

**Materials for this course will release 07/13/2022**

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**Solid Organ Transplantation Pharmacy Specialty Review Course and Practice Exam (No Recert Credit  
(Cert # L229238)**

**Teaser:** This online Specialty Review Course and Practice Exam package will help you prepare for the Board of Pharmacy Specialty (BPS) examination. With this course, get comprehensive, practical guidance, with a variety of complex cases, including references for further study.

**Tag:** Certifications; solid organ transplantation

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**ACPE Numbers:** Various – see listing below

**Pre-Sale Date:** 06/08/2022

**Content Release Date:** 07/13/2022

**Expiration Date:** 06/13/2023

**Activity Type:** Application-based

**CE Credits:** 22 contact hours (ACPE only)

**Activity Fee:** \$425 (ASHP member); \$625 (non-member)

**Accreditation for Pharmacists**



The American College of Clinical Pharmacy (ACCP) and American Society of Health-System Pharmacists (ASHP) is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

**Target Audience**

These activities are intended for pharmacists who are seeking to update their knowledge and skills commensurate with a board certification examination in the areas listed below.

**Activity Overview**

This online course provides a robust preparatory curriculum for the pharmacy professional preparing for the Board of Pharmacy Specialties (BPS) Solid Organ Transplantation Specialty Certification Examination. Designed based on the domains, tasks, and knowledge statements developed by the BPS for the certification examination, this course will help you prepare for the exam by identifying areas needed for in-depth review of solid organ transplantation issues by:

- Reviewing pertinent clinical topics and practice skills
- Providing exam practice questions
- Listing valuable references for further study

These activities are part of the ACCP and ASHP professional development program.

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**REVIEW COURSE**

This course consists of 17 activities (see table below) and provides up to 22 contact hours of continuing pharmacy education credit. The Review Course includes case-based presentations for application to real-life scenarios, a practice exam along with correct answers, and links to the reference sources, and domains, tasks, and knowledge statements. To help you further prepare, this package includes a compilation of practice questions in the same format and rigor to help you prepare for the BPS Specialty Examination.

Learning Activity	ACPE Number	Contact Hours	ACPE Expiration Date
Transplant Immunology	TBD	1.25	07/13/2025
Induction and Management of Acute Cellular Rejection	TBD	1.0	
Maintenance of Immunosuppression Part One	TBD	1.5	
Kidney Transplantation	TBD	1.0	
Liver Transplantation	TBD	1.0	
Pancreas and Islet Cell Transplantation and Intestinal Transplantation	TBD	1.0	
Heart Transplantation	TBD	1.0	
Lung Transplantation	TBD	1.0	
Maintenance of Immunosuppression Part Two	TBD	2.0	
Infection Prevention and Management in Solid Organ Transplant Patients	TBD	1.25	
Prevention and Management of Malignancy in Solid Organ Transplant Patients	TBD	1.0	
Primary Care of the Solid Organ Transplant Patient	TBD	1.0	
Special Considerations in Pediatric and Geriatric Transplant Populations	TBD	2.0	
Trial Design and Biostatistics	TBD	2.5	
Continuity of Care and Managing Transitions of Care in the Transplant Patient	TBD	1.25	
Transplant Regulations and Performance Improvement	TBD	1.25	
Transplant Resources, Patient Education and Transplant Study Endpoints	TBD	1.0	

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### Learning Objectives

After participating in these CPE activities, learners should be able to:

#### Transplant Immunology

ACPE #: TBD

- Differentiate between components of innate and adaptive immunity.
- Review lymphocyte activation, differentiation and effect mechanisms.
- Discuss pathways of allorecognition, transplant rejection and injury.
- Assess immunologic risk of rejection.
- Describe pathways to immunologic tolerance of allograft.

#### Induction and Management of Acute Cellular Rejection

ACPE #: TBD

- Outline the principles of induction immunosuppression and how these agents can be used for different organs.
- Compare and contrast the available induction agents; specifically focusing on mechanism of action, ease of administration, adverse events and economic impact.
- Evaluate the efficacy of induction therapy among the different organs.
- Design an evidence-based induction regimen centered on donor, recipient and transplant characteristics.
- Compare and contrast the agents available for the treatment of acute cellular rejection.
- Assess the optimal therapeutic options for management of acute cellular rejection.

#### Maintenance of Immunosuppression Part One

ACPE #: TBD

- Differentiate between the pharmacokinetic profiles of immunosuppressive medication formulations utilized in solid organ transplantation.
- Select the appropriate method for therapeutic drug monitoring of immunosuppressive medications.
- Design an initial immunosuppression regimen for a solid organ transplant recipient utilizing a patient's pharmacogenomic data.
- Revise an immunosuppression regimen for a solid organ transplant recipient based on the presence of pertinent drug-drug interactions.
- Assess patient-specific data to identify immunosuppression-related adverse effects.
- Design an appropriate monitoring plan for immunosuppressive medications.

