaluated all-cause mortality following kidney transplantation in patients with T2DM from Australia and New Zealand Dialysis and Transplant Registry.[25] Of 10714 transplant recipients during the study period, 985 (9%) had T2DM. The 10-year unadjusted OS in patients with an intact graft was 53% for individuals who had diabetes compared with 83% for transplant recipients who did not. The adjusted HR for all-cause mortality in patients with diabetes was 1.60 (95% CI, 1.37 to 1.86; p<0.001), with the excess risk of death attributable to both cardiovascular disease and infection. Graft survival rates at 1, 5, and 10 years were 94%, 85%, and 70% in patients with diabetes compared with 95%, 89%, and 78% in transplant recipients without diabetes (p<0.001), respectively.

Section Summary: Kidney Transplant

A large number of kidney transplants have been performed worldwide. Available data have demonstrated reasonably high survival rates after kidney transplant for appropriately selected patients and significantly higher survival rates for patients undergoing kidney transplant compared with those who remained on a waiting list. HIV infection has not been found to increase the risk of adverse events after kidney transplantation. Obesity and T2DMt may increase the risk of adverse outcomes, and some data have suggested that kidney transplant recipients with HCV have worse outcomes than those without hepatitis C infection; however, data have not shown that patients with these conditions do not benefit from kidney transplants.

Kidney Retransplant

Clinical Context and Test Purpose

The purpose of kidney retransplants in patients who have a failed kidney transplant without contraindications to another kidney transplant is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does kidney retransplant improve net health outcomes in individuals with failed kidney transplants who do not have contraindications to another kidney transplant?

The following PICO was used to select literature to inform this review.

Patients
The relevant population of interest are individuals with a failed kidney transplant without contraindications to another kidney transplant.

Interventions
The therapy being considered is kidney retransplant from a living or cadaveric donor which is provided in a hospital setting by specialized staff who are equipped to perform the surgical procedure and manage postsurgical intensive care.

Comparators
The following therapies and practices are currently being used to make decisions about managing patients whose kidney transplant has failed: medical management including dialysis, self-care, and medications, including dietary supplements and diuretics.

Outcomes
The general outcomes of interest are OS, elimination of the need for dialysis, and treatment-related adverse events (e.g., immunosuppression, graft failure, surgical complications, infections), with follow-up ranging from immediate postsurgery to 30 days posttransplantation and long-term follow-up out to 10 years or more. See the Potential Contraindications section for detailed discussion.

Review of Evidence
Case Series
Barocci et al (2009) in Italy reported on long-term survival after kidney retransplantation.[26] There were 100 (0.8%) second transplants of 1302 kidney transplants performed at a single-center between 1983 and 2007. Among the second kidney recipients, 1-, 5-, and 10-year patient survival rates were 100%, 96%, and 92%, respectively. Graft survival rates at 1, 5, and 10 years were 85%, 72%, and 53%, respectively.

Registry Studies
According to data analysis from the OPTN between 2008 and 2015, the 1-year survival rate of patients undergoing a repeat kidney transplant was 97.2 % (95% CI, 96.8 % to 97.5%).[3] The 5-year patient survival rate after a repeat kidney transplant was 88.0 % (95% CI, 87.3 % to 88.8 %).

Children
Gupta et al (2015) retrospectively analyzed OPTN data, focusing on patients who had an initial kidney transplant as children.[27] A total of 2281 patients were identified who had their first transplant when they were younger than 18 years and a second kidney transplant at any age. In multivariate analysis, the length of first graft survival and age at second graft were significantly associated with second graft survival. Specifically, the first graft survival time of more than 5 years was associated with better second graft survival. However, patients who were between 15 and 20 years old at second transplant were at increased risk of second kidney graft failure compared with patients in other age groups.

Potential Contraindications to Kidney Retransplant
HIV Infection
Shelton et al (2017) evaluated outcomes in HIV-infected patients undergoing kidney retransplantation.[28] In adjusted survival analysis, HIV-infected retransplant patients had a significantly increased risk of death compared with HIV-negative patients (HR=3.11; 95% CI, 1.82 to 5.34). Other factors significantly associated with increased risk of death after kidney

retransplantation included recipient infection with HCV (HR=1.77; 95% CI, 1.32 to 2.38) and grafts from older donors (HR=1.01; 95 CI, 1.00 to 1.02). The analysis included only 22 HIV-infected patients, which is too small to draw conclusions about the appropriateness of kidney retransplantation in HIV-infected individuals.

