

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

Applies to all products administered or underwritten by Blue Cross and Blue Shield of Louisiana and its subsidiary, HMO Louisiana, Inc. (collectively referred to as the "Company"), unless otherwise provided in the applicable contract. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

Investigational or experimental services are not covered. This includes any drug, device, procedure, or service provided under the investigational arm of a clinical trial or clinical study. These services are excluded from coverage under benefits.

When Services May Be Eligible for Coverage

Coverage for eligible medical treatments or procedures, drugs, devices or biological products may be provided only if:

- *Benefits are available in the member's contract/certificate, and*
- *Medical necessity criteria and guidelines are met.*

Based on review of available data, the Company may consider a liver transplant using a cadaver or living donor, for carefully selected individuals with end-stage liver failure due to irreversibly damaged livers to be **eligible for coverage**.**

Etiologies of end-stage liver disease include the following:

- A. Hepatocellular diseases
 - Alcoholic liver disease (see Policy Guidelines section)
 - Viral hepatitis (either A, B, C, or non-A, non-B)
 - Autoimmune hepatitis
 - Metabolic dysfunction-associated steatohepatitis (MASH)
 - Cryptogenic cirrhosis
- B. Cholestatic liver diseases
 - Primary biliary cirrhosis
 - Primary sclerosing cholangitis with development of secondary biliary cirrhosis
 - Biliary atresia
- C. Vascular disease
 - Budd-Chiari syndrome
- D. Primary hepatocellular carcinoma confined to the liver when **BOTH** of the following criteria are met:
 - A single tumor 5 cm or less or 2 to 3 tumors 3 cm or less; **AND**
 - No extrahepatic spread or macrovascular invasion by staging imaging
- E. Inborn errors of metabolism including:
 - Wilson disease
 - Organic acidurias

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

- α 1-Antitrypsin deficiency
- Hemochromatosis
- Crigler-Najjar Syndrome type I
- Erythropoietic Protoporphyria
- Some urea cycle deficiencies
- Maple Syrup Urine Disease
- Severe progressive familial intrahepatic cholestasis
- Glycogen storage diseases types I and IV
- Tyrosinemia type I
- Citrullinemia
- Ornithine transcarboxylase deficiency
- Primary Hyperoxaluria type 1 (oxalosis)

F. Trauma and toxin exposure (acetaminophen overdose, fulminant hepatic failure due to mushroom poisoning)

Based on review of available data, the Company may consider liver transplantation in individuals with polycystic disease of the liver who have massive hepatomegaly causing obstruction or functional impairment to be **eligible for coverage**.**

Based on review of available data, the Company may consider liver transplantation in individuals with unresectable hilar cholangiocarcinoma (CCA) to be **eligible for coverage**.**

Patient Selection Criteria

Coverage eligibility for liver transplantation in individuals with unresectable hilar CCA may be considered when **ALL** of the following criteria are met:

- Considered unresectable based on technical considerations or underlying disease (e.g., primary sclerosing cholangitis); **AND**
- Tumor diameter 3 cm or less on cross-sectional imaging studies (CT and/or MRI); and
- Negative lymph nodes; **AND**
- Intra- and extrahepatic metastases should be excluded by cross-sectional imaging studies of the chest and abdomen/pelvis at the interval every 3 months.

Based on review of available data, the Company may consider liver transplantation in pediatric individuals with nonmetastatic hepatoblastoma to be **eligible for coverage**.**

Based on review of available data, the Company may consider liver *re-transplantation* to be **eligible for coverage**** in individuals with:

- Primary graft nonfunction
- Hepatic artery thrombosis
- Chronic rejection
- Ischemic type biliary lesions after donation after cardiac death
- Recurrent nonneoplastic disease causing late graft failure

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

Based on review of available data, the Company may consider combined liver-kidney transplantation (CLKT) in individuals who qualify for liver transplantation and have advanced irreversible kidney disease to be **eligible for coverage**.**

When Services Are Considered Investigational

Coverage is not available for investigational medical treatments or procedures, drugs, devices or biological products.

Based on review of available data, the Company considers liver transplantation to be **investigational*** when coverage criteria are not met and in all other situations, including but not limited to:

- Individuals with intrahepatic cholangiocarcinoma (CCA)
- Individuals with neuroendocrine tumors (NETs) metastatic to the liver
- Individuals with hepatic adenoma
- Individuals with unresectable colorectal liver metastases
- Individuals with epithelioid hemangioendothelioma (HEHE)
- Individuals with hepatocellular carcinoma (HCC) that has extended beyond the liver (See Policy Guidelines section for individual selection criteria).
- Individuals with ongoing alcohol and/or drug abuse. (Evidence for abstinence may vary among liver transplant programs, but generally a minimum of 3 months is required. A formal psychological evaluation can help stratify individuals into higher- or lesser-risk strata for relapse, see Policy Guidelines.)

Policy Guidelines

Contraindications

Potential contraindications for solid organ transplant are subject to the judgment of the transplant center and include the following:

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

Liver-Specific Criteria

The Model for End-stage Liver Disease (MELD) and Pediatric End-stage Liver Disease (PELD) scores range from 6 (less ill) to 40 (gravely ill). The MELD and PELD scores will change during an individual's tenure on the waiting list.

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

Individuals with liver disease related to alcohol (alcoholic liver disease) or drug abuse must be actively involved in a substance abuse treatment program.

Patients who have alcoholic hepatitis (AH) are infrequently transplanted because the diagnosis of AH implies recent harmful alcohol use and because some patients will improve without transplantation. The chronic inflammatory state associated with AH has the potential to increase perioperative complications, although most studies found that long-term morbidity is related primarily to recurrent alcohol use disorder rather than acute complications of transplantation.

The number of patients undergoing liver transplantation for acute AH has been steadily increasing in the United States, with marked geographic variation because a limited number of centers perform transplantation for this indication. Criteria for patient selection remain highly variable among centers, and additional studies with long-term follow-up are needed to optimize criteria for liver transplantation. At most transplant centers, criteria for selecting patients with AH require that there is no prior history of liver decompensation because prior decompensation has been associated with higher risk of mortality and alcohol relapse.

Some transplant centers may use instruments such as Maddrey's Discriminant Function (Maddrey et al., 1978), the Sustained Alcohol Use Post-LT (SALT) (Lee et al., 2019), or the Penn Alcohol Craving Scale (PACS) (Flannery et al., 1999) to assist in the identification of patients who are at low risk for continued alcohol use and thus are good candidates for liver transplant.

Tobacco use is strongly discouraged and requires mandatory cessation counseling and risk mitigation. Programs may defer listing for persistent heavy use. Documentation should include confirmation of patient enrollment into smoking cessation program and treatment plan if patient continues to smoke despite interventions.

Smoking remains an independent and significant risk factor for post-transplant morbidity and mortality. Moreover, long-term morbidity and mortality are also linked to continued smoking, which accelerates cardiovascular and cancer risk.

Some authorities have advocated removing individuals from the transplant waiting list who continue to smoke despite these interventions. Roughly 20 percent of transplant centers report that they will refuse to list individuals due to smoking. One report found that up to 40 percent of individuals who had undergone transplantation for alcoholic liver disease resumed smoking early in the post-transplant course, underscoring the need for continued counseling and monitoring after transplantation.

Individuals with polycystic disease of the liver do not develop liver failure but may require transplantation due to the anatomic complications of a hugely enlarged liver. The MELD and PELD score may not apply to these cases. One of the following complications should be present:

- Enlargement of liver impinging on respiratory function
- Extremely painful enlargement of liver

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

- Enlargement of liver significantly compressing and interfering with function of other abdominal organs.

Individuals with familial amyloid polyneuropathy do not experience liver disease per se, but develop polyneuropathy and cardiac amyloidosis due to the production of a variant transthyretin molecule by the liver. MELD and PELD exception criteria and scores may apply to these cases. Candidacy for liver transplant is an individual consideration based on the morbidity of the polyneuropathy. Many individuals may not be candidates for liver transplant alone due to coexisting cardiac disease.

Hepatocellular Carcinoma

Criteria used for selection of individuals with hepatocellular carcinoma (HCC) eligible for liver transplant include the Milan criteria, which is considered the criterion standard, the University of California, San Francisco expanded criteria, and United Network of Organ Sharing (UNOS) criteria. See Supplemental Information for current OPTN criteria.

Milan Criteria

A single tumor 5 cm or less or 2 to 3 tumors 3 cm or less.

University of California, San Francisco Expanded Criteria

A single tumor 6.5 cm or less or up to 3 tumors 4.5 cm or less, and a total tumor size of 8 cm or less.

United Network for Organ Sharing Stage T2 Criteria

A single tumor 2 cm or greater and up to 5 cm or less or 2 to 3 tumors 1 cm or greater and up to 3 cm or less and without extrahepatic spread or macrovascular invasion. United Network for Organ Sharing criteria were updated in 2022.

Individuals with HCC are appropriate candidates for liver transplant only if the disease remains confined to the liver. Therefore, the individual should be periodically monitored while on the waiting list, and if metastatic disease develops, the individual should be removed from the transplant waiting list. Also, at the time of transplant, a backup candidate should be scheduled. If locally extensive or metastatic cancer is discovered at the time of exploration before hepatectomy, the transplant should be aborted, and the backup candidate scheduled for transplant.

Note that liver transplantation for those with T3 HCC is not prohibited by UNOS guidelines, but such individuals do not receive any priority on the waiting list. All individuals with HCC awaiting transplantation are reassessed at 3-month intervals. Those whose tumors have progressed and are no longer stage T2 will lose the additional allocation points.

Additionally, nodules identified through imaging of cirrhotic livers are given a class 5 designation. Class 5B and 5T nodules are eligible for automatic priority. Class 5B criteria consists of a single nodule 2 cm or larger and up to 5 cm (T2 stage) that meets specified imaging criteria. Class 5T nodules have undergone subsequent locoregional treatment after being automatically approved on initial application or extension. A single class 5A nodule (greater than 1 cm and less than 2 cm)

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

corresponds to T1 HCC and does not qualify for automatic priority. However, combinations of class 5A nodules are eligible for automatic priority if they meet stage T2 criteria. Class 5X lesions are outside of stage T2 and ineligible for automatic exception points. Nodules less than 1 cm are considered indeterminate and are not considered for additional priority. Therefore, the UNOS allocation system provides strong incentives to use locoregional therapies to downsize tumors to T2 status and to prevent progression while on the waiting list.

Cholangiocarcinoma

According to the Organ Procurement and Transplantation Network (OPTN) policy on liver allocation, candidates with cholangiocarcinoma meeting the following criteria will be eligible for a MELD or PELD exception with a 10% mortality equivalent increase every 3 months:

- Centers must submit a written protocol for patient care to the OPTN and UNOS Liver and Intestinal Organ Transplantation Committee before requesting a MELD score exception for a candidate with cholangiocarcinoma. This protocol should include selection criteria, administration of neoadjuvant therapy before transplantation, and operative staging to exclude individuals with regional hepatic lymph node metastases, intrahepatic metastases, and/or extrahepatic disease. The protocol should include data collection as deemed necessary by the OPTN and UNOS Liver and Intestinal Organ Transplantation Committee.
- Candidates must satisfy diagnostic criteria for hilar cholangiocarcinoma: malignant-appearing stricture on cholangiography and 1 of the following: carbohydrate antigen 19-9 100 U/mL, or biopsy or cytology results demonstrating malignancy, or aneuploidy. The tumor should be considered unresectable on the basis of technical considerations or underlying liver disease (eg, primary sclerosing cholangitis).
- If cross-sectional imaging studies (computed tomography scan, ultrasound, magnetic resonance imaging) demonstrate a mass, the mass should be less than 3 cm.
- Intra- and extrahepatic metastases should be excluded by cross-sectional imaging studies of the chest and abdomen at the time of initial exception and every 3 months before score increases.
- Regional hepatic lymph node involvement and peritoneal metastases should be assessed by operative staging after completion of neoadjuvant therapy and before liver transplantation. Endoscopic ultrasound-guided aspiration of regional hepatic lymph nodes may be advisable to exclude individuals with obvious metastases before neoadjuvant therapy is initiated.
- Transperitoneal aspiration or biopsy of the primary tumor (either by endoscopic ultrasound, operative, or percutaneous approaches) should be avoided because of the high risk of tumor seeding associated with these procedures.

Living Donor Criteria

Donor morbidity and mortality are prime concerns in donors undergoing right lobe, left lobe, or left lateral segment donor partial hepatectomy as part of living donor liver transplantation. Partial hepatectomy is a technically demanding surgery, the success of which may be related to the availability of an experienced surgical team. The American Society of Transplant Surgeons proposed the following guidelines for living donors (American Society of Transplant Surgeons: Ethics

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

Committee. American Society of Transplant Surgeons' position paper on adult-to-adult living donor liver transplantation. *Liver Transplant*. 2000;6(6):815-817. PMID 11084076):

- They should be healthy individuals who are carefully evaluated and approved by a multidisciplinary team including hepatologists and surgeons to assure that they can tolerate the procedure.
- They should undergo evaluation to ensure that they fully understand the procedure and associated risks.
- They should be of legal age and have sufficient intellectual ability to understand the procedures and give informed consent.
- They should be emotionally related to the recipients.
- They must be excluded if the donor is felt or known to be coerced.
- They need to have the ability and willingness to comply with long-term follow-up.

Background/Overview

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. 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 and United Network of Organ Sharing.

Liver transplantation

Liver transplantation is routinely performed as a treatment of last resort for patients with end-stage liver disease. Liver transplantation may be performed with liver donation after a brain or cardiac death or with a liver segment donation from a living donor. Certain populations are prioritized as Status 1A (eg, acute liver failure with a life expectancy of fewer than 7 days without a liver transplant) or Status 1B (pediatric patients with chronic liver disease). Following Status 1, donor livers are prioritized to those with the highest scores on the Model for End-stage Liver Disease (MELD) and Pediatric End-stage Liver Disease (PELD) scales. Due to the scarcity of donor livers, a variety of strategies have been developed to expand the donor pool. For example, a split graft refers to dividing a donor liver into 2 segments that can be used for 2 recipients. Living donor (LD) liver transplantation (LT) is now commonly performed for adults and children from a related or unrelated donor. Depending on the graft size needed for the recipient, either the right lobe, left lobe, or the left lateral segment can be used for LD LT. In addition to addressing the problem of donor organ scarcity, LD LT allows the procedure to be scheduled electively before the recipient's condition deteriorates or serious complications develop. Living donor LT also shortens the preservation time for the donor liver and decreases disease transmission from donor to recipient.

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

FDA or Other Governmental Regulatory Approval

U.S. Food and Drug Administration (FDA)

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/Source

This medical policy was developed through consideration of peer-reviewed medical literature generally recognized by the relevant medical community, U.S. Food and Drug Administration approval status, nationally accepted standards of medical practice and accepted standards of medical practice in this community, technology evaluation centers, reference to regulations, other plan medical policies, and accredited national guidelines.

Description

Liver transplantation is currently the treatment of last resort for patients with end-stage liver disease. Liver transplantation may be performed with a liver donation after a brain or cardiac death or with a liver segment donation from a living donor. Individuals are prioritized for transplant by mortality risk and severity of illness criteria developed by the Organ Procurement and Transplantation Network and the United Network of Organ Sharing. The severity of illness is determined by the Model for End-stage Liver Disease and Pediatric End-stage Liver Disease scores.

Summary of Evidence

For individuals who have a hepatocellular disease who receive a liver transplant, the evidence includes registry studies and systematic reviews. Relevant outcomes include overall survival (OS), morbid events, and treatment-related morbidity and mortality. Studies on liver transplantation for viral hepatitis have found that survival is lower than for other liver diseases. Although these statistics raise questions about the most appropriate use of a scarce resource (donor livers), the long-term survival rates are significant in a group of patients who have no other treatment options. Also, survival can be improved by the eradication of the hepatitis virus before transplantation. For patients with nonalcoholic steatohepatitis, OS rates have been shown to be similar to other indications for liver transplantation. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have primary hepatocellular carcinoma who receive a liver transplant, the evidence includes systematic reviews of observational studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. In the past, long-term outcomes in patients with primary hepatocellular malignancies had been poor (19%) compared with the OS of liver transplant recipients. However, the recent use of standardized patient selection criteria (eg, the Milan criteria diameter) has dramatically improved OS rates. In the appropriately selected patients,

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

a liver transplant has been shown to result in higher survival rates than resection. In patients who present with unresectable organ-confined disease, transplant represents the only curative approach. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have extrahepatic cholangiocarcinoma who receive a liver transplant, the evidence includes systematic reviews of observational studies and individual registry studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. For patients with extrahepatic (hilar or perihilar) cholangiocarcinoma who are treated with adjuvant chemotherapy, 5-year survival rates have been reported as high as 76%. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have intrahepatic cholangiocarcinoma who receive a liver transplant, the evidence includes registry studies and a systematic review of observational studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. In a registry study comparing outcomes in patients with intrahepatic cholangiocarcinoma who received liver transplantation to those who received surgical resection of the liver, no differences were found in OS, length of stay, or unplanned 30-day readmission rates between groups. Additional studies reporting survival rates in patients with intrahepatic cholangiocarcinoma or in mixed populations of patients with extrahepatic and intrahepatic cholangiocarcinoma have reported 5-year survival rates of less than 30%. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have metastatic neuroendocrine tumors who receive a liver transplant, the evidence includes systematic reviews of case series. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. In select patients with nonresectable, hormonally active liver metastases refractory to medical therapy, liver transplantation has been considered as an option to extend survival and minimize endocrine symptoms. While some centers may perform liver transplants on select patients with neuroendocrine tumors, the available studies are limited by their heterogeneous populations. Further studies are needed to determine the appropriate selection criteria. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have unresectable colorectal liver metastases who receive a liver transplant, the evidence includes one randomized controlled trial (RCT) and nonrandomized studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. Five-year OS was improved with liver transplant compared with standard of care in the RCT, however, the study was limited by the small sample size and heterogeneous standard of care. Nonrandomized studies indicate improved OS compared with historic controls. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have unresectable hepatic epithelioid hemangioendothelioma (HEHE) who receive a liver transplant, the evidence includes nonrandomized, observational studies. Relevant

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

outcomes include OS, morbid events, and treatment-related morbidity and mortality. Posttransplant survival among patients with HEHE was similar to those undergoing liver transplant for other indications. Based on the lack of standard treatment and the rare tumor type, high-quality comparative trials are unlikely to be conducted for hepatic transplant in HEHE. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have hepatic adenomas who receive a liver transplant, the evidence includes nonrandomized observational studies and a systematic review of these studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. The systematic review found 5-year OS rates of 95% but noted a lack of optimal selection criteria for patients with hepatic adenoma who would benefit from hepatic transplant. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have pediatric hepatoblastoma who receive a liver transplant, the evidence includes case series. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. The literature on liver transplantation for pediatric hepatoblastoma is limited, but case series have demonstrated good outcomes and high rates of long-term survival. Additionally, nonmetastatic pediatric hepatoblastoma is among the United Network for Organ Sharing criteria for patients eligible for liver transplantation. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have a failed liver transplant who receive a liver retransplant, the evidence includes observational studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. Case series have demonstrated favorable outcomes with liver retransplantation in certain populations, such as when criteria for original liver transplantation are met for retransplantation. While some evidence has suggested outcomes after retransplantation may be less favorable than for initial transplantation in some patients, long-term survival benefits have been demonstrated. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with indications for liver and kidney transplant who receive a combined liver-kidney transplant, the evidence includes a systematic review of retrospective observational studies in adults and several individual registry studies. Relevant outcomes include OS, morbid events, and treatment-related morbidity and mortality. Most of the evidence involves adults with cirrhosis and kidney failure. Indications for combined liver-kidney transplant in children are rare and often congenital and include liver-based metabolic abnormalities affecting the kidney, along with structural diseases affecting both the liver and kidney. In both adults and children, comparisons with either liver or kidney transplantation alone would suggest that combined liver-kidney transplant is no worse, and possibly better, for graft and patient survival. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

Supplemental Information

Clinical Input From Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

2012 Input

In response to requests, input was received from 3 physician specialty societies and 5 academic medical centers while this policy was under review in 2012. There was a consensus among reviewers that liver transplantation may be medically necessary for end-stage liver failure due to irreversibly damaged livers from various disease states such as those considered during the report update. There was also a consensus among reviewers that liver retransplantation is appropriate in patients with acute or chronic liver failure such as primary graft nonfunction, ischemic-type biliary injury after donation after cardiac death, hepatic artery thrombosis, chronic rejection or recurrent diseases such as primary sclerosing cholangitis, autoimmune hepatitis, and hepatitis C resulting in end-stage liver failure. There was general support for the use of liver transplantation as a treatment for cholangiocarcinoma in patients who meet strict eligibility criteria. In general, there was no support for the use of liver transplantation for a neuroendocrine tumor metastatic to the liver.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Association for the Study of Liver Diseases and American Society of Transplantation

In 2013, the American Association for the Study of Liver Diseases (AASLD) and the American Society of Transplantation (AST) issued joint guidelines on evaluating patients for a liver transplant. These guidelines indicated liver transplantation for severe acute or advanced chronic liver disease after all effective medical treatments have been attempted. The formal evaluation should confirm the irreversible nature of the liver disease and lack of effective alternative medical therapy.

The guidelines also stated that liver transplant is indicated for the following conditions:

- Acute liver failure from complications of cirrhosis
- Liver-based metabolic condition with systemic manifestations
 - α_1 -Antitrypsin deficiency
 - Familial amyloidosis
 - Glycogen storage disease
 - Hemochromatosis

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

- Primary oxaluria
 - Wilson disease
- Systemic complications of chronic liver disease.

The guidelines also included 1-A recommendations (strong recommendation with high-quality evidence) for a liver transplant that:

- "Tobacco consumption should be prohibited in LT [liver transplant] candidates."
- "Patients with HIV [Human Immunodeficiency Virus] infection are candidates for LT if immune function is adequate and the virus is expected to be undetectable by the time of LT."
- "LT candidates with HCV [hepatitis C virus] have the same indications for LT as for other etiologies of cirrhosis."

Contraindications to liver transplant included:

- "MELD [Model for End-stage Liver Disease] score less than 15
- Severe cardiac or pulmonary disease
- AIDS [acquired immunodeficiency syndrome]
- Ongoing alcohol or illicit substance abuse
- Hepatocellular carcinoma with metastatic spread
- Uncontrolled sepsis
- Anatomic abnormality that precludes liver transplantation
- Intrahepatic cholangiocarcinoma
- Extrahepatic malignancy
- Fulminant hepatic failure
- Hemangiosarcoma
- Persistent noncompliance
- Lack of adequate social support system."

In 2014, the AASLD, AST, and the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition issued joint guidelines on the evaluation of the pediatric patients for liver transplant. The guidelines stated that "disease categories suitable for referral to a pediatric LT program are similar to adults: acute liver failure, autoimmune, cholestasis, metabolic or genetic, oncologic, vascular, and infectious. However, specific etiologies and outcomes differ widely from adult patients, justifying independent pediatric guidelines." The indications listed for liver transplantation included biliary atresia, Alagille syndrome, pediatric acute liver failure, hepatic tumors, hepatocellular carcinoma (HCC), hemangioendothelioma, cystic fibrosis-associated liver disease, urea cycle disorders, immune-mediated liver disease, along with other metabolic or genetic disorders.

In 2019, the AASLD guideline on alcohol-associated liver disease provided recommendations on the timing of referral and selection of candidates for liver transplant. The guidance notes that the patient's history of addiction to alcohol is a primary driver in selecting appropriate candidates for liver transplantation. Clinical characteristics that should trigger an evaluation and consideration for

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

liver transplant include decompensated alcohol-associated cirrhosis, Child-Pugh-Turcotte class C cirrhosis, or a MELD-Na score greater than or equal to 21. Additionally, the guideline notes that candidate selection "should not be based solely on a fixed interval of abstinence" and instead a formal psychological evaluation can help stratify patients into higher- or lesser-risk strata for relapse.

In 2023, the AASLD released a practice guideline on the management of hepatocellular carcinoma. Evidence recommendations by the expert panel are rated based on the Oxford Center for Evidence-Based Medicine and the strength of recommendations are categorized based on the level of evidence, risk–benefit ratio, and patient preferences. Recommendations regarding liver transplantation are listed below.

- "Liver transplantation should be the treatment of choice for transplant-eligible patients with early-stage HCC occurring in the setting of clinically significant portal hypertension and/or decompensated cirrhosis (Level 2, Strong Recommendation)
- AASLD advises the use of pre-transplant locoregional bridging therapy for patients being evaluated or listed for liver transplantation, if they have adequate hepatic reserve, to reduce the risk of waitlist dropout in the context of anticipated prolonged wait times for transplant (Level 3, Strong Recommendation)
- AASLD advises patients with decompensated cirrhosis who develop T1 HCC and are eligible for LT be monitored with cross-sectional imaging at least every 3 months until criteria are met for MELD exception before pursuing LRT [locoregional therapy] (Level 3, Weak Recommendation)
- Patients who are otherwise transplant-eligible except with initial tumor burden exceeding the Milan criteria, especially those meeting United Network of Organ Sharing (UNOS) downstaging criteria, should be considered for LT following successful downstaging to within Milan criteria after a 3-to-6-month period of observation (Level 2, Strong Recommendation)
- AASLD advises surveillance for detection of post-transplant HCC recurrence using multiphasic contrast-enhanced abdominal CT [computed tomography] or MRI [magnetic resonance imaging] and chest CT scan (Level 2, Strong Recommendation)"

In July 2025, AASLD published a critical update to the guidance based on newly published data. However, the update was related to immunotherapy in the adjuvant setting and did not change any previous recommendations related to transplantation.

International Consensus Conference

In 2010, an International Consensus Conference, including representation from the U.S., convened with the goal of reviewing current practice regarding liver transplantation in patients with HCC. The Conference ultimately came up with recommendations beginning from the assessment of candidates with HCC for liver transplantation and managing patients on waitlists, to the role of liver transplantation and post-transplant management. Some notable recommendations are described.

The Milan criteria were recommended for use as the benchmark for patient selection, although it was suggested that the Milan criteria might be modestly expanded based on data from expansion

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

studies that demonstrated outcomes are comparable with outcomes from studies using the Milan criteria. Candidates for liver transplantation should also have a predicted survival of 5 years or more. The consensus criteria indicate alpha-fetoprotein concentrations may be used with imaging to assist in determining patient prognosis.

Regarding liver retransplantation, the consensus criteria issued a weak recommendation for retransplantation after graft failure of a living donor transplant for HCC in patients meeting regional criteria for a deceased donor liver transplant. A strong recommendation was issued against liver retransplantation with a deceased donor for graft failure for patients exceeding regional criteria. Also, the consensus criteria issued a strong recommendation that liver retransplantation for recurrent HCC would not be appropriate. However, a de novo case of HCC may be treated as a new tumor, and retransplantation may be considered even though data to support this is limited.

In 2024, another international joint conference was held, convening the International Liver Transplantation Society (ILTS) and International Liver Cancer Association (ILCA) to update its consensus on liver transplantation for HCC and intrahepatic cholangiocarcinoma. Similarly to 2010, the Conference came up with recommendations beginning from the assessment of candidates with HCC or intrahepatic cholangiocarcinoma and managing patients on waitlists, to the role of liver transplantation and post-transplantation management. Some notable recommendations are summarized in Table 1, below.

Table 1. Notable Recommendations From 2024 ILTS and ILCA Conference on Liver Transplantation in HCC and iCCA

Recommendation	Level of evidence	Strength of recommendation
<i>HCC</i>		
Liver transplantation should not be restricted to HCC patients who have a predicted 5-year survival rate comparable to non-HCC patients. However, organ availability in different regions should be considered in allocation policies to avoid disadvantaging non-HCC patients.	Moderate	Moderate
Criteria for listing patients with HCC for liver transplantation must not rely solely on tumor size and number and should consider biomarkers (mainly AFP) and their dynamics on the waitlist. Emerging data suggest the use of AFP-L3, DCP, and PET-CT can add prognostic value.	Moderate	Strong
Salvage liver transplantation in patients with HCC recurrence or liver insufficiency can be as safe and effective as primary transplantation for HCC in patients that meet transplantation criteria.	Weak	Moderate
Given that the outcomes with regards to overall and disease-free survival are on-par and, in certain cases, better than DDLT, LDLT	Moderate	Moderate

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

should be considered as an oncologically durable and safe alternative to DDLT. In regions where the waiting time (>3 mo) or where LDLT is the predominant type of LT, LDLT may be a preferred option for HCC within and beyond standard criteria.		
iCCA		
In cirrhotic patients with iCCA, liver transplantation may be considered as a potential therapeutic option in tumors ≤ 3 cm in diameter after a period of observation with stability and without extrahepatic metastasis, as it offers a chance of curative treatment and improved survival.	Moderate	Moderate
In non-cirrhotic patients with intrahepatic cholangiocarcinoma, liver transplantation is not routinely recommended but may be considered as part of investigational protocols for patients with unresectable, liver-confined disease after at least 6 mo of stability after systemic therapy. Limitations on tumor size and number should be explored in prospective clinical trials.	Moderate	Weak

AFP: alpha-fetoprotein; DCP: des-gamma-carboxy prothrombin; DDLT: deceased donor liver transplantation; HCC: hepatocellular carcinoma; iCCA: intrahepatic cholangiocarcinoma; ILCA: International Liver Cancer Association; ILTS: International Liver Transplantation Society; LDLT: living donor liver transplantation; LT: liver transplantation; PET-CT: positron emission tomography-computed tomography

Many recommendations deferred to local or regional protocols, but there seemed to be interest in expansion of liver transplantation protocols from the 2010 consensus.

National Comprehensive Cancer Network

The National Comprehensive Cancer Network (NCCN) guidelines on hepatocellular carcinoma (v 1.2025) recommend referral to a liver transplant center or bridge therapy for patients with HCC meeting United Network of Organ Sharing (UNOS) criteria of a single tumor measuring 2 to 5 cm, or 2 to 3 tumors 1 to 3 cm in diameter with no macrovascular involvement or extrahepatic disease. In patients who are ineligible for transplant and in select patients with Child-Pugh class A or B liver function with tumors that are resectable and who fit UNOS criteria/extended criteria, the NCCN indicates that these patients could be considered for resection or transplant. Patients with unresectable HCC should be evaluated for liver transplantation; if the patient is a transplant candidate, then referral to a transplant center should be given or bridge therapy should be considered. The NCCN guidelines also indicate that patients with unresectable disease who are not a transplant candidate should receive locoregional therapy with ablation, arterially directed therapies, or external beam radiation therapy or may receive systemic therapy, best supportive care, or be enrolled in a clinical trial. These are level 2A recommendations based on lower-level evidence and uniform consensus.

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

The NCCN guidelines on neuroendocrine tumors (v.2.2025) indicate that liver transplantation for neuroendocrine liver metastases is considered investigational despite "encouraging" 5-year survival rates.

The NCCN guidelines on colorectal cancer (v.5.2025) do not mention or recommend liver transplant as a treatment option for unresectable colorectal liver-only metastases.

National Liver Review Board

In July 2025, the board revised guidance for specific clinical situations to evaluate common exception case requests for adult liver transplant candidates. This resource is not OPTN Policy, so it does not carry the monitoring or enforcement implications of policy. It is not an official guideline for clinical practice, nor is it intended to be clinically prescriptive or to define a standard of care. This resource is intended to provide guidance to transplant programs and the review board. This guidance replaces any independent criteria that OPTN regions used to request and approve exceptions, commonly referred to as "regional agreements." This guidance document is intended to provide recommendations for the review board considering hepatic neoplasm cases which are outside standard policy.

They should use this resource when considering MELD exception case requests for adult candidates with the following diagnoses:

- Hepatocellular Carcinoma (HCC)
- Intrahepatic Cholangiocarcinoma (iCCA)
- Neuroendocrine Tumors (NET)
- Colorectal Liver Metastases (CRLM)
- Hepatic Epithelioid Hemangioendothelioma (HEHE)
- Hepatic Adenomas

Hepatocellular Carcinoma

Patients with the following are contraindications for HCC exception score:

- Macro-vascular invasion of main portal vein or hepatic vein
- Extrahepatic metastatic disease
- Ruptured HCC
- T1 stage HCC

Intrahepatic Cholangiocarcinoma

According to the OPTN policy on liver allocation, candidates with unresectable intrahepatic cholangiocarcinoma can be considered if all of the following criteria are met:

- Biopsy-proven, unresectable, solitary intrahepatic cholangiocarcinoma or mixed hepatocellular carcinoma/intrahepatic cholangiocarcinoma;
- History of locoregional or systemic therapy;

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

- Less than or equal to 3 cm tumor with stable disease for 6 months (no new lesions or extrahepatic disease) and imaging every 3 months to ensure tumor is less than or equal to 3 cm.

Neuroendocrine Tumors

According to the OPTN policy on liver allocation, candidates with unresectable neuroendocrine liver metastasis can be considered if all of the following criteria are met:

- Tumor must be of gastro-entero-pancreatic (GEP) origin with portal system drainage (neuroendocrine tumors with the primary located in the lower rectum, esophagus, lung, adrenal gland, and thyroid are not candidates for MELD exception);
- Resection of primary malignancy and extrahepatic disease without any evidence of recurrence for greater than or equal to 6 months;
- Lower-intermediate grade following the WHO classification;
- No evidence for extrahepatic tumor recurrence based on metastatic radiologic workup greater than or equal to 3 months prior to initial or extension MELD exception request (negative metastatic workup should include functional imaging).

Colorectal Liver Metastases

According to the OPTN policy on liver allocation, candidates with unresectable colorectal liver metastases can be considered if all of the following criteria are met:

- Primary diagnosis of colon/rectal adenocarcinoma that is BRAF wild type and microsatellite stable of at least 12 months duration;
- Standard resection of the primary tumor with negative resection margins and no evidence of local recurrence by colonoscopy within 12 months prior to request;
- No signs of extrahepatic disease or local recurrence;
- Received or receiving first-line chemo- or immunotherapy with stability or disease regression with systemic and/or locoregional therapy for at least 6 months;
- Individuals with synchronous colon lesions must also have resection of the primary tumor more than 6 months after initial diagnosis and a minimum of 6 months of chemotherapy after primary tumor resection with disease stability of at least 12 months after diagnosis.

Hepatic Epithelioid Hemangioendothelioma

According to the OPTN policy on liver allocation, candidates with unresectable hepatic epithelioid hemangioendothelioma (HEHE) can be considered if all of the following criteria are met:

- Biopsy-proven diagnosis of HEHE and exclude hemangiosarcoma;
- Absence of macrovascular invasion on biopsy or imaging;
- Lesions are unresectable.

Hepatic Adenoma

According to the OPTN policy on liver allocation, candidates with unresectable hepatic adenoma can be considered if one of the following criteria are met:

- Adenoma in the presence of glycogen storage disease or Abernethy malformation;

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

- Unresectable adenoma with β -catenin mutation;
- Unresectable adenoma in a candidate with liver adenomatosis (greater than 10 HA);
- Adenoma(s) with all 3 of the following criteria:
 - Unresectable;
 - Unresponsive to non-operative management (e.g., observation after withholding estrogen-containing medications, observation after efforts to maintain an ideal body weight, transarterial embolization, or radiofrequency ablation);
 - Progressive or with complications such as hemorrhage, rupture, or malignant transformation.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

Medicare covers adult liver transplantation for end-stage liver disease and HCC when performed in a facility approved by the Centers for Medicare & Medicaid Services as meeting institutional coverage criteria for liver transplants. The following conditions must be met for coverage of HCC:

- "The patient is not a candidate for subtotal liver resection;
- The patient's tumor(s) is less than or equal to 5 cm in diameter;
- There is no macrovascular involvement; and
- There is no identifiable extrahepatic spread of tumor to surrounding lymph nodes, lungs, abdominal organs or bone; and
- The transplant is furnished in a facility that is approved by CMS [Centers for Medicare & Medicaid Services]..."

Beginning in June 2012, on review of this national coverage decision for new evidence, Medicare began covering adult liver transplantation, at Medicare administrative contractor discretion, for extrahepatic unresectable cholangiocarcinoma, liver metastases due to a neuroendocrine tumor, and hemangioendothelioma. Adult liver transplantation is excluded from other malignancies.

Pediatric liver transplantation is covered for children (less than 18 years of age) when performed at pediatric hospitals approved by the Centers for Medicare & Medicaid Services. Coverage includes extrahepatic biliary atresia or any other form of end-stage liver disease, except for children with a malignancy extending beyond the margins of the liver or those with persistent viremia.

Ongoing and Unpublished Clinical Trials

Some currently ongoing and unpublished trials that might influence this review are listed in Table 2.

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

Table 2. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
NCT05717842	Simultaneous Prospective Kidney Transplant Assessment in Combined Liver Kidney	15	Feb 2026

NCT: national clinical trial.

References

1. O'Grady JG. Liver transplantation alcohol related liver disease: (deliberately) stirring a hornet's nest! Gut. 2006 Nov;55(11):1529-31. doi: 10.1136/gut.2005.090506. PMID: 17047102; PMCID: PMC1860102.
2. De Gottardi A, Spahr L, Gelez P, Morard I, Mentha G, Guillaud O, Majno P, Morel P, Hadengue A, Paliard P, Scoazec JY, Boillot O, Giostra E, Dumortier J. A simple score for predicting alcohol relapse after liver transplantation: results from 387 patients over 15 years. Arch Intern Med. 2007 Jun 11;167(11):1183-8. doi: 10.1001/archinte.167.11.1183. PMID: 17563028.
3. Pfitzmann R, Schwenzer J, Rayes N, Seehofer D, Neuhaus R, Nüssler NC. Long-term survival and predictors of relapse after orthotopic liver transplantation for alcoholic liver disease. Liver Transpl. 2007 Feb;13(2):197-205. doi: 10.1002/lt.20934. PMID: 17205563.
4. De Gottardi A, Dumortier J. Transplantation for alcoholic liver disease. Gut. 2007 May;56(5):735-6. doi: 10.1136/gut.2006.115022. Epub 2006 Dec 5. PMID: 17148501; PMCID: PMC1942147.
5. Bittermann T, Mahmud N, Abt P. Trends in Liver Transplantation for Acute Alcohol-Associated Hepatitis During the COVID-19 Pandemic in the US. JAMA Netw Open. 2021 Jul 1;4(7):e2118713. doi: 10.1001/jamanetworkopen.2021.18713. PMID: 34323988; PMCID: PMC8322991.
6. Mathurin P, Moreno C, Samuel D, Dumortier J, Salleron J, Durand F, Castel H, Duhamel A, Pageaux GP, Leroy V, Dharancy S, Louvet A, Boleslawski E, Lucidi V, Gustot T, Francoz C, Letoublon C, Castaing D, Belghiti J, Donckier V, Pruvot FR, Duclos-Vallée JC. Early liver transplantation for severe alcoholic hepatitis. N Engl J Med. 2011 Nov 10;365(19):1790-800. doi: 10.1056/NEJMoal105703. PMID: 22070476.
7. Ayyala-Somayajula D, Han H, Terrault NA. Selective use of liver transplantation for severe alcohol-associated hepatitis. Expert Rev Gastroenterol Hepatol. 2020 Mar;14(3):175-184. doi: 10.1080/17474124.2020.1733414. Epub 2020 Mar 3. PMID: 32077333.
8. Ayyala-Somayajula D, Han H, Terrault NA. Selective use of liver transplantation for severe alcohol-associated hepatitis. Expert Rev Gastroenterol Hepatol. 2020 Mar;14(3):175-184. doi: 10.1080/17474124.2020.1733414. Epub 2020 Mar 3. PMID: 32077333.
9. Lee BP, Mehta N, Platt L, Gurakar A, Rice JP, Lucey MR, Im GY, Therapondos G, Han H, Victor DW, Fix OK, Dinges L, Dronamraju D, Hsu C, Voigt MD, Rinella ME, Maddur H, Eswaran S, Hause J, Foley D, Ghobrial RM, Dodge JL, Li Z, Terrault NA. Outcomes of Early Liver Transplantation for Patients With Severe Alcoholic Hepatitis. Gastroenterology. 2018 Aug;155(2):422-430.e1. doi: 10.1053/j.gastro.2018.04.009. Epub 2018 Apr 12. PMID: 29655837; PMCID: PMC6460480.

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

10. Weinberg EM, Dukewich M, Jakhete N, Stonesifer E, Im GY, Lucey MR, Shetty K, Rice JP, Victor DW 3rd, Ghobrial MR, Shetty A, Rutledge SM, Florman SS, Hsu C, Shoreibah M, Aryan M, Orandi BJ, Han H, Terrault N, Lee BP. Early Liver Transplantation for Severe Alcohol-Associated Hepatitis and a History of Prior Liver Decompensation. *Am J Gastroenterol*. 2022 Dec 1;117(12):1990-1998. doi: 10.14309/ajg.0000000000001901. Epub 2022 Jul 11. PMID: 35853462; PMCID: PMC10361649.
11. MSD Manuals. Hepatitis Criteria Calculator.
<https://www.msmanuals.com/iframe/manual/medical-calculators/hepatitiscriteria-en.htm?ruleredirectid=569>. Accessed March 2, 2026.
12. Blaney H. Why do we use steroids, Maddrey's Discriminant Function, and the Lille score in Alcohol-Associated Hepatitis? American Association for the Study of Liver Diseases (AASLD). Published January 9, 2022. Accessed March 2, 2026.
<https://www.aasld.org/liver-fellow-network/core-series/why-series/why-do-we-use-steroids-maddreys-discriminant-function> [aasld.org]
13. Lee BP, Vittinghoff E, Hsu C, et al. Predicting low risk for sustained alcohol use after early liver transplant for acute alcoholic hepatitis: The sustained alcohol use post-liver transplant score. *Hepatology*. 2019;69(4):1477-1487.
14. Nolan S. New tool can predict patients at low risk for return to sustained alcohol use following early liver transplantation. *Alcohol, Other Drugs, and Health: Current Evidence*. Published August 26, 2019. Accessed March 2, 2026.
<https://www.bu.edu/aodhealth/2019/08/26/new-tool-can-predict-patients-at-low-risk-for-return-to-sustained-alcohol-use-following-early-liver-transplantation/>
15. Addiction Research Center, University of Wisconsin–Madison. Penn Alcohol Craving Scale (PACS). <https://arc.psych.wisc.edu/self-report/penn-alcohol-craving-scale-pacs/>. Accessed March 2, 2026. [arc.psych.wisc.edu]
16. Watt KD, Pedersen RA, Kremers WK, Heimbach JK, Charlton MR. Evolution of causes and risk factors for mortality post-liver transplant: results of the NIDDK long-term follow-up study. *Am J Transplant*. 2010 Jun;10(6):1420-7. doi: 10.1111/j.1600-6143.2010.03126.x. Epub 2010 May 10. PMID: 20486907; PMCID: PMC2891375.
17. Lucey MR, Terrault N, Ojo L, Hay JE, Neuberger J, Blumberg E, Teperman LW. Long-term management of the successful adult liver transplant: 2012 practice guideline by the American Association for the Study of Liver Diseases and the American Society of Transplantation. *Liver Transpl*. 2013 Jan;19(1):3-26. doi: 10.1002/lt.23566. PMID: 23281277.
18. Lucey MR. Liver transplantation in patients with alcoholic liver disease. *Liver Transpl*. 2011 Jul;17(7):751-9. doi: 10.1002/lt.22330. PMID: 21567894.
19. Ehlers SL, Rodrigue JR, Widows MR, Reed AI, Nelson DR. Tobacco use before and after liver transplantation: a single center survey and implications for clinical practice and research. *Liver Transpl*. 2004 Mar;10(3):412-7. doi: 10.1002/lt.20087. PMID: 15004770.
20. DiMartini A, Javed L, Russell S, Dew MA, Fitzgerald MG, Jain A, Fung J. Tobacco use following liver transplantation for alcoholic liver disease: an underestimated problem. *Liver Transpl*. 2005 Jun;11(6):679-83. doi: 10.1002/lt.20385. Erratum in: *Liver Transpl*. 2005 Oct;11(10):1302. PMID: 15915490.

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

21. Black CK, Termanini KM, Aguirre O, et al. Solid organ transplantation in the 21 st century. *Ann Transl Med.* Oct 2018; 6(20): 409. PMID 30498736
22. Belle SH, Beringer KC, Detre KM. An update on liver transplantation in the United States: recipient characteristics and outcome. *Clin Transpl.* 1995: 19-33. PMID 8794252
23. Sheiner P, Rochon C. Recurrent hepatitis C after liver transplantation. *Mt Sinai J Med.* 2012; 79(2): 190-8. PMID 22499490
24. Gadiparthi C, Cholanteril G, Perumpail BJ, et al. Use of direct-acting antiviral agents in hepatitis C virus-infected liver transplant candidates. *World J Gastroenterol.* Jan 21 2018; 24(3): 315-322. PMID 29391754
25. Wang X, Li J, Riaz DR, et al. Outcomes of liver transplantation for nonalcoholic steatohepatitis: a systematic review and meta-analysis. *Clin Gastroenterol Hepatol.* Mar 2014; 12(3): 394-402.e1. PMID 24076414
26. Yong JN, Lim WH, Ng CH, et al. Outcomes of Nonalcoholic Steatohepatitis After Liver Transplantation: An Updated Meta-Analysis and Systematic Review. *Clin Gastroenterol Hepatol.* Jan 2023; 21(1): 45-54.e6. PMID 34801743
27. Cholanteril G, Wong RJ, Hu M, et al. Liver Transplantation for Nonalcoholic Steatohepatitis in the US: Temporal Trends and Outcomes. *Dig Dis Sci.* Oct 2017; 62(10): 2915-2922. PMID 28744836
28. Schoenberg MB, Bucher JN, Vater A, et al. Resection or Transplant in Early Hepatocellular Carcinoma. *Dtsch Arztebl Int.* Aug 07 2017; 114(31-32): 519-526. PMID 28835324
29. Zheng Z, Liang W, Milgrom DP, et al. Liver transplantation versus liver resection in the treatment of hepatocellular carcinoma: a meta-analysis of observational studies. *Transplantation.* Jan 27 2014; 97(2): 227-34. PMID 24142034
30. Guiteau JJ, Cotton RT, Washburn WK, et al. An early regional experience with expansion of Milan Criteria for liver transplant recipients. *Am J Transplant.* Sep 2010; 10(9): 2092-8. PMID 20883543
31. Pomfret EA, Washburn K, Wald C, et al. Report of a national conference on liver allocation in patients with hepatocellular carcinoma in the United States. *Liver Transpl.* Mar 2010; 16(3): 262-78. PMID 20209641
32. Ioannou GN, Perkins JD, Carithers RL. Liver transplantation for hepatocellular carcinoma: impact of the MELD allocation system and predictors of survival. *Gastroenterology.* May 2008; 134(5): 1342-51. PMID 18471511
33. Chan EY, Larson AM, Fix OK, et al. Identifying risk for recurrent hepatocellular carcinoma after liver transplantation: implications for surveillance studies and new adjuvant therapies. *Liver Transpl.* Jul 2008; 14(7): 956-65. PMID 18581511
34. Mazzaferro V, Regalia E, Doci R, et al. Liver transplantation for the treatment of small hepatocellular carcinomas in patients with cirrhosis. *N Engl J Med.* Mar 14 1996; 334(11): 693-9. PMID 8594428
35. Firl DJ, Kimura S, McVey J, et al. Reframing the approach to patients with hepatocellular carcinoma: Longitudinal assessment with hazard associated with liver transplantation for HCC (HALTHCC) improves ablate and wait strategy. *Hepatology.* Oct 2018; 68(4): 1448-1458. PMID 29604231

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

36. National Comprehensive Cancer Network. Hepatocellular Carcinoma. Version 1.2025. https://www.nccn.org/professionals/physician_gls/PDF/hepatobiliary.pdf.
37. Yadav DK, Chen W, Bai X, et al. Salvage Liver Transplant versus Primary Liver Transplant for Patients with Hepatocellular Carcinoma. *Ann Transplant*. Aug 03 2018; 23: 524-545. PMID 30072683
38. Murali AR, Patil S, Phillips KT, et al. Locoregional Therapy With Curative Intent Versus Primary Liver Transplant for Hepatocellular Carcinoma: Systematic Review and Meta-Analysis. *Transplantation*. Aug 2017; 101(8): e249-e257. PMID 28282359
39. Maggs JR, Suddle AR, Aluvihare V, et al. Systematic review: the role of liver transplantation in the management of hepatocellular carcinoma. *Aliment Pharmacol Ther*. May 2012; 35(10): 1113-34. PMID 22432733
40. Chan DL, Alzahrani NA, Morris DL, et al. Systematic review of efficacy and outcomes of salvage liver transplantation after primary hepatic resection for hepatocellular carcinoma. *J Gastroenterol Hepatol*. Jan 2014; 29(1): 31-41. PMID 24117517
41. Zhu Y, Dong J, Wang WL, et al. Short- and long-term outcomes after salvage liver transplantation versus primary liver transplantation for hepatocellular carcinoma: a meta-analysis. *Transplant Proc*. Nov 2013; 45(9): 3329-42. PMID 24182812
42. Cambridge WA, Fairfield C, Powell JJ, et al. Meta-analysis and Meta-regression of Survival After Liver Transplantation for Unresectable Perihilar Cholangiocarcinoma. *Ann Surg*. Feb 01 2021; 273(2): 240-250. PMID 32097164
43. Gu J, Bai J, Shi X, et al. Efficacy and safety of liver transplantation in patients with cholangiocarcinoma: a systematic review and meta-analysis. *Int J Cancer*. May 01 2012; 130(9): 2155-63. PMID 21387295
44. Heimbach JK. Successful liver transplantation for hilar cholangiocarcinoma. *Curr Opin Gastroenterol*. May 2008; 24(3): 384-8. PMID 18408469
45. Darwish Murad S, Kim WR, Harnois DM, et al. Efficacy of neoadjuvant chemoradiation, followed by liver transplantation, for perihilar cholangiocarcinoma at 12 US centers. *Gastroenterology*. Jul 2012; 143(1): 88-98.e3; quiz e14. PMID 22504095
46. Heimbach JK, Gores GJ, Haddock MG, et al. Predictors of disease recurrence following neoadjuvant chemoradiotherapy and liver transplantation for unresectable perihilar cholangiocarcinoma. *Transplantation*. Dec 27 2006; 82(12): 1703-7. PMID 17198263
47. Rea DJ, Heimbach JK, Rosen CB, et al. Liver transplantation with neoadjuvant chemoradiation is more effective than resection for hilar cholangiocarcinoma. *Ann Surg*. Sep 2005; 242(3): 451-8; discussion 458-61. PMID 16135931
48. Pascher A, Jonas S, Neuhaus P. Intrahepatic cholangiocarcinoma: indication for transplantation. *J Hepatobiliary Pancreat Surg*. 2003; 10(4): 282-7. PMID 14598146
49. Friman S, Foss A, Isoniemi H, et al. Liver transplantation for cholangiocarcinoma: selection is essential for acceptable results. *Scand J Gastroenterol*. Mar 2011; 46(3): 370-5. PMID 21073376
50. Meyer CG, Penn I, James L. Liver transplantation for cholangiocarcinoma: results in 207 patients. *Transplantation*. Apr 27 2000; 69(8): 1633-7. PMID 10836374
51. Robles R, Figueras J, Turrión VS, et al. Spanish experience in liver transplantation for hilar and peripheral cholangiocarcinoma. *Ann Surg*. Feb 2004; 239(2): 265-71. PMID 14745336

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

52. Casavilla FA, Marsh JW, Iwatsuki S, et al. Hepatic resection and transplantation for peripheral cholangiocarcinoma. *J Am Coll Surg*. Nov 1997; 185(5): 429-36. PMID 9358085
53. Ziogas IA, Giannis D, Economopoulos KP, et al. Liver Transplantation for Intrahepatic Cholangiocarcinoma: A Meta-analysis and Meta-regression of Survival Rates. *Transplantation*. Oct 01 2021; 105(10): 2263-2271. PMID 33196623
54. Hue JJ, Rocha FG, Ammori JB, et al. A comparison of surgical resection and liver transplantation in the treatment of intrahepatic cholangiocarcinoma in the era of modern chemotherapy: An analysis of the National Cancer Database. *J Surg Oncol*. Mar 2021; 123(4): 949-956. PMID 33400841
55. Palaniappan V, Li CH, Frilling A, et al. Long-Term Outcomes of Liver Transplantation for the Management of Neuroendocrine Neoplasms: A Systematic Review. *J Pers Med*. Sep 23 2023; 13(10). PMID 37888039
56. Fan ST, Le Treut YP, Mazzaferro V, et al. Liver transplantation for neuroendocrine tumour liver metastases. *HPB (Oxford)*. Jan 2015; 17(1): 23-8. PMID 24992381
57. Máthé Z, Tagkalos E, Paul A, et al. Liver transplantation for hepatic metastases of neuroendocrine pancreatic tumors: a survival-based analysis. *Transplantation*. Mar 15 2011; 91(5): 575-82. PMID 21200365
58. Adam R, Piedvache C, Chiche L, et al. Liver transplantation plus chemotherapy versus chemotherapy alone in patients with permanently unresectable colorectal liver metastases (TransMet): results from a multicentre, open-label, prospective, randomised controlled trial. *Lancet*. Sep 21 2024; 404(10458): 1107-1118. PMID 39306468
59. Hagness M, Foss A, Line PD, et al. Liver transplantation for nonresectable liver metastases from colorectal cancer. *Ann Surg*. May 2013; 257(5): 800-6. PMID 23360920
60. Dueland S, Syversveen T, Solheim JM, et al. Survival Following Liver Transplantation for Patients With Nonresectable Liver-only Colorectal Metastases. *Ann Surg*. Feb 2020; 271(2): 212-218. PMID 31188200
61. Dueland S, Yaqub S, Syversveen T, et al. Survival Outcomes After Portal Vein Embolization and Liver Resection Compared With Liver Transplant for Patients With Extensive Colorectal Cancer Liver Metastases. *JAMA Surg*. Jun 01 2021; 156(6): 550-557. PMID 33787838
62. Larson EL, Ciftci Y, Jenkins RT, et al. Outcomes of Liver Transplant for Hepatic Epithelioid Hemangioendothelioma. *Clin Transplant*. Feb 2025; 39(2): e70087. PMID 39869081
63. Rodriguez JA, Becker NS, O'Mahony CA, et al. Long-term outcomes following liver transplantation for hepatic hemangioendothelioma: the UNOS experience from 1987 to 2005. *J Gastrointest Surg*. Jan 2008; 12(1): 110-6. PMID 17710508
64. Lerut JP, Orlando G, Adam R, et al. The place of liver transplantation in the treatment of hepatic epithelioid hemangioendothelioma: report of the European liver transplant registry. *Ann Surg*. Dec 2007; 246(6): 949-57; discussion 957. PMID 18043096
65. Ziogas IA, Tasoudis PT, Serifis N, et al. Liver Transplantation for Hepatic Adenoma: A UNOS Database Analysis and Systematic Review of the Literature. *Transplant Direct*. Feb 2022; 8(2): e1264. PMID 35018302
66. Hamilton EC, Balogh J, Nguyen DT, et al. Liver transplantation for primary hepatic malignancies of childhood: The UNOS experience. *J Pediatr Surg*. Oct 12 2017. PMID 29108844

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

67. Barrena S, Hernandez F, Miguel M, et al. High-risk hepatoblastoma: results in a pediatric liver transplantation center. *Eur J Pediatr Surg.* Jan 2011; 21(1): 18-20. PMID 20938901
68. Malek MM, Shah SR, Atri P, et al. Review of outcomes of primary liver cancers in children: our institutional experience with resection and transplantation. *Surgery.* Oct 2010; 148(4): 778-82; discussion 782-4. PMID 20728194
69. Browne M, Sher D, Grant D, et al. Survival after liver transplantation for hepatoblastoma: a 2-center experience. *J Pediatr Surg.* Nov 2008; 43(11): 1973-81. PMID 18970927
70. Czauderna P, Otte JB, Aronson DC, et al. Guidelines for surgical treatment of hepatoblastoma in the modern era--recommendations from the Childhood Liver Tumour Strategy Group of the International Society of Paediatric Oncology (SIOPEL). *Eur J Cancer.* May 2005; 41(7): 1031-6. PMID 15862752
71. Organ Procurement and Transplantation Network (OPTN). Policy 9: Allocation of Livers and Liver-Intestines. Updated June 26, 2025; https://optn.transplant.hrsa.gov/media/1200/optn_policies.pdf#nameddest=Policy_01.
72. Salimi J, Jafarian A, Fakhar N, et al. Study of re-transplantation and prognosis in liver transplant center in Iran. *Gastroenterol Hepatol Bed Bench.* 2021; 14(3): 237-242. PMID 34221263
73. Bellido CB, Martínez JM, Artacho GS, et al. Have we changed the liver retransplantation survival?. *Transplant Proc.* 2012; 44(6): 1526-9. PMID 22841203
74. Remiszewski P, Kalinowski P, Dudek K, et al. Influence of selected factors on survival after liver retransplantation. *Transplant Proc.* Oct 2011; 43(8): 3025-8. PMID 21996216
75. Hong JC, Kaldas FM, Kositamongkol P, et al. Predictive index for long-term survival after retransplantation of the liver in adult recipients: analysis of a 26-year experience in a single center. *Ann Surg.* Sep 2011; 254(3): 444-8; discussion 448-9. PMID 21817890
76. Bouari S, Rijkse E, Metselaar HJ, et al. A comparison between combined liver kidney transplants to liver transplants alone: A systematic review and meta-analysis. *Transplant Rev (Orlando).* Dec 2021; 35(4): 100633. PMID 34098490
77. Lunsford KE, Bodzin AS, Markovic D, et al. Avoiding Futility in Simultaneous Liver-kidney Transplantation: Analysis of 331 Consecutive Patients Listed for Dual Organ Replacement. *Ann Surg.* May 2017; 265(5): 1016-1024. PMID 27232249
78. Fong TL, Khemichian S, Shah T, et al. Combined liver-kidney transplantation is preferable to liver transplant alone for cirrhotic patients with renal failure. *Transplantation.* Aug 27 2012; 94(4): 411-6. PMID 22805440
79. Ruiz R, Jennings LW, Kim P, et al. Indications for combined liver and kidney transplantation: propositions after a 23-yr experience. *Clin Transplant.* 2010; 24(6): 807-11. PMID 20002463
80. Calinescu AM, Wildhaber BE, Poncet A, et al. Outcomes of combined liver-kidney transplantation in children: analysis of the scientific registry of transplant recipients. *Am J Transplant.* Dec 2014; 14(12): 2861-8. PMID 25274400
81. de la Cerda F, Jimenez WA, Gjertson DW, et al. Renal graft outcome after combined liver and kidney transplantation in children: UCLA and UNOS experience. *Pediatr Transplant.* Jun 2010; 14(4): 459-64. PMID 20070563
82. Marcos A, Ham JM, Fisher RA, et al. Single-center analysis of the first 40 adult-to-adult living donor liver transplants using the right lobe. *Liver Transpl.* May 2000; 6(3): 296-301. PMID 10827229

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

83. Malagó M, Testa G, Marcos A, et al. Ethical considerations and rationale of adult-to-adult living donor liver transplantation. *Liver Transpl.* Oct 2001; 7(10): 921-7. PMID 11679994
84. Renz JF, Busuttil RW. Adult-to-adult living-donor liver transplantation: a critical analysis. *Semin Liver Dis.* 2000; 20(4): 411-24. PMID 11200412
85. Bak T, Wachs M, Trotter J, et al. Adult-to-adult living donor liver transplantation using right-lobe grafts: results and lessons learned from a single-center experience. *Liver Transpl.* Aug 2001; 7(8): 680-6. PMID 11510011
86. Shiffman ML, Brown RS, Olthoff KM, et al. Living donor liver transplantation: summary of a conference at The National Institutes of Health. *Liver Transpl.* Feb 2002; 8(2): 174-88. PMID 11862598
87. Grant RC, Sandhu L, Dixon PR, et al. Living vs. deceased donor liver transplantation for hepatocellular carcinoma: a systematic review and meta-analysis. *Clin Transplant.* 2013; 27(1): 140-7. PMID 23157398
88. Tang W, Qiu JG, Cai Y, et al. Increased Surgical Complications but Improved Overall Survival with Adult Living Donor Compared to Deceased Donor Liver Transplantation: A Systematic Review and Meta-Analysis. *Biomed Res Int.* 2020; 2020: 1320830. PMID 32908865
89. Cooper C, Kanters S, Klein M, et al. Liver transplant outcomes in HIV-infected patients: a systematic review and meta-analysis with synthetic cohort. *AIDS.* Mar 27 2011; 25(6): 777-86. PMID 21412058
90. Terrault NA, Roland ME, Schiano T, et al. Outcomes of liver transplant recipients with hepatitis C and human immunodeficiency virus coinfection. *Liver Transpl.* Jun 2012; 18(6): 716-26. PMID 22328294
91. Organ Procurement and Transplantation Network (OPTN). Organ Procurement and Transplantation Network Policies. Updated June 26, 2025; https://optn.transplant.hrsa.gov/media/1200/optn_policies.pdf.
92. Blumberg EA, Rogers CC. Solid organ transplantation in the HIV-infected patient: Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clin Transplant.* Sep 2019; 33(9): e13499. PMID 30773688
93. Durand CM, Massie A, Florman S, et al. Safety of Kidney Transplantation from Donors with HIV. *N Engl J Med.* Oct 17 2024; 391(15): 1390-1401. PMID 39413376
94. American Association for the Study of Liver Diseases, American Society of Transplantation. Liver transplantation, evaluation of the adult patient. 2014; <https://www.aasld.org/practice-guidelines/evaluation-adult-liver-transplant-patient>.
95. Squires RH, Ng V, Romero R, et al. Evaluation of the pediatric patient for liver transplantation: 2014 practice guideline by the American Association for the Study of Liver Diseases, American Society of Transplantation and the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. *Hepatology.* Jul 2014; 60(1): 362-98. PMID 24782219
96. American Association for the Study of Liver Diseases. Diagnosis and Treatment of Alcohol Associated Liver Diseases: 2019 Practice Guidance From the American Association for the Study of Liver Diseases. <https://www.aasld.org/practice-guidelines/alcohol-associated-liver-disease>.

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

97. Singal AG, Llovet JM, Yarchoan M, et al. AASLD Practice Guidance on prevention, diagnosis, and treatment of hepatocellular carcinoma. *Hepatology*. Dec 01 2023; 78(6): 1922-1965. PMID 37199193
98. Taddei TH, Brown DB, Yarchoan M, et al. Critical Update: AASLD Practice Guidance on prevention, diagnosis, and treatment of hepatocellular carcinoma. *Hepatology*. Jul 01 2025; 82(1): 272-274. PMID 39992051
99. Clavien PA, Lesurtel M, Bossuyt PM, et al. Recommendations for liver transplantation for hepatocellular carcinoma: an international consensus conference report. *Lancet Oncol*. Jan 2012; 13(1): e11-22. PMID 22047762
100. Kodali S, Kulik L, D'Allesio A, et al. The 2024 ILTS-ILCA consensus recommendations for liver transplantation for HCC and intrahepatic cholangiocarcinoma. *Liver Transpl*. Jun 01 2025; 31(6): 815-831. PMID 40014003
101. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Neuroendocrine and Adrenal Tumors. Version 2.2025. https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf.
102. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Colon Cancer. Version 5.2025. https://www.nccn.org/professionals/physician_gls/pdf/colon.pdf
103. Guidance to Liver Transplant Programs and the National Liver Review Board for: Adult MELD Exceptions for Transplant Oncology (July 2025).
104. Centers for Medicare & Medicaid Services. National Coverage Determination (NCD) for Adult Liver Transplantation (260.1). 2012; <https://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?NCAId=259&NcaName=Liver+Transplantation+for+Malignancies&ExpandComments=n&CommentPeriod=0&NCDId=70&ncdver=3&id=186&bc=gABAAAAAEEAAAA%3D%3D&>.
105. Centers for Medicare & Medicaid Services. National Coverage Determination (NCD) for Pediatric Liver Transplantation (260.2). 1991; <https://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?MCDId=17&ExpandComments=n&McdName=Clinical+Pharmacology+Compendium+Revision+Request+-+CAG-00392&mcdtypename=Compendia&MCDIndexType=6&NCDId=71&ncdver=1&bc=AgAEA AAAA&>.

Policy History

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

05/01/2014 Medical Policy Committee review

05/21/2014 Medical Policy Implementation Committee approval. New policy.

03/05/2015 Medical Policy Committee review

03/20/2015 Medical Policy Implementation Committee approval. Removed requirement for "Patients with ongoing alcohol and/or drug abuse. (Evidence for abstinence may

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

	vary among liver transplant programs, but generally a minimum of 3 months is required.)”.
08/03/2015	Coding update: ICD10 Diagnosis code section added; ICD9 Procedure code section removed.
01/01/2016	Coding update
03/03/2016	Medical Policy Committee review
03/16/2016	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
01/01/2017	Coding update: Removing ICD-9 Diagnosis Codes
03/02/2017	Medical Policy Committee review
03/15/2017	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
03/01/2018	Medical Policy Committee review
03/21/2018	Medical Policy Implementation Committee approval. Policy title changed from “Liver Transplant” to “Liver Transplant and Combined Liver-Kidney Transplant.” Combined liver-kidney transplantation added to policy as eligible for coverage. Policy Guidelines moved from the Background/Overview to a new Policy Guidelines section. Contraindication for smoking and HIV criteria added to Policy Guidelines.
01/01/2019	Coding update
03/07/2019	Medical Policy Committee review
03/20/2019	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
12/10/2019	Coding update
03/05/2020	Medical Policy Committee review
03/11/2020	Medical Policy Implementation Committee approval. Added a reference to see the patient selection criteria in the Policy Guidelines section for liver transplantation in patients with unresectable hilar cholangiocarcinoma. Added a not medically necessary criteria bullet as follows: • Patients with ongoing alcohol and/or drug abuse. (Evidence for abstinence may vary among liver transplant programs, but generally a minimum of 3 months is required.)
09/16/2020	Coding update
03/04/2021	Medical Policy Committee review
03/10/2021	Medical Policy Implementation Committee approval. Coverage eligibility unchanged. Added information on tobacco consumption under Liver-Specific Criteria in the Policy Guidelines.
03/03/2022	Medical Policy Committee review
03/09/2022	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
03/02/2023	Medical Policy Committee review

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

- 03/08/2023 Medical Policy Implementation Committee approval. Coverage eligibility unchanged. Minor editorial refinements to policy statements changing “patients” to “individuals”; intent unchanged.
- 07/02/2024 Medical Policy Committee review
- 07/10/2024 Medical Policy Implementation Committee approval. Added a reference to see Policy Guidelines section for alcoholic liver disease in the coverage criteria. Removed the Not Medically Necessary section. Combined investigational statements into one statement. Added investigational bullet for HCC that has extended beyond the liver. Added two investigational bullets for individuals with ongoing alcohol and/or drug abuse addressing evidence for abstinence and for formal psychological evaluation. Added content to Policy Guidelines section under Liver-Specific Criteria and the related sources to the References.
- 03/06/2025 Medical Policy Committee review
- 03/12/2025 Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
- 03/05/2026 Medical Policy Committee review
- 03/11/2026 Medical Policy Implementation Committee approval. Changed coverage heading from “When Services Are Eligible for Coverage” to “When Services May Be Eligible for Coverage”. Revised content for etiologies of end-stage liver disease. Added criteria for liver transplantation in individuals with unresectable hilar cholangiocarcinoma. Added liver transplantation to be investigational when coverage criteria are not met. Added liver transplantation to be investigational for individuals with hepatic adenoma, unresectable colorectal liver metastases and epithelioid hemangioendothelioma. Updated Policy Guidelines, Rationale, Supplemental Information and References.

Next Scheduled Review Date: 03/2027

Coding

The five character codes included in the Louisiana Blue Medical Policy Coverage Guidelines are obtained from Current Procedural Terminology (CPT®)[‡], copyright 2025 by the American Medical Association (AMA). CPT is developed by the AMA as a listing of descriptive terms and five character identifying codes and modifiers for reporting medical services and procedures performed by physician.

The responsibility for the content of Louisiana Blue Medical Policy Coverage Guidelines is with Louisiana Blue and no endorsement by the AMA is intended or should be implied. The AMA disclaims responsibility for any consequences or liability attributable or related to any use, nonuse or interpretation of information contained in Louisiana Blue Medical Policy Coverage Guidelines. Fee schedules, relative value units, conversion factors and/or related components are not assigned by the AMA, are not part of CPT, and the AMA is not recommending their use. The AMA does not directly or indirectly practice medicine or dispense medical services. The AMA assumes no liability for data contained or not contained herein. Any use of CPT outside of Louisiana Blue Medical Policy Coverage Guidelines should refer to the most current Current Procedural Terminology which

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

contains the complete and most current listing of CPT codes and descriptive terms. Applicable FARS/DFARS apply.

CPT is a registered trademark of the American Medical Association.

Codes used to identify services associated with this policy may include (but may not be limited to) the following:

Code Type	Code
CPT	47133, 47135, 47140, 47141, 47142, 47143, 47144, 47145, 47146, 47147, 47399
HCPSC	No codes
ICD-10 Diagnosis	All related diagnoses

*Investigational – A medical treatment, procedure, drug, device, or biological product is Investigational if the effectiveness has not been clearly tested and it has not been incorporated into standard medical practice. Any determination we make that a medical treatment, procedure, drug, device, or biological product is Investigational will be based on a consideration of the following:

- A. Whether the medical treatment, procedure, drug, device, or biological product can be lawfully marketed without approval of the U.S. Food and Drug Administration (FDA) and whether such approval has been granted at the time the medical treatment, procedure, drug, device, or biological product is sought to be furnished; or
- B. Whether the medical treatment, procedure, drug, device, or biological product requires further studies or clinical trials to determine its maximum tolerated dose, toxicity, safety, effectiveness, or effectiveness as compared with the standard means of treatment or diagnosis, must improve health outcomes, according to the consensus of opinion among experts as shown by reliable evidence, including:
 1. Consultation with technology evaluation center(s);
 2. Credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community; or
 3. Reference to federal regulations.

**Medically Necessary (or “Medical Necessity”) - Health care services, treatment, procedures, equipment, drugs, devices, items or supplies that a Provider, exercising prudent clinical judgment, would provide to a patient for the purpose of preventing, evaluating, diagnosing or treating an illness, injury, disease or its symptoms, and that are:

- A. In accordance with nationally accepted standards of medical practice;
- B. Clinically appropriate, in terms of type, frequency, extent, level of care, site and duration, and considered effective for the patient's illness, injury or disease; and
- C. Not primarily for the personal comfort or convenience of the patient, physician or other health care provider, and 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 that patient's illness, injury or disease.

Liver Transplant and Combined Liver-Kidney Transplant

Policy # 00411

Original Effective Date: 05/21/2014

Current Effective Date: 04/01/2026

For these purposes, “nationally accepted standards of medical practice” means standards that are based on credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community, Physician Specialty Society recommendations and the views of Physicians practicing in relevant clinical areas and any other relevant factors.

‡ Indicated trademarks are the registered trademarks of their respective owners.

NOTICE: If the Patient’s health insurance contract contains language that differs from the BCBSLA Medical Policy definition noted above, the definition in the health insurance contract will be relied upon for specific coverage determinations.

NOTICE: Medical Policies are scientific based opinions, provided solely for coverage and informational purposes. Medical Policies should not be construed to suggest that the Company recommends, advocates, requires, encourages, or discourages any particular treatment, procedure, or service, or any particular course of treatment, procedure, or service.

NOTICE: 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 eligibility for coverage.

NOTICE: If an authorization for an ongoing course of treatment has been provided to a member and the member changes from one health plan to another health plan (e.g., a member moves from carrier A to Louisiana Blue), Louisiana Blue may honor the previous health plan’s authorization for the same service under the same type of in-network benefit for a 90-day transition period. Documentation of the authorization for the ongoing course of treatment from the previous health plan must be provided to us by the member or their provider and the services provided for the course of treatment must otherwise be a covered service under the Louisiana Blue health plan. This provision does not apply to medications covered under the plan’s pharmacy benefit.