Subject: Pancreas Transplantation Procedures (Pancreas Alone, Simultaneous Pancreas and Kidney, Pancreas after Kidney and Pancreatic Islet Cell and Retransplantation)		Original Effective Date: 6/06
Guidance Number: MCG-017	**Revision Date(s):** 8/30/07, 8/10, 10/31/12	
Medical Coverage Guidance Approval Date: 10/31/12		

PREFACE

This Medical Guidance is intended to facilitate the Utilization Management process. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (i.e., will be paid for by Molina) for a particular member. The member's benefit plan determines coverage. Each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their providers will need to consult the member's benefit plan to determine if there are any exclusions or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid members. CMS's Coverage Database can be found on the following website: http://www.cms.hhs.gov/center/coverage.asp.

FDA INDICATIONS

Pancreas transplant procedures are not regulated by the FDA.[1] The U.S. Congress established the Organ Procurement and Transplantation Network (OPTN) when it enacted the National Organ Transplant Act (NOTA) of 1984. The Act called for a unified transplant network to be operated by a private, nonprofit organization under federal contract. The United Network for Organ Sharing (UNOS) was awarded the initial OPTN contract. Effective March 16, 2000, HHS implemented a Final Rule establishing a regulatory framework for the structure and operations of the OPTN. Under the terms of the Final Rule, the policies intended to be binding upon OPTN members are developed through the OPTN committees and Board of Directors and then submitted to the Secretary of HHS for final approval.

CENTERS FOR MEDICARE AND MEDICAID SERVICES (CMS)

The coverage directive(s) and criteria of an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCD document and provide the directive for all Medicare members. The directives of this MCG document may be followed if there are no available NCD or LCD documents noted below.

Refer to the following document(s) for Medicare coverage:

Pancreas Transplants Alone NCD (260.3)[7]

CMS does have a National Coverage Determination (NCD) for Pancreas Transplants Alone.[7] Pancreas transplantation alone or when performed simultaneously with or after a kidney transplant are covered. Other criteria must also be met and are outlined in the NCD.

Islet Cell Transplantation in the context of a Clinical Trial NCD (260.3.1)[8]

Medicare covers islet cell transplantation for patients with Type 1 diabetes who are participating in a National Institutes of Health (NIH) sponsored clinical trial.[8] The islet cell transplant may be done alone or in combination with a kidney transplant.

INITIAL COVERAGE CRITERIA

All transplants require prior authorization from the Corporate Transplant Department. Solid organ transplant requests will be reviewed by the Corporate Senior Medical Director or qualified clinical designee. If the criteria are met using appropriate NCD and/or LCD guidelines, state regulations and/or MCG policies the Corporate Senior Medical Director's designee can approve the requested transplant.

Members must meet UNOS guidelines for transplantation and the diagnosis must be made by an Endocrinologist, Nephrologist and/or Transplant Surgeon.

Pre-Transplant Evaluation:

General requirements for transplant evaluation include all of the following [105 106 107]:

- ❑ History and physical examination
- ❑ **Psychosocial evaluation and clearance:** This must be completed and documentation submitted for review before any additional transplant work-up or testing is initiated.
- ❑ Dietary consult and clearance for transplant
- ❑ EKG
- ❑ Chest X-ray
- ❑ Carotid doppler indicated: [ANY]
    - known history of cardiovascular disease
    - age > 50 years old
    - presence of carotid bruit
- ❑ Cardiac risk assessment and clearance that includes testing in the following order:
    1. dipyridamole thallium rest and exercise isotope ventriculogram
    2. echocardiogram: if abnormal:
        - ➢ cardiac catheterization
- ❑ Lab studies:
    - Complete blood cell count, liver function tests, kidney profile, coagulation profile (prothrombin time, partial thromboplastin time)
    - HIV testing.
    - Hepatitis A (HAV), Hepatitis B (HBV), Hepatitis C (HCV), Hepatitis D, Ebstein-Barr virus (EBV), cytomegalovirus (CMV) serology, syphilis, toxoplasmosis, herpes simplex virus
    - HLA Antibody
    - Blood type
    - Glomular Filtration Rate
    - Urinalysis

- Amylase
- Blood glucose and HgA1c
- Creatinine Clearance
- C-Peptide

Within the last 12 months the following is required:

- ❑ Colonoscopy (indicated > age 50 with removal of any polyps if applicable)
- ❑ Dental examination (contact plan for coverage criteria)
- ❑ GYN examination with Pap smear (indicated > age 18) with complete workup and treatment of abnormal results as indicated
- ❑ Immunizations up to date when indicated: Hepatitis A and Hepatitis B, pneumococcal vaccine, influenza vaccine, tetanus booster)
- ❑ Mammogram (indicated > age 40) with complete workup and treatment of abnormal results as indicated
- ❑ Osteoporosis screening with DEXA Scan:[ONE]
  - indicated for cholestatic disorders
  - prolonged corticosteroid therapy
  - postmenopausal women
  - > age 65
- ❑ Peripheral artery disease (PAD) screening with doppler-recorded ankle-brachial index: [ONE]
  - age > 50
  - history of diabetes or smoking
- ❑ Testicular examination > age 50

Pancreas Alone, Simultaneous pancreas-kidney transplantation and pancreas after kidney transplantation may be authorized when the following criteria are met**: [ALL]**

{Requires meeting main criteria below and specific criteria for PTA, SPK, or PAK to be met}

Main Criteria

- ❑ Optimally managed for at least 12 months by Prescriber **[ONE]**
  - Board Certified Endocrinologist
  - Pancreas Transplant Surgeon**; and**
- ❑ Member age 18 to 45[2,3,16,89] (outside age limits evaluated on case-by case-basis**)**
  - advanced age (>45years) should be carefully considered to evaluate the risks versus benefits of the procedure; based on general state of health[2,3]**; and**

- ❑ Documentation of insulin dependent Type 1 diabetes juvenile diabetes with documentation showing:[70, 71,87]

  Abnormal beta cell functioning **[ONE**]; and

  - Beta cell autoantibody positive[70,71,88]

    OR

  - Fasting C-peptide undetectable[89] (e.g., than or equal to 110% of the laboratory's lower limit of normal and with a concurrently obtained fasting glucose<225mg/dl)[71]**; and**

- ❑ Documented history of frequent medically uncontrolled labile (brittle) insulin dependent diabetes mellitus, with recurrent, acute and severe life threatening metabolic complications that have required previous hospitalization. (e.g., ketoacidosis, hypoglycemia or hyperglycemia attacks)[1,2,3,72,82,101] **; and**

- ❑ Consistent failure of aggressive exogenous insulin management (e.g., insulin pump, adjusting amounts and frequencies of injected insulin, multiple daily blood glucose levels, and strict diet and exercise)[1,2,3]

  - a requirement for 0.3 to 1.0 U/kg of insulin daily[89]**; and**

- ❑ No Absolute Contraindications by history /physical, psychosocial, and clinical testing documentation from past 12 months: **[NONE]**