#### Kidney Transplantation

ACPE #: TBD

- Evaluate effects of nonadherence on long-term allograft survival.
- Assess non-pharmacologic and pharmacologic risks of patients undergoing kidney transplant evaluation.
- Distinguish between absolute and relative contraindications to kidney transplant.
- Differentiate pathophysiology of and design management strategies for allograft specific complications.
- Design modifications to therapy that account for patient-specific factors, immunologic risk, and complications after kidney transplant.
- Assess barriers after kidney transplant and implement strategies to improve adherence.

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### **Liver Transplantation**

ACPE #: TBD

- Describe diagnoses that may lead to referral for liver transplantation.
- Identify indications and contraindications for liver transplantation.
- Create a medication regimen for a liver transplant recipient taking into account immunologic risks and comorbid conditions.
- Summarize the presentation and management of common immunologic and non-immunologic complications after liver transplantation.
- Evaluate potential causes of medication non-adherence after liver transplantation.

### **Pancreas and Islet Cell Transplantation and Intestinal Transplantation**

ACPE #: TBD

#### ***Pancreas and Islet Cell***

- Demonstrate an understanding for common complications of pancreas transplantation and develop strategies to prevent or treat these complications.
- Devise a monitoring strategy to evaluate exocrine and endocrine function after pancreas transplantation.
- Compare and contrast the advantages and disadvantages of pancreas and islet cell transplantation.

#### ***Intestinal***

- Describe the etiologies of intestinal transplantation.
- List the current trends in immunosuppression for small bowel transplantation.
- Discuss the common complications observed after small bowel transplantation.

### **Heart Transplantation**

ACPE #: TBD

- Describe common indications that may lead to heart transplantation.
- Identify pre-transplant risk factors that may impact outcomes after heart transplantation.
- Describe heart techniques for rejection surveillance.
- Understand heart specific pathologic findings.
- List and discuss heart specific post-transplant complications and strategies for management.

### **Lung Transplantation**

ACPE #: TBD

- Describe diagnoses that may lead to end-stage lung disease and referral for lung transplantation.
- Identify indications, absolute contraindications, and relative contraindications for lung transplantation.
- Formulate a medication regimen for a lung transplant recipient, taking into account immunologic risks and needs, preventative needs, and comorbid diseases.
- Explain the objective testing used to evaluate lung allograft function.
- Summarize the presentation and management of common immunologic complications after lung transplantation.
- Summarize the presentation and management of common non-immunologic complications after lung transplantation.

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### **Maintenance of Immunosuppression Part Two**

ACPE #: TBD

#### ***Kidney***

- Create an evidence-based maintenance regimen for a kidney transplant recipient that accounts for patient-specific factors.
- Evaluate the role of extended-release tacrolimus formulations and novel immunosuppression regimens.

#### ***Liver***

- Evaluate maintenance immunosuppression regimens for liver transplant recipients that account for patient-specific factors.
- Design evidence based maintenance immunosuppression regimens for liver transplant recipients.

#### ***Pancreas and Islet Cell***

- Design a maintenance immunosuppression regimen for the prevention of rejection after pancreas transplant.
- Design a maintenance immunosuppression regimen for the prevention of rejection after islet cell transplant.

#### ***Heart***

- Describe common immunosuppression approaches in heart transplantation.
- Discuss alternate approaches to immunosuppression.

#### ***Lung***

- Compare and contrast the benefit, risk, and role of each maintenance immunosuppressant medication in lung transplantation.
- Design evidence-based maintenance immunosuppression regimens for lung transplant recipients.

### **Infection Prevention and Management in Solid Organ Transplant Patients**

ACPE #: TBD

- Develop appropriate pre-transplant serologic testing recommendations and interpretation of these results.
- Identify risk factors associated with post-transplant infections and the epidemiology and timing of these infections.
- Design strategies to prevent post-transplant opportunistic infections, including prophylaxis regimens and monitoring parameters.
- Formulate treatment plans for bacterial, viral, and fungal infections in solid-organ transplant recipients.
- Develop monitoring plans for patients receiving antimicrobials, complete with management of adverse effects and intolerances.

### **Prevention and Management of Malignancy in Solid Organ Transplant Patients**

ACPE #: TBD

- Demonstrate the common pathogenesis of and risk factors for types of malignancy after solid organ transplant.
- Distinguish between the types of malignancy that are of increased risk before and after solid organ transplant.
- Assess preventative strategies for malignancy after transplantation.
- Diagram an overview of immunosuppression management in the setting of malignancy.
- Compare common treatment approaches to common malignancies after transplantation, including non-melanoma skin cancer, post-transplant lymphoproliferative disorder, and Kaposi's sarcoma.

### **Primary Care of the Solid Organ Transplant Patient**

ACPE #: TBD

- Apply general principles and practices of disease prevention to solid organ transplant recipients.
- Outline unique patient populations that require additional disease screening.
- Create an immunization plan for a solid organ transplant recipient in both the pre and post-transplant setting.
- Identify reputable resources for public education and awareness on organ transplantation including organ donation.

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### **Special Considerations in Pediatric and Geriatric Transplant Populations**

ACPE #: TBD

#### ***Pediatrics***

- Discuss practical differences of medication use in children with emphasis on pharmacokinetics, formulations, and monitoring of commonly used immunosuppressants.
- Describe the etiologic differences for organ disease and discuss associated complications after solid organ transplant in children.
- Design a pharmacotherapeutic treatment plan for pediatric patients undergoing intended ABO incompatible organ transplantation.
- Formulate an immunization plan for a pediatric organ transplant candidates.

#### ***Geriatrics***

- Compare outcomes of transplant recipients by age group.
- Evaluate geriatric candidates for transplant based on guideline recommendations.
- Distinguish pharmacokinetic differences among geriatric transplant recipients.
- Design an immunosuppression regimen for a geriatric transplant recipient.

### **Trial Design and Biostatistics**

ACPE #: TBD

- Describe hypothesis testing and state the meaning of and distinguish between p values and confidence intervals, and measures of central tendency and data spread.
- Define, compare, and contrast the concepts of internal and external validity, causation, association, bias, and confounding in trial design. Select strategies to eliminate or control for bias and improve internal and external validity.
- Compare and contrast the advantages and disadvantages of various study designs (e.g., prospective, retrospective, case-control, cohort, cross-sectional, randomized controlled clinical trials, systematic review, meta-analysis).
- Determine why a statistical test is appropriate or not appropriate, given the sample distribution, data type, and study design. Interpret statistical and clinical significance for results from commonly used statistical tests.
- Define and evaluate odds ratio, risk/incidence rate, relative risk, number needed to treat, number needed to harm, and other risk estimates.

### **Continuity of Care and Managing Transitions of Care in the Transplant Patient**

ACPE #: TBD

- Describe the role of the pharmacist in obtaining an accurate medication, allergy and immunization history and the importance of proper medication reconciliation in solid organ transplant recipients at all stages of the transplant process.
- Identify challenges in assessing readiness of a pediatric patient to transition to the adult transplant care team.
- Evaluate the unique role of a pharmacist in the transition of solid organ transplant recipients between healthcare settings as it relates to medication error reduction, cost avoidance, and hospital readmission.
- Summarize the common obstacles and potential solutions to proper medication adherence post-transplant including health literacy, cultural competence and language and sensory barriers.
- Differentiate between various medication access resources in solid organ transplant recipients.

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### **Transplant Regulations and Performance Improvement**

ACPE #: TBD

- Review regulations for solid organ transplantation (SOT) programs.
- Compose policies and procedures for SOT pharmacists that are consistent with transplant regulatory requirements.
- Identify opportunities for SOT pharmacists to participate in Quality Assessment and Performance Improvement (QAPI) activities to enhance the safety and effectiveness of medication-use process in SOT.
- Evaluate compliance with institutional SOT guidelines in order to identify areas failing to meet expectations and implement performance improvement initiatives.
- Implement processes for cost effective care focusing on continuous quality improvement, patient safety and outcomes in order to justify modifications in transplantation pharmacy services.
- Diagram involvement of SOT pharmacists in collaborative relationships with interdisciplinary transplant team to promote quality patient care across the continuum.

### **Transplant Resources, Patient Education and Transplant Study Endpoints**

ACPE #: TBD

- List key government organizations and transplant societies that influence the practice of solid organ transplantation.
- Compare practice-defining guidelines within the field of solid organ transplantation.
- Assess patients' barriers to understanding their medication regimen and adapt education strategy to foster patient competency.
- Describe appropriate monitoring strategies for transplant medications requiring REMS participation.
- Formulate an appropriate contraceptive regimen for a female transplant recipient of childbearing age.
- Evaluate patient risk factors for non-adherence and implement a plan to improve compliance.
- Review transplant study end points used in the literature to establish efficacy of clinical intervention.

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**Disclosures**

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#### **Methods and CE Requirements**

Activities can be completed in any order. Each activity consists of audio, video, and/or PDFs and evaluations. Learners must review all content and complete the evaluations to receive continuing pharmacy education credit for each activity.

Follow the prompts to claim, view, or print the statement of credit within 60 days after completing the activity.

#### **System Technical Requirements**

Courses and learning activities are delivered via your Web browser and Acrobat PDF. For all activities, you should have a basic comfort level using a computer and navigating web sites.

View the [minimum technical and system requirements](#) for learning activities.

#### **Development**

These activities were developed by ASHP.

ACCP and ASHP collaborate on solid organ transplantation activities.

*To maintain its strict, independent standards for certification, BPS does NOT endorse or provide review information, preparatory courses, or study guides for Board Certification Examinations.*