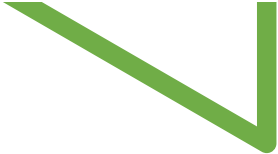


Pediatric to Adult Transition of Care After Solid Organ Transplant

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Riley Scalzo, PharmD, BCTXP



Pediatric to Adult Transitions of Care After Solid Organ Transplant



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Hospital of Wisconsin
Kids deserve the best.



Background

Definitions: Transition and Transfer

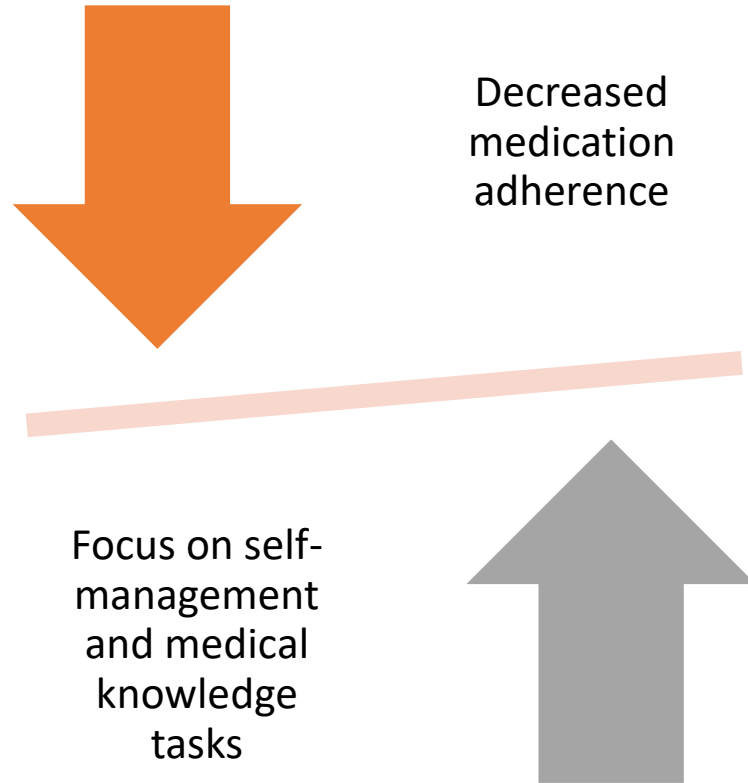
Transition continues to be a national practice and research priority

Adolescents and young adults (AYA) with functioning solid organ transplant

- 2025: 8,000 – 12,000 transplant recipients in US based on estimates from SRTR and OPTN data

AYA are at the highest risk for non-adherence across the transplant lifespan

Adolescence is recognized as a time of increased risk for poor health outcomes.



Contributing Factors to Non-Adherence

Development Stage	Psychosocial Issues	Transition Gaps	System Level Barriers
• Desire for autonomy, risk-taking, limited executive function	• Depression, anxiety, peer pressure, stigma	• Poor communication between pediatric and adult teams	• Insurance changes, decreased parental involvement



Outcomes of Poor Transition



Higher rates of
rejection and
graft loss

18-25 year
old group vs
younger
children and
older adults



Up to 25-35% of graft losses
in young adults have been
linked to non-adherence



Increased hospitalizations
and health care costs when
transition is unstructured

Guidelines and Consensus Statements

- Resources
 - AAP
 - AST
 - NASPGHAN
- Structured, developmentally appropriate, and multidisciplinary transition programs can improve:
 - Adherence
 - Continuity of care
 - Long term graft and survival

American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

Supporting the Health Care Transition From Adolescence to Adulthood in the Medical Home

Patience H. White, MD, MA, FAAP, FACP,* W. Carl Cooley, MD, FAAP,[†] TRANSITIONS CLINICAL REPORT AUTHORIZING GROUP,
AMERICAN ACADEMY OF PEDIATRICS, AMERICAN ACADEMY OF FAMILY PHYSICIANS, AMERICAN COLLEGE OF PHYSICIANS

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Wiley Periodicals Inc.

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Transplantation and the American Society of Transplant Surgeons

Meeting Report

doi: 10.1111/j.1600-6143.2008.02415.x

Adolescent Transition to Adult Care in Solid Organ Transplantation: A consensus conference report

L. E. Bell^{*,†}, S. M. Bartosh^{*,†}, C. L. Davis^{*,†},
F. Dobbels^{*,†}, A. Al-Uzri^{*,†}, D. Lotstein^{*,†}, J. Reiss^{*,†},
V. R. Dhamidharka^{*,†} on behalf of the conference
attendees

There are close to 1500 late adolescent/young adult solid organ recipients with at least 5-year graft survival in the United States alone, the majority having received a kidney (Table 1, Organ Procurement and Transplantation Network (OPTN) data as of July 11, 2008).

Original article

Building consensus on transition of transplant patients from paediatric to adult healthcare

Nicholas Webb,¹ Paul Harden,² Clive Lewis,³ Sarah Tizzard,⁴ Grainne Walsh,⁵ Jo Wray,⁶
Alan Watson⁷