Other contraindications are discussed in the section on initial kidney transplants.

Section Summary: Kidney Retransplant
Data have demonstrated reasonably high survival rates after kidney retransplants for appropriately selected patients (e.g., 5-year survival rates ranging from 87% to 96%).

Summary of Evidence
For individuals who have end-stage renal disease without contraindications to kidney transplant who receive a kidney transplant from a living donor or deceased (cadaveric) donor, the evidence includes registry data and case series. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Data from large registries have demonstrated reasonably high survival rates after kidney transplant for appropriately selected patients and significantly higher survival rates for patients undergoing kidney transplant compared with those who remained on a waiting list. Kidney transplantation is contraindicated for patients in whom the procedure is expected to be futile due to comorbid disease or in whom posttransplantation care is expected to significantly worsen comorbid conditions. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have a failed kidney transplant without contraindications to kidney transplant who receive a kidney retransplant from a living donor or deceased (cadaveric) donor, the evidence includes registry data and case series. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Data have demonstrated reasonably high survival rates after kidney retransplant (e.g., 5-year survival rates ranging from 87% to 96%) for appropriately selected patients. Kidney retransplantation is contraindicated for patients for whom the procedure is expected to be futile due to comorbid disease or for whom posttransplantation care is expected to significantly worsen comorbid conditions. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

Supplemental Information
Practice Guidelines and Position Statements
The American Society of Transplantation (2017) convened a consensus conference of experts to address issues related to the transplantation of hepatitis C virus (HCV) viremic solid organs into HCV non-viremic recipients.[31] Key findings and recommendations are summarized in Table 2.

Table 2. American Society of Transplantation Consensus Conference - Use of HCV Viremic Donors

	Content Area	Key Point
1	Definition of HCV positive	HCV –viremic reflecting a positive NAT should be adopted
2	Data interpretation	HCV antibody status alone limits interpretation of outcomes of transplantation of HCV "positive" organs
3	Transmission and Treatment	Highest risk for unexpected HCV transmission is associated with organ donation from a person who injected drugs within the eclipse or pre-viremic period
4	OPTN policy	No current policies prevent transplantation of HCV-viremic organs into HCV non-viremic recipients
5	Ethical considerations	Transplantation of HCV-viremic organs into HCV non-viremic recipients should be conducted under site specific IRB approved protocols with multi-step informed consent.

American Society of Transplant Surgeons et al

In 2011, the American Society of Transplant Surgeons, the American Society of Transplantation, the Association of Organ Procurement Organizations, and the UNOS issued a joint position statement recommending modifications to the National Organ Transplant Act of 1984.[29] The joint recommendation stated that the potential pool of organs from HIV-infected donors should be explored. With modern antiretroviral therapy, the use of these previously banned organs would open an additional pool of donors to HIV-infected recipients. The increased pool of donors has the potential to shorten waiting times for organs and decrease the number of waiting list deaths. The organs from HIV-infected deceased donors would be used for transplant only with patients already infected with HIV. In 2013, the HIV Organ Policy Equity Act permitting the use of this group of organ donors.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

The Medicare Benefit Policy Manual includes a chapter on ESRD.[30] A section on identifying candidates for transplantation (140.1) states:

> "After a patient is diagnosed as having ESRD, the physician should determine if the patient is suitable for transplantation. If the patient is a suitable transplant candidate, a live donor transplant is considered first because of the high success rate in comparison to a cadaveric transplant. Whether one or multiple potential donors are available, the following sections provide a general description of the usual course of events in preparation for a live-donor transplant."

Ongoing and Unpublished Clinical Trials

Some currently unpublished trials that might influence this review are listed in Table 3.

Table 3. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
Ongoing			
NCT04182607	Donor Outcomes Following Hand-Assisted And Robotic Living Donor Nephrectomy: A Retrospective Review	240	Nov 2020
NCT03500315	HOPE in Action Prospective Multicenter, Clinical Trial of Deceased HIVD+ Kidney Transplants for HIV+ Recipients	360	Aug 2022

NCT: national clinical trial.

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Documentation for Clinical Review

Please provide the following documentation:

- History and physical
- Laboratory report(s)
- Transplant consultation/evaluation report and progress notes

Post Service (in addition to the above, please include the following):

- Operative report(s)

Coding

This Policy relates only to the services or supplies described herein. Benefits may vary according to product design; therefore, contract language should be reviewed before applying the terms of the Policy. Inclusion or exclusion of codes does not constitute or imply member coverage or provider reimbursement.

Type	Code	Description
CPT®	50300	Donor nephrectomy (including cold preservation); from cadaver donor, unilateral or bilateral
	50320	Donor nephrectomy (including cold preservation); open, from living donor
	50323	Backbench standard preparation of cadaver donor renal allograft prior to transplantation, including dissection and removal of perinephric fat, diaphragmatic and retroperitoneal attachments, excision of adrenal gland, and preparation of ureter(s), renal vein(s), and renal artery(s), ligating branches, as necessary
	50325	Backbench standard preparation of living donor renal allograft (open or laparoscopic) prior to transplantation, including dissection and removal of perinephric fat and preparation of ureter(s), renal vein(s), and renal artery(s), ligating branches, as necessary
	50327	Backbench reconstruction of cadaver or living donor renal allograft prior to transplantation; venous anastomosis, each
	50328	Backbench reconstruction of cadaver or living donor renal allograft prior to transplantation; arterial anastomosis, each
	50329	Backbench reconstruction of cadaver or living donor renal allograft prior to transplantation; ureteral anastomosis, each

Type	Code	Description
	50340	Recipient nephrectomy (separate procedure)
	50360	Renal allotransplantation, implantation of graft; without recipient nephrectomy
	50365	Renal allotransplantation, implantation of graft; with recipient nephrectomy
	50547	Laparoscopy, surgical; donor nephrectomy (including cold preservation), from living donor
HCPCS	S2152	Solid organ(s), complete or segmental, single organ or combination of organs; deceased or living donor(s), procurement, transplantation, and related complications; including: drugs; supplies; hospitalization with outpatient follow-up; medical/surgical, diagnostic, emergency, and rehabilitative services, and the number of days of pre- and posttransplant care in the global definition

Policy History

This section provides a chronological history of the activities, updates and changes that have occurred with this Medical Policy.

Effective Date	Action
07/01/2011	New policy
06/11/2014	Policy revision with position change
07/14/2014	Policy revision with position change
07/31/2015	Coding Update
02/01/2017	Policy revision without position change
11/01/2017	Policy revision without position change
10/01/2018	Policy revision without position change
10/01/2019	Policy revision without position change
10/01/2020	Annual review. No change to policy statement. Literature review updated.
11/01/2020	Administrative update. Policy guidelines updated.

Definitions of Decision Determinations

Medically Necessary: Services that are Medically Necessary include only those which have been established as safe and effective, are furnished under generally accepted professional standards to treat illness, injury or medical condition, and which, as determined by Blue Shield, are: (a) consistent with Blue Shield medical policy; (b) consistent with the symptoms or diagnosis; (c) not furnished primarily for the convenience of the patient, the attending Physician or other provider; (d) furnished at the most appropriate level which can be provided safely and effectively to the patient; and (e) not more costly than an alternative service or sequence of services at least as likely to produce equivalent therapeutic or diagnostic results as to the diagnosis or treatment of the Member's illness, injury, or disease.

Investigational/Experimental: A treatment, procedure, or drug is investigational when it has not been recognized as safe and effective for use in treating the particular condition in accordance with generally accepted professional medical standards. This includes services where approval by the federal or state governmental is required prior to use, but has not yet been granted.

Split Evaluation: Blue Shield of California/Blue Shield of California Life & Health Insurance Company (Blue Shield) policy review can result in a split evaluation, where a treatment, procedure, or drug will be considered to be investigational for certain indications or conditions, but will be deemed safe and effective for other indications or conditions, and therefore potentially medically necessary in those instances.

Prior Authorization Requirements (as applicable to your plan)

Within five days before the actual date of service, the provider must confirm with Blue Shield that the member's health plan coverage is still in effect. Blue Shield reserves the right to revoke an authorization prior to services being rendered based on cancellation of the member's eligibility. Final determination of benefits will be made after review of the claim for limitations or exclusions.

Questions regarding the applicability of this policy should be directed to the Prior Authorization Department at (800) 541-6652, or the Transplant Case Management Department at (800) 637-2066 ext. 3507708 or visit the provider portal at www.blueshieldca.com/provider.

Disclaimer: This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. Blue Shield of California may consider published peer-reviewed scientific literature, national guidelines, and local standards of practice in developing its medical policy. Federal and state law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over medical policy and must be considered first in determining covered services. Member contracts may differ in their benefits. Blue Shield reserves the right to review and update policies as appropriate.