  - Insufficient cardiovascular reserve including**:**[15,17,83,87,89] **[NONE]**

    - ◊ Ejection Fraction below 50%[87,90]
    - ◊ Angiography indicating clinically significant severe and non-correctable coronary artery disease[90,101]
    - ◊ Positive stress test within the past 6 months*[90,101]
    - ◊ Refractory congestive heart failure[93,101]

    * Requires cardiac catheterization and possible angioplasty or bypass and clearance from Cardiologist prior to consideration after the 6 month period; **or**

  - Chronic lung disease[93]
    - ◊ Forced vital capacity (FVC)/forced expiratory volume (FEV1)/diffusion capacity of the lung for carbon monoxide (DLCO) all > 60% of predicted**; or**

  - Active sepsis or ongoing/recurring infections[2,87,90]**; or**

  - Active peptic ulcer/poor gastric emptying[2,87,90]**; or**

  - Severe peripheral vascular disease[70,87,96] **[NONE]**

    - ◊ Ankle brachial index <0.7
    - ◊ Amputation/risk of limb loss with decreased perfusion

- ◊ Non-healing ulcers or frequent foot infections requires assessment of PVD and clearance**; or**

- If HIV positive all of the following are met[15]:
  - ◊ CD4 count >200 cells/mm-3 for >6 months
  - ◊ HIV-1 RNA undetectable
  - ◊ On stable anti-retroviral therapy >3 months
  - ◊ No other complications from AIDS (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidioses mycosis, resistant fungal infections, Kaposi's sarcoma, or other neoplasm)
  - ◊ Meeting all other criteria for transplantation**; or**

- Non curable malignancy (excluding localized skin malignancy); no history of melanoma within 2- 5 years depending on malignancy type[2,87,89,90,101]

  - ◊ History requires Board certified Oncologist clearance**; or**

- No behavioral health disorder by history or psychosocial issues: [One]
  - ◊ if history of behavioral health disorder, no severe psychosis or personality disorder
  - ◊ mood/anxiety disorder must be excluded or treated
  - ◊ member has understanding of surgical risk and post procedure compliance and follow-up required

  Note: Patient's need to understand the importance of adherence to medication schedules and follow-up appointments/noncompliance is a major cause of graft failure.

- No adequate social/family support

- Active medical conditions that would lead to poor postoperative outcomes (not an all inclusive list)[93] **[NONE]**
  - ◊ GI bleed
  - ◊ systemic lupus erythematosus (SLE)
  - ◊ osteoporosis-T score $\underline{\geq}$ 2.5
  - ◊ uncontrolled hypertension
  - ◊ uncorrected abdominal aortic aneurysm > 4 cm)**; or**

- Active alcohol and/or other substance abuse including smoking (to remove as a contraindication there must be 6 months of documented abstinence through participation in a structured alcohol/substance abuse program with regular meeting attendance and negative random drug testing) Current use of illicit drugs, alcohol, or tobacco[2,86,87,89,101] **; or**

- Severe irreversible neurologic impairment caused by intracranial cerebrovascular disease not amendable to rehabilitation[87,93]; **or**

- Chronic liver disease with cirrhosis (biopsy with Stage IV cirrhosis)[2,87,89,101]**; or**
- HTLV-1 positive indicating leukemia or lymphoma[93]; **or**

❑ None of the following **absolute contraindications** are present: **[NONE]**

The presence of a relative contraindication does not exclude the possibility of kidney transplantation if it is managed clinically or the condition is reversed; requires documentation and clearance by appropriate physician: **[NONE]**

- Age under 18 or over 45 years[16]**; or**
- BMI >30[2,74,84,85,87,89]**; or**
- Unsupportive physical or social environment that would prohibit a successful post transplant recovery[93]**; or**
- Unwilling or unable to take immunosuppressant medications[93]**; or**
- Recurrent urinary tract infections or structural genitourinary abnormality[101]
  - ◊ Requires Urologic consultation prior to consideration**; or**
- Substance abuse history
  - ◊ Evidence of involvement in 6-12 months of alcohol/drug-free rehabilitation program**;**
  - ◊ Negative random toxicology screens; **or**
- Extensive calcification of aortic or iliac arteries
  - ◊ Claudication and rest ischemia must be evaluated by Board certified vascular surgeon and treated/resolved prior to transplant consideration**; or**
- Chronic liver disease such as Hepatitis B/C or persistently abnormal liver function testing[2,87,89,101]
  - ◊ Requires evaluation and clearance by a Hepatologist/Gastroenterologist**; or**
- Controlled HIV infection; HIV is considered controlled when the following criteria are met**:[ALL]**[2,91,92,101]
  - ◊ CD4 count >200 cells/mm-3 for >6 months
  - ◊ HIV-1 RNA undetectable
  - ◊ On stable anti-retroviral therapy >3 months
  - ◊ No other complications from AIDS (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidioses mycosis, resistant fungal infections, Kaposi's sarcoma, or other neoplasm)
  - ◊ Meeting all other criteria for transplantation

AND

The following Pancreas transplantation specific requirements by transplantation type must also be met:

Pancreas Transplant Alone**:[ALL]**

- ❑ All of the above outlined main criteria are met **AND** both of the following criteria are present:
- ❑ The presence of minimally one secondary complication that has not progressed to end-organ failure such as proliferative diabetic retinopathy, neuropathy, gastroparesis, accelerated atherosclerosis[70,87,101]
- ❑ Stable adequate kidney function as evidenced by creatinine clearance glomerular filtration rate of ≥ 80ml/min[17,33,94,95](a rapid decline due to immunosuppressive medications can occur post surgery)[94]
- ❑ Minimum proteinuria[17,66]

Simultaneous pancreas-kidney transplant**:[ALL]**

- ❑ All of the above outlined main criteria are met **AND** both of the following criteria are present:
- ❑ The presence of minimally one secondary complication that has not progressed to end-organ failure such as proliferative diabetic retinopathy, neuropathy, gastroparesis, accelaerated atherosclerosis[70,87,101]
- ❑ The member has renal insufficiency with uremia or impending/ current end stage renal disease (ESRD) with poor renal function and one of the following:[17,87]**[ONE]**
  - Currently on dialysis[87]; or
  - Anticipated date of the member requiring dialysis would be within the next 6 months[87]; or demonstrates 50% or more decline in renal function in the past year
  - The Creatinine Clearance by Cockcroft-Gault formula is less than 20 ml/min[99,100,101]

    Cockcroft-Gault formula calculation:

    $$\text{Clcr (ml/min)} = \frac{(140-\text{age})\ (\text{wt.kg})}{\text{Creatinine (mg/dl)} \times 72}$$

    For women, the result is multiplied by 0.85

Pancreas after kidney Transplant**:[ALL]**

- ❑ All of the above outlined main criteria are met **AND** all of the following criteria are present:

- ❑ The presence of minimally one secondary complication that has not progressed to end-organ failure such as proliferative diabetic retinopathy, neuropathy, gastroparesis, accelaerated atherosclerosis[70,87]
- ❑ The member has a living organ donor for the kidney transplant procedure[17,94] otherwise SPK should be considered
- ❑ Previously successful kidney transplant[57,87] as evidenced by stable function of previous renal allograft [87,94]
- ❑ Stable adequate kidney function as evidenced by creatinine clearance glomerular filtration rate of ≥ 45ml/min[66,97,98]
- ❑ Minimum proteinuria[17,66]

CONTINUATION OF THERAPY

A review for any pancreas transplantation procedure is valid for one year from the time the request was approved.

An annual review of clinical information should be conducted to evaluate any changes in the member's clinical status Due to potential lengthy organ donor waiting times.

One subsequent pancreas retransplantation may be authorized following graft failure.

There is insufficient data regarding positive health outcomes associated with any transplant beyond one retransplantation.

COVERAGE EXCLUSIONS

All requests that do not meet the above outlined criteria for pancreas alone, simultaneous pancreas-kidney transplantation and pancreas after kidney transplantation **may not be** authorized as they are considered unproven or experimental and investigational. This includes, but is not limited, to the following:

- ❑ Members diagnosed with Type II diabetes
- ❑ Pancreas Islet Cell Transplantation
- ❑ Any transplant beyond one retransplantation.

DESCRIPTION OF PROCEDURE/SERVICE/PHARMACEUTICAL

Pancreas transplantation is used to treat type 1 diabetes.[1,5] The ultimate goal for pancreas transplantation is to improve the overall quality of life for the recipient. Transplantation, when successful, can eliminate the need for exogenous insulin, renal dialysis, and the associated primary and secondary complications that result from diabetes mellitus and renal failure (e.g., retinopathy, neuropathy, and vasculopathy).[1] Kidney disease, or nephropathy, is a frequent major complication associated with both type 1 and type 2 diabetes and often ends in end-stage renal disease (kidney failure). There are several types of organ and pancreas related transplantations available to treat severe conditions. Simultaneous pancreas-kidney (SPK) accounts for approximately 75% of pancreas transplants because the most common reason for transplantation is kidney failure in patients with type

1 diabetes.[6] Pancreas-after-kidney accounts for about 15% of transplantations and pancreas alone accounts for about 10% of transplantations. The number of pancreas transplants in the United States is limited to approximately 1200 due to the limited number of available donors.

Pancreas transplantation types are outlined below:

Pancreas Transplant Alone (PTA)[1]- Typically performed in labile diabetics with hypoglycemic unawareness and frequent ketoacidotic episodes without end stage renal disease. The goal is to limit or prevent complications that could cause permanent disability that may result from uncontrolled glucose levels (e.g., retinopathy, neuropathy, nephropathy, and vasculopathy).

Simultaneous pancreas kidney transplantation (SPK)[2]- Generally performed in Type I diabetes with end stage renal disease. Both organs come from the same living or deceased donor. The objectives are to restore glucose-regulated endogenous insulin secretion, arrest progression of complications, protect kidney damage from hyperglycemia and improve quality of life.[9]

Pancreas after kidney transplantation (PAK)[3]- Performed in Type I diabetic patients with end stage renal disease. Two operations are required for this procedure. This is the treatment of choice for candidates with a living donor for a kidney transplant.[2,3,4]

Pancreas Islet Cell Transplantation- (PICT)[4] - Generally for patients who are candidates for PTA. Transplanted islets (small clusters of endocrine cells found in the pancreas that include insulin producing beta cells) are infused into the portal vein through a catheter and anchored in the liver.

GENERAL INFORMATION

Centers for Medicare and Medicaid Services (CMS)

Pancreas Transplants Alone NCD (260.3)[7]

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Hayes Directory Reports

Pancreas Transplant Alone (PTA)[1]

A Hayes directory report for pancreas transplant alone indicates that there is some positive published evidence supporting that patients with refractory type 1 diabetes can achieve normoglycemia following successful pancreas transplantation alone. The stabilization of blood glucose may contribute to the reduction or

progression of certain secondary complications of diabetes. There is insufficient evidence to support these findings in Type 2 diabetic patients. There is also insufficient evidence available to show improved survival rates of patients that have been treated with PTA versus those treated by conventional diabetes management. There is limited evidence available to support retransplantation in PTA patients. All subsequent update searches have not identified any changes to the Hayes rating recommendations. The most recent update search was conducted March, 2010.

Simultaneous Pancreas-Kidney (SPK) Transplantation in Diabetic Patients[2]

A Hayes directory report for SPK transplantation in diabetic patients indicates for patients with imminent or current end stage renal disease and type 1 diabetes experiencing hyperglycemia, hypoglycemia, or episodes of ketoacidosis pancreas transplantation has a moderate level of proven benefit. There is minimal evidence to support the effectiveness for pancreas transplantation in type 2 diabetes or for retransplantation. All subsequent update searches have not identified any changes to the Hayes rating recommendations. The most recent update search was conducted February 22, 2012.

Pancreas after Kidney Transplantation (PAK)[3]

A Hayes Directory report for PAK transplantation indicates that there is moderate evidence from registry data that PAK restores insulin independence in people that have difficulties controlling blood glucose levels. Some positive published evidence but a beneficial impact on health outcomes has not been proven because data are sparse and the level of evidence is low. Graft failure is experienced in a moderate number of patients. There is little evidence evaluating secondary complications. The small amount of data regarding quality of life is positive. The most recent update search was conducted June 24, 2010 with no changes to the Hayes rating recommendations.

Pancreas Islet Cell Transplantation- (PICT)

A previous Hayes Directory report that originated in August, 2004 was available for islet cell transplantation for the Treatment of Type 1 Diabetes. This report was archived on September 1, 2009 as it was considered to be outdated. The report indicated that there was some evidence in a small number of patients for safety and efficacy in adult patients with type 1 diabetes who cannot achieve adequate glycemic control even with intensive insulin therapy. There is lack of long-term safety and efficacy data. The annual updates conducted did not anticipate any changes to the Hayes ratings. The last update was July, 2009. Data was available that impacted efficacy. This report was archived in September, 2009.

Summary of Medical Evidence

A large trend analysis of 25,000 pancreas transplant cases followed over 24 years was recently published. This report examined the outcome of pancreas and pancreas-kidney transplantations based on comprehensive follow-up data reported to the International Pancreas Transplant Registry (IPTR). [108] A total of 25,030 pancreas transplantations performed in the United States during 44 years from December 16, 1966, through December 31, 2010 were analyzed. Pancreas grafts were considered functioning for as long as the recipients were totally

insulin independent, and death with a functioning graft was considered as graft failure. Kidney grafts were considered functioning as long as the patients on dialysis before transplantation were dialysis-free afterwards, or as long as their post-transplant serum creatinine level was below the pre-transplant level. Overall, SPK transplantations accounted for 72%, PAK for 17%, and PTA for 7%. The survival rate of patients who received primary deceased donor pancreas transplants has constantly improved in the last few decades and reached more than 95% at 1 year post-transplant in all 3 categories for transplantations performed in 2009. At 5 years post-transplant, the unadjusted patient survival rate reached 87% in SPK, 83% in PAK, and 89% in PTA. At 10 years post-transplant, more than 70% of recipients were reported to be alive. The highest patient survival rate was found in PTA recipients, with a 10-year patient survival rate of 82%. The author concluded that over the last decades, patient survival and graft function has improved significantly in all 3 pancreas transplantation categories.

Pancreas Transplant Alone (PTA)

Pancreas transplantation alone is controversial.[11] PTA is more controversial than SPK and PAK, because it requires the recipient to receive immunosuppression that may have been unnecessary otherwise.[57] SPK and PAK recipients would be committed to lifelong immunosuppression following their kidney transplant. Pancreas transplant alone is rarely conducted[6] and is recommended to be considered in only those patients whose risks for life-threatening complications due to labile glycemic control appear to exceed the risks associated with immunosuppression and surgery.[16,17] High mortality rates (47%) have been reported after 4 years on the waiting list for SPK candidates.[15] A PTA in appropriate candidates can prevent waiting for a limited deceased donor kidney graft prior to developing end-stage renal nephropathy.[15] Literature also indicates PTA has a more rapid deterioration in glomerluar filtration rate than does treatment with an intensified insulin regimen, and has shown to be an independent risk factor for renal failure in retrospective studies.[17,25]

Evidence from transplant registries exist of increased graft and patient survival, and reduction of complications.[28] According to the OPTN/SRTR 2010 data report [103] patient survival for PTA at one-year is 96.9%, at 5-years 89.7% and 10-years 77.6%.

No randomized-control trials comparing pancreas transplantation and intensive insulin therapy have been performed as practical and ethical considerations will prevent a trial of this nature to be conducted.[14] Several studies have addressed the effects of pancreas transplantation on patient survival and the end-organ complications of diabetes mellitus. The majority of these studies have focused on SPK transplantation in patients with type I mellitus and existing end-stage renal disease (ESRD). Relatively few studies exist regarding the efficacy and outcomes of pancreas transplantation alone.

One large retrospective observational cohort study of 11,572 patients with diabetes mellitus on waiting list for pancreas transplantation at 124 US transplant centers was conducted to determine the association between solitary pancreas transplantation and survival in patients with diabetes and preserved kidney function.[11] Overall survival was reported to be worse in the transplanted patients compared with patients on the waiting list. After 1 year, all-cause mortality was 3.5% in pancreas transplants versus 2.4% on the waiting list and at 4 years 14.8% following transplant versus 7.9% on the waiting list. The data should be interpreted with caution as there

have been reports of differences between the pancreas transplant and the waiting list patients.[9] Some patients were registered more than once on the waiting lists. Eight percent of patients underwent a kidney transplant due to deteriorating kidney function and were removed from the waiting lists. These differences may have biased the study outcomes in favor of the waiting list results. A subsequent analysis that removed patients with multiple listings and extended the follow-up period identified that mortality after 4 years for solitary transplant recipients as equivalent to patients on the waiting list.[13]

It is difficult to assess the effects of pancreas transplantation on secondary diabetic complications as there are no randomized-control trials or long term direct comparison studies regarding effects compared with those of insulin therapy.[18] Improved glucose control reduced the long term complications of insulin-dependent diabetes in the Diabetes Control and Complications Trial.[19] Pancreas transplantation can restore normoglycemia[1] and it has been reported that similar benefits in reducing complications of hyperglycemia may be established if side effects such as nephrotoxicity from immunosuppressive regimens are minimized.[14] There are limited studies on the effects of solitary pancreas transplantation on quality of life and other diabetic complications such as retinopathy, vasculopathy, neuropathy, and cardiovascular disease.[9,14,17,32]

There are conflicting studies regarding normoglycemia post pancreas transplant and the prevention of renal dysfunction or the development of glomerular lesions in type 1 diabetic patients. One study failed to show improvement in renal dysfunction following PTA at five year follow-up.[20] This was attributed to the adverse effects of cyclosporine use post surgery. A second study examined the relationship of cyclosporine dose and blood levels with changes in renal function.[21] The results showed a decrease in creatinine clearance after 5 years in post PTA patients that correlated with cysclosporine blood levels and dose. Kidney function did not change appreciable in diabetic controls. The researchers concluded pancreas transplantation does not improve kidney function and may contribute to a significant decrease in creatinine clearance within five tears post transplantation. The short follow-up was thought to have impacted the study. The same researchers performed a 10 year study to address this limitation.[22] The creatinine clearance significantly declined at five years but stabilized thereafter. Examination of kidney tissue revealed that the thickness of the tubular and glomerular basement membranes were similar at five years but decreased by ten years. It was concluded that pancreas transplantation can reverse the lesion soft diabetic nephropathy but more than five years of normoglycemia is required for the reversal to occur. The initial decline of kidney function following pancreas transplantation alone is most likely related to the untoward effects of calcineurin inhibitors.[24] A higher creatinine clearance and less albuminuria is found at ten years post PTA. It is recommended to conduct a cyclosporine or tacrolimus challenge test pretransplant to pancreas alone candidates to determine the degree of kidney injury induced by the calcineurin inhibitor when deciding whether to proceed with pancreas transplant alone, simultaneous kidney-pancreas, or kidney transplant alone, followed by subsequent pancreas transplantation.[24]

A prospective controlled comparative study of 62 PTA with portal enteral drainage patients versus not-treated patients was conducted to determine whether long lasting normoglycemia in PTA patients would provide benefit to diabetic nephropathy.[26,29] The inclusion criteria included presence of 2 or more overt diabetes complications and/or glucose hyperlability with hypoglycemic unawareness and impaired quality of life. At 1 year following transplantation, the results showed statistically significant improvements in the transplanted group such as reduction of glycosylated hemoglobin and C-peptide ($p<0.01$), total cholesterol, LDL levels, and decreased urinary protein ($p<0.05$), blood pressure were lower in the treated group at 1 year ($p<0.02$); 4

microalbuminuric and 3 low-grade macroalbuminuric patients became normoalbumeric. There were 9 normoalbuminuric patients in the control group that were microalbuminuric at the 1 year follow-up. Antihypertensive treatment was no longer required in 7 patients. Study limitations included short term follow-up and no disclosure of the number of patients that were available for the follow-up.

A small study examined the renal function of 23 PTA recipients managed by bladder drainage.[30] In these recipients, the mean iothalamate clearance decreased from 84 ± 33 ml/min/1.73m^2 pretransplant to 52 ± 26 ml/min/1.73m^2 at 1 year (a 38% decrease; P < 0.001). One patient developed renal failure in the first year after transplant required kidney transplantation. A larger study of 45 successful transplant recipients of patients receiving both bladder and enteric exocrine drainage reported similar findings.[31] These patients experienced an average reduction in measured creatinine clearance of 29%. The decline in renal function was more pronounced in those recipients with a pretransplant creatinine clearance of up to 70ml/min. A more recent retrospective review identified similar results. PTA patients experienced overall significantly greater rates of decline over time. Glomerular filtration rate in PTA patients decreased from 78 ± 19 (40 to 114) mL/min/1.73 m2 at baseline to 65 ± 20 at 1 year (*P* = .006), while serum creatinine increased from 1.03 ± 0.25 mg/dL to 1.28 ± 0.43 over the same time period (*P* = .012).[33]

Simultaneous Pancreas and Kidney (SPK)

It has been well established that kidney transplant compared with dialysis patients is able to increase survival in uremic diabetic patients. Following UNOS database analysis over many years, a large number of patients demonstrated high long-term survival rates following SPK transplantation and comparisons provide evidence of substantial benefit compared with continued insulin treatment.[35] This included six institution specific studies in Europe with 544 patients.[36-41]. An assessment of the actual impact of SPK transplantation on patient survival was conducted by comparing SPK recipients with patients eligible for SPK but remain on a waiting list.[13] This mortality study of 12,478 patients found little difference after 1-year, the 4-year survival was 90.3% for SPK recipients and only 58.7% for waiting list patients. A multivariate analysis showed that SPK recipients were only 20% as likely to die as were wait-list patients during the study period and only 4% as likely to die beyond 1 year. Survival rates after 7 years were calculated at 75% for SPK recipients and only 37% for SPK transplant-eligible on the wait list, these results were statistically significant.[36] The most recent reported survival rates remain high at 1-year 95.1%, 5- years 86.6%, and at 10 years 69.9%.[28] The current graft survival rates are 92.8% after 1 year, 78.9% at 5-years, and 56.6% after 10-years. Various comparison studies have shown SPK transplantation as more beneficial to diabetic uremic patients than kidney transplant alone (KTA).[51,52] Two prospective comparison studies[42,43] and nine retrospective analysis showed better long-term survival in SPK.[34,36,44-50]

There is a four times greater risk of one-year mortality (20 percent) in SPK and PAK recipients in diabetics with cardiac risk factors (e.g., prior myocardial infarction, coronary bypass or percutaneous coronary angioplasty) than diabetic patients without these risk factors.[16] Pretransplant cardiac risk evaluation is recommended in patients with underlying coronary heart disease. This includes echocardiogram and a dipyridamole thallium rest and exercise isotope ventriculogram.

A comparison study evaluated the impact of SPK transplant on kidney graft survival in patients with type 1 diabetes.[34] The study included 7,448 SPK wait list recipients to 865 recipients of a kidney alone (KA) transplant. SPK recipients had fewer kidney graft failures (15% versus 34.0%, p <0.001). Kidney graft failure or patient death occurred in 23% of SPK recipients compared with 43% in the KA group (p<0.001).

There are several available studies that suggest secondary complications associated with diabetic patients improve following SPK.[36] Serum HbA1c levels were lower for SPK transplant recipients compared with kidney transplant alone after 3 and 6 years. However, baseline values were lower in the SPK group. Two studies reported fewer post transplant cardiovascular events.[36,43] Acute pulmonary edema and acute myocardial infarction were less common in SPK when compared with KTA. (e.g., pulmonary edema 1 % SPK and KTA 24%; myocardial infarction 2% SPK and KTA18%).[36] At a two year follow-up, 80% of KTA patients had hypertension versus 58% of SPK patients. A prospective study identified an increased prevalence of vascular diseases after a mean 10 years in KTA compared with SPK patients (coronary vascular disease were 80% KTA versus 41% SPK; peripheral vascular disease were 80% KTA versus 50% SPK; and coronary heart disease were 90% KTA versus 50% SPK).[43]

One study demonstrated that approximately 40% of the patients undergoing SPK have an improvement of the coronary atherosclerotic lesions which was correlated with survival improvement.[53] Coronary angiography was performed in 26 functioning pancreas transplanted patients and six nonfunctioning transplanted patients. At 4-year follow-up 38% of the patients with functioning graft showed a regression of atherosclerosis. No signs of regression were noted in the nonfunctioning graft group.

One study suggested slightly better pulmonary function in patients that underwent SPK transplantation compared to those on a wait list.[54] SPK compared with KTA has been associated with better phosphate metabolism and a higher ATP/Pi ratio (related to prolonged kidney graft survival. ATP/Pi ratio evaluated through 31P-RM was also correlated to HbA1c levels, suggesting a significant effect of glycometabolic control on kidney graft function.[55]

There have been many quality of life studies that have reported recipients of successful pancreas transplants enjoyed improved quality of life when compared with KTA recipients.[47,49,56] In a prospective, SPK patients had better results with respect to diabetes related and physical health quality of life.[42] Post transplant employment rates after three years were 63% for SPK recipients versus 46%in KTA recipients.

According to the OPTN/SRTR 2010 data report [103] the patient survival for SPK at three months is 98%, at 1-year 96.2% and 5-years 87.8% and at 10-years 72%.

Pancreas after Kidney Transplantation (PAK)

There is minimal comparative data available for PAK transplantation.[14] The reported benefits of PAK compared with SPK include a decreased waiting time and the option of transplanting a kidney from a living donor with correction of uremia.[18,58] It has been reported that at least 50% of candidates on the list for SPK die waiting for more than 4 years.[13,17] SPK from a deceased donor has not proven to show a survival advantage compared with kidney transplant alone from a living donor.[46,59] A pancreas transplanted after a kidney transplant (from a living donor) has been reported to potentially lead to a better outcome than SPK due to the high mortality rate

while waiting for two organs to transplant.[13,17] Recipients of a PAK generally do well as the uremia resolves and their general health improves.[60]

One retrospective study of over 11, 000 diabetics on the wait list between 1995 to 2000 was evaluated for mortality among PAK, PTA and SPK compared with patients on the waiting list for the same procedures.[11] At four years, the overall relative risk of all-cause mortality was significantly higher for those undergoing PAK versus those on the wait list (RR of 1.42, 95% CI 1.03-1.94). The one year survival rate was also relatively lower (95 versus 97 percent) for PAK and PTA. There were concerns regarding the duplication of patients on more than one list and counted more than once. This could have attributed to biased data toward the wait list patients.[32]

A study of 2942 diabetics wait-listed for PAK assessed 2942 diabetics.[13] There was little difference in survival rates at 1 year between PAK and PAK eligible recipients on the wait-list. Four year survival was higher in those who underwent PAK transplant after using univariate analysis (88 versus 82 percent).[13] Mortality was not increased after multivariate analysis, suggesting that survival after PAK is similar to that observed with wait-listed patients. The risk of death was 4.63 as high as wait-list patients during the first 90 days following PAK transplant. It was approximately the same between the 90 day and 1-year timeframe as the wait list patient group. PAK transplant recipients were only 18% as likely to die as patients on the wait-list. Patients after 1-year PAK transplant have a much lower risk of mortality compared with those on the wait list after one year. The most current UNOS data suggest patient survival rates to be 97.4% at 1-year, 84.1% at 5 years, and 65.3% at 10 years.[28]

In three institutional studies there were no differences between PAK and SPK or PAK and PTA in pancreas graft or patient survival.[60,62,63] Chronic rejection rate was less likely following SPK. SPK showed greater post-transplant morbidity than PAK procedures. Survival rates of cadaver kidney grafts did not differ between PAK and SPK.

A recent study evaluated the impact of PAK versus KTA on long-term graft survival concluded that subsequent transplant of a pancreas after living donor kidney transplant did not adversely affect patient or kidney graft survival rates and it was associated with better long-term kidney graft function.[64] Kidney graft survival rates were similar in PAK versus KTA eligible group at one, five and 10 years post transplant : 98%, 82%, and 67% (PAK) versus 100%, 84%, and 62% (KTA-E) p=0.9). The greater than four year estimated glomerular filtration rate (GFR) was higher in the PAK group (p=0.016). The patient survival rates were also similar.

Current pancreas allograft survival PAK has shown to improve in recent years due to newer immunosuppression regimens resulting in decreased immunologic graft loss.[65] PAK kidney allograft loss has been shown to be strongly associated with pre transplant impaired renal function, proteinuria as well as other post transplant treatment processes.[66] Pancreas graft survival was noted to be similar among PAK-69%, SPK-72% and PTA-72% in a review of 914 pancreas transplant procedures.[62] Graft failure among PAK or PTA, solitary transplant recipients was most likely due to chronic rejection. Graft failure in SPK patients resulted from death with failure or technical failure. Multivariate analysis indicated solitary transplant is three times as likely to result on chronic rejection compared with SPK recipients. The increased risk of chronic rejection there is no kidney graft to serve as a surrogate marker.[9] Therefore, it is more difficult to diagnose pancreas rejection

in PAK or PTA patients which may partially account for the lower graft survival rates compared with those of SPK.[9,57] There are conflicting studies showing greater differences in pancreas survival when comparing SPK(74%) to PAK (62%).[60] The difference was not found to be significant. In a small study of 64 patients SPK had a lower graft survival rate of 76% compared with PAK at 80%.[62] Differences were not tested significantly.

Kidney graft survival was shown to be improved by PAK (n=232) transplantation when compared with kidney transplantation recipients (n=235).[58] One year graft survival was 100% from the time of kidney transplantation and 94% from the time of the PAK procedure and 86 in the KTA group. The results were statistically significant.

One study with 204 PAK recipients provided evidence of quality of life following transplantation.[61] Quality of life measures (e.g., life satisfaction, management of life, status of health, and health satisfaction) were significantly increased. A mean increase of 3.7 points out of 20 was observed on the Karnofsky Performance Index at 1 year post-transplant in patients without graft loss. The improvement was noted at two years. There was a high number of loss to follow-up.

Pancreas Islet Cell Transplantation- (PICT)

Transplantation of pancreatic islet cells is considered an experimental therapy for patients with type 1 diabetes, and is conducted under an Investigational New Drug (IND) application.[8,9,68] There is lack of long-term follow-up and multiple donor grafts are required for one recipient.[69] Results of the Edmonton Protocol published in the year 2000 sparked a renewed interest in clinical transplantation of allogeneic islets, triggering a large number of IND applications for phase I clinical trials.[67] Promising results reported by a number of centers since then prompted the Food and Drug Administration (FDA) to consider the possibility of licensing allogeneic islets as a therapeutic treatment for patients with type 1 diabetes.[67] However, prior to licensure, issues such as safety, purity, efficacy, and potency of the islet product must be addressed. This is complicated by the intricate nature of pancreatic islets and limited characterization prior to transplantation.

Retransplantations

There is paucity of data for retransplantation procedures as this area has not been studied extensively.[75] The studies that have been conducted all contain small sample sizes and are mainly retrospective studies. The medical literature suggests in some patients, a retransplant could improve health outcomes after graft loss, although there is insufficient data regarding health outcomes associated with third and subsequent pancreas transplants to allow strong conclusions. The International Register of Pancreas Transplantation (PTR) reported graft survival rates after retransplantation for all categories of pancreas transplantation 69% versus 84% for SPK, 73% versus 78% for PAK, and 77% versus 78% for PTA.[81] This lower rate is attributed to technical loss (19% in the PRT versus 9% in primary pancreas transplant. According to the registry, there was no significant difference in graft survival rates for all types of pancreas retransplant between 1999 and 2003.

Technical failure continues to be a major cause of morbidity and graft loss.[73] Technical failure is defined by the International Pancreas Transplant registry as graft loss secondary to vascular thrombosis, bleeding, anastomotic leaks or infection/pancreatitis and is responsible for more than 50% of all pancreas grafts lost in the first 6 months following transplantation.[74] Thrombosis accounts for more than one-half of these technical failures, and

may be influenced by donor and recipient factors, preservation and ischemic injury, immunological issues and surgical technique. Retransplanting the pancreas following allograft pancreatectomy offers the possibility of regaining the benefits of a functional allograft.

There is conflicting data regarding immediate retransplantation and patient survival. One older study indicates similar graft and patient survival as primary transplants.[78] A more recent study identified a higher incidence of post-operative complications and rejection leading to premature loss of the second graft.[75] Graft survival has been reported as lower due to a higher incidence of early graft loss from surgical complications as well as a twofold increase in early and late graft loss due to acute and chronic rejection compared with primary grafts for all types: SPK, PTA and PAK.[79] Timing of the second transplantation influenced long-term results.[75] Three of five patients out of 6 that received an early second pancreas transplant graft (<2 weeks) without modified, immunosuppressive therapy had repeated acute rejection episodes refractory to treatment. One of the four resulted in postoperative death (pulmonary embolism) as a result of the same complication as in the first procedure, and one patient lost the second graft to an enteric anastomatic leak.[75] The two retransplanted patients that received their second graft between 6 and 11 months and underwent reinduction therapy continued to have good graft function and were free of rejection episodes.

Another study evaluating nine immediate pancreas retransplantations between 1 and 16 days (mean 6.7 days) from the date of the original transplant.[77] The failed pancreas was removed at the time of retransplant in three cases. The graft was removed in a separate operation prior to retransplantation in three cases. One graft was lost to thrombosis 8 days after retransplant, this recipient had a heparin-induced thrombocytopenia complication. A second patient expired 2.9 years following retransplant. The remaining seven patients retained graft function for mean 698 days ranging from 228-1237 days of follow-up. The late retransplantation group contained 10 patients. Four had major surgical complications (e.g., one enteric leak, one retroperitoneal hematoma. One pancreatic fistula and one ischemic intestine.

Twenty pancreas retransplantations were performed following 285 pancreas transplants.[80] The type of pancreas transplants were reported as : 14 SPK, 3 PAK, and 3 PTA. Primary graft loss was attributed to thrombosis in 11 patients, 4 chronic rejections and 2 ischemic/reperfusion injuries, 1 primary nonfunction, 1 severe graft pancreatitis, and 1 sepsis. There was one reported venous thrombosis surgical complication, and one death from sepsis, 2 grafts were lost to thrombosis, and one chronic rejection following retransplantation. The mean follow-up was 24 months . One year patient and graft survival was reported at 95% and 85%. The authors concluded that retransplantation rates were comparable to primary transplant survival and graft survival rates.

A total of 33 pancreas transplants (17%) in 30 patients were performed after previous transplant. The mean interval between transplants was 3.9 years.[76] At the time of retransplantation, 16 patients had concomitant procedures. Venous extension grafts were used in 10 patients. The incidences of rejection, infection, and operative complications were 61%, 67%, and 45%, respectively. Patient survival was 90%, kidney graft survival was 82%, and pancreas graft survival was 61 % after a mean follow-up of 29 months. Complete rehabilitation was achieved in 73% of cases.

Professional Organizations

An American Diabetes Association (ADA) position statement adopted in 2004 and updated in 2006 [104] recommends that pancreas transplantation be performed in tertiary care centers that have an active kidney transplant program and are equipped to adequately handle the long-term, complex, medical and psychological needs of transplant recipients.[72] Included in the position statement are three recommendations regarding pancreas transplantation in patients with type 1 diabetes:

- Pancreas transplantation should be considered an acceptable therapeutic alternative to continued insulin therapy in diabetic patients with imminent or established end-stage renal disease who have had or plan to have a kidney transplant since the successful addition of a pancreas does not jeopardize patient survival, may improve kidney survival, and will restore normoglycemia. Such patients also must meet the medical indications and criteria for kidney transplantation and not have excessive surgical risk for the dual transplant procedure.

- In the absence of indications for kidney transplantation, PTA should only be considered a therapy in patients who exhibit these three criteria: (1) a history of frequent, acute, and severe metabolic complications (e.g., hypoglycemia, hyperglycemia, ketoacidosis) requiring medical attention; (2) clinical and emotional problems with exogenous insulin therapy that are so severe as to be incapacitating; and (3) consistent failure of insulin-based management to prevent acute complications. The program guidelines for ensuring an objective multidisciplinary evaluation of the patients' condition and eligibility for transplantation should be established and followed. Third-party payer coverage is appropriate only where such guidelines and procedures exist.

- Islet cell transplant holds significant potential advantages over whole-gland transplants. Recent strides have been made in improving the success rates of this procedure. However, at this time, islet transplantation is a rapidly evolving technology that also requires systemic immunosuppression and should be performed only within the setting of controlled research studies.

The 2006 ADA guidelines for islet transplantation recommend that this procedure be performed only within the context of a controlled research study.[72] There have been no updates to this guideline since 2006.

The Clinical Practice Committee of the American Society of Transplantation [102] proposed that the presence of AIDS could be considered a contraindication to kidney transplant unless the following criteria were present. These criteria may be extrapolated to other solid organs:

- CD4 count >200 cells/mm-3 for >6 months
- HIV-1 RNA undetectable
- On stable anti-retroviral therapy >3 months
- No other complications from AIDS (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidioses mycosis, resistant fungal infections, Kaposi's sarcoma, or other neoplasm)
- Meeting all other criteria for transplantation

CODING INFORMATION

CPT	Description COVERED
48160	Pancreatectomy, total or subtotal, with autologous transplantation of pancreas or (pancreatic islet cells-Not Covered)
48550	Donor pancreatectomy (including cold preservation), with or without duodenal segment for transplantation
48554	Transplantation of pancreatic allograft
48556	Removal of transplanted pancreatic allograft
50300	Donor nephrectomy (including cold preservation); from cadaver donor, unilateral or bilateral
50320	Donor nephrectomy (including cold preservation); open, from living donor
50340	Recipient nephrectomy (separate procedure)
50360	Renal allotransplantation, implantation of graft; without recipient nephrectomy
50365	Renal allotransplantation, implantation of graft; with recipient nephrectomy
50370	Removal of transplanted renal allograft
50380	Renal autotransplantation, reimplantation of kidney

HCPCS	Description-COVERED
S2065	Simultaneous pancreas kidney transplantation (COVERED)
S2102	Islet cell tissue transplant from pancreas; allogeneic (NOT COVERED)
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 post transplant care in the global definition

ICD-9	Description HOSPITAL PROCEDURE CODES--COVERED
52.80	Pancreatic transplant, not otherwise specified
52.82	Homotransplant of pancreas
55.69	Other kidney transplantation (Use in conjunction with 52.80 or 52.83)

ICD-9	Description DIAGNOSIS CODES----COVERED
	Type 1 Diabetes, uncontrolled-only

250.03	Diabetes mellitus without mention of complication, type I [juvenile type], uncontrolled
250.13	Diabetes with ketoacidosis, type I [juvenile type], uncontrolled
250.23	Diabetes with hyperosmolarity, type I [juvenile type], uncontrolled
250.33	Diabetes with other coma, type I [juvenile type], uncontrolled
250.43	Diabetes with renal manifestations, type I [juvenile type], uncontrolled
250.53	Diabetes with ophthalmic manifestations, type I [juvenile type], uncontrolled
250.63	Diabetes with neurological manifestations, type I [juvenile type], uncontrolled
250.73	Diabetes with peripheral circulatory disorders, type I [juvenile type], uncontrolled
250.83	Diabetes with other specified manifestations, type I [juvenile type], uncontrolled
250.93	Diabetes with unspecified complication, type I [juvenile type], uncontrolled
585.5	Chronic kidney disease, Stage V SPK transplant
585.6	End stage renal disease SPK transplant
585.9	Renal insufficiency with uremia SPK transplant
V45.11	Renal Dialysis-current SPK transplant
	DIAGNOSES MAY NOT BE COVERED (Refer to policy, may need MD documentation)
001.0-139.8	Infectious and parasitic diseases –(ongoing, recurring infections)
079.51	Human T-cell lymphotrophic virus, type I [HTLV-I] --indicating leukemia or lymphoma
140.0-208.92	Malignant neoplasms (non curable) excluding localized skin malignancy . No history of melanoma within 2-5 years depending on malignancy type.
230.0-234.9	Carcinoma in situ, (non curable)
278.00	Obesity, unspecified
278.01	Morbid obesity
294.8	Dementia
298.9	Psychosis (active)
300.9	Suicidal tendencies/risk
303.00-305.93	Alcohol,drug and tobacco abuse-current use
318.1	Severe mental retardation
393-429.9	Cardiac disease-severe and non-correctable
401.0-401.9	Essential hypertension (stated uncontrolled)
430-438.9	Cerebrovasculr disease (with severe irreversible neurologic impairment)
440.20-440.9	Atherosclerosis of the extremities
441.4	Abdominal aortic aneurysm uncorrected
443.81-443.9	Other and unspecified peripheral vascular disease
496	Chronic obstructive lung disease
518.89	Lung disease (chronic)
533.00-533.91	Peptic uler (active)
536.3	Gastroparesis/poor gastric emptying
571.0-571.9	Chronic liver disease and cirrhosis
578.0-578.9	GI Bleed

599.0-599.9	Other disorders of urethra and urinary tract (recurrent urinary tract infections or structural genitourinary abnormality)
707.00-707.9	Chronic ulcer of skin, non healing
	DIAGNOSES MAY NOT BE COVERED
710.0	Systemic lupus erythematosus
733.00-733.09	Osteoporosis (T score greater or equal to 2.5)
752.0-753.9	Congenital anomalies of the genital organs and urinary system (structural genitourinary abnormality)
995.91	Sepsis
V08	HIV infection (uncontrolled)
V11.0-V11.9	Personal history of mental disorder (major chronic psychiatric or psychosocial history likely to result in non compliance
V15.81	Noncompliance with medical treatment
V85.30-V85.4	Body Mass Index 30.0 and over, adult

ICD-10 PCS	**Description PROCEDURE CODES----COVERED**
0FYG0Z0	Transplantation pancreas allogeneic open approach
0FYG0Z1	Transplantation pancreas syngeneic open approach
0FYG0Z2	Transplantation pancreas zooplastic open approach
0TY00Z0	Transpl rt kidney allogeneic open approach
0TY00Z1	Transpl rt kidney syngeneic open approach
0TY00Z2	Transpl rt kidney zooplastic open approach
0TY10Z0	Transpl lt kidney allogeneic open approach
0TY10Z1	Transpl lt kidney syngeneic open approach
0TY10Z2	Transpl lt kidney zooplastic open approach

ICD-10 CM	**Description DIAGNOSIS CODES----COVERED**
Type 1 Diabetes, uncontrolled-only:	
E10.10	Type 1 DM w/ketoacidosis w/o coma
E10.11	Type 1 DM w/ketoacidosisw/coma
E10.21	Type 1 DM w/diabetic nephropathy
E10.39	Type 1 DM w/oth diab ophthalmic comp
E10.40	Type 1 DM w/diab neuropathy unspec
E10.51	Type 1 DM w/diab periph angiopathy w/o gangrene
E10.65	Type 1 DM w/hyperglycemia
E10.69	Type 1 DM w/oth specified complication
E10.8	Type 1 DM w/unspec complications
N18.5	Chronic kidney disease Stage V
N18.6	End stage renal disease
N18.9	Chronic kidney disease unspecified
Z99.2	Dependence on renal dialysis

DIAGNOSES MAY NOT BE COVERED (Refer to policy, may need MD documentation)	
A00.0-B94.9, D86.0-D86.9, M02.30-M02.39	Infectious & parasitic diseases (ongoing, recurring infections)
A02.1-A54.86	Sepsis
B97.33	HTLV-I cause of diseases classified elsewhere
C00.0-C95.92	Malignant neoplasms (non curable) excluding localized skin malignancy. No history melanoma within 2-5 yrs depending on malignancy type
C06.9, D00.01-D09.9	Carcinoma in situ
E08.43	DM d/t underly w/diab autonomic polyneuropathy
E08.51	DM d/t underly diab periph angiopathy no gangrene
E08.52	DM d/t underly diab periph angiopathy with gangrene
E08.621	DM d/t underly cond w/foot ulcer
E08.622	DM d/t underly cond w/oth skin ulcer
E09.43	Rx/chem inducd DM neuro comp DM autonom neurpath
E09.51	Rx/chem inducd DM diab periph angopath no gangrene
E09.52	Rx/chem inducd DM diab periph angopath with gangrene
E09.621	Drug/chem induced DM w/foot uler
E09.622	Drug/chem induced DM w/oth skin ulcer
E10.43	Type 1 DM w/diab autonomic polyneuropathy
E10.51	Type 1 DM w/diab periph angiopathy w/o gangrene
E10.52	Type 1 DM w/diab periph angiopathy with gangrene
E13.43	Oth spec DM w/diab autonomic polyneuropathy
E13.51	Other spec DM w/diab periph angiopathy no gangrene
E13.52	Other spec DM w/diab periph angiopathy with gangrene
E66.01-E66.9	Obesity
F06.0	Psychotic d/o w/hallucination due to physio cond
F06.1	Catatonic d/o due known physiological condition
F06.8	Oth spec mental d/o due to known physiological condition
F10.120-F55.8	Alcohol,drug&tobacco abuse current use
F28	Oth psychotic d/o not due substance/physiologic cond
F29	Unspec psychosis not due to substance/physiologic cond
F48.9	Nonpsychotic mental disorder unspec
F72	Severe mental retardation
F99	Mental disorder not otherwise spec
I05.0-I52	Cardiac disease-severe and noncorrectable
401.0-401.9	Hypertension
I60.00-I69.998	Cerebrovascular disease
I70.0-I70.91	Atherosclerosis of the extremities
I70.231-	Atherscler nat art leg w/ulcer (right or left)

I70.249	
I70.25	Athscl nat art oth ext w/ulceration
I70.331-I70.35	Atheroscler uns type bp gft w/ulcer (right and left leg: thigh, calf, ankle, midfoot, oth prt foot, other prt leg, other ext)
I70.431-I70.45	Atheroscler autol vein bp gft leg w/ulcer (right and left leg: thigh, calf, ankle, midfoot, oth prt foot, other prt leg, other ext)
I70.531-I70.55	Atheroscler nonautol bio bp gft leg w/ulcer (right and left leg: thigh, calf, ankle, midfoot, oth prt foot, other prt leg, other ext)
I70.631-I70.65	Atheroscler nonbiol bp gft leg w/ulcer (right and left leg: thigh, calf, ankle, midfoot, oth prt foot, other prt leg, other ext)
I70.731-I70.75	Atheroscler oth type bp gft leg w/ulcer
I71.4	Abdominal aortic aneurysm w/o rupture
I73.81	Erythromelalgia
I73.89	Other spec peripheral vascular diseases
I73.9	Peripheral vascular disease unspecified
I79.1	Aortitis in diseases classified elsewhere
I79.8	Oth d/o art arteriols & capilares in dz class elsw
J44.9	Chronic obstructive pulmonary disease uns
J98.4	Other disorders of lung
K27.0-K27.9	Peptic ulcer
K31.89	Other diseases stomach & duodenum
K70.0-K70.9	Alcoholic liver disease with and w/o complications
K73.0-K76.9	Hepatic -liver disease
K92.0	Hematemesis
K92.1	Melena
K92.2	Gastrointestinal hemorrhage unspecified
L89.000-L89.95	Pressure Ulcers
L97.101-L98.499	Non-prss chrn ulcr
M32.0-M32.9	Systemic lupus erythematosus 9with and w/o complications)
M81.0	Age-related osteopor w/o current path fx
M81.6	Localized osteoporo lequesne
M81.8	Oth osteopor w/o current path fx
N13.9	Obstructive & reflux uropathy unspec
N36.0	Urethral fistula
N36.1	Urethral diverticulum
N36.2	Urethral caruncle
N36.41	Hypermobility of urethra
N36.42	Intrinsic sphincter deficiency
N36.43	Comb hypermobility urethra & intrin sphnctr defic
N36.8	Other specified disorders of urethra
N36.9	Urethral disorder unspecified

N39.0	Urinary tract infection site not specified
N39.8	Other spec disorders of urinary system
N39.9	Disorder of urinary system unspecified
Q50.01-Q64.9	Congenital anomalies genital organs and urinary system (structural gen abnormal)
R31.0	Gross hematuria
R31.1	Benign essential microscopic hematuria
R31.2	Other microscopic hematuria
R31.9	Hematuria unspecified
R45.5	Hostility
R45.6	Violent behavior
Z21	Asymptomatic HIV infection status
Z65.8	Oth spec probs rel psychosocial circumstan
Z68.30-Z68.45	Obesity
Z86.51	Personal hx combat and operational stress reaction
Z86.59	Personal hx other mental & behavioral disorders
Z91.11	Patients noncompliance with dietary regimen
Z91.120	Intenional ud med regimen-financial hardship
Z91.128	Patients intentional undrdos med regimen other rsn
Z91.130	PT unintentional ud med regimen-age-rel debility
Z91.138	PT unintentional underdosing med regimen oth reason
Z91.14	PT other noncompliance w/med regimen
Z91.19	PT noncompliance w/oth med tx & regimen

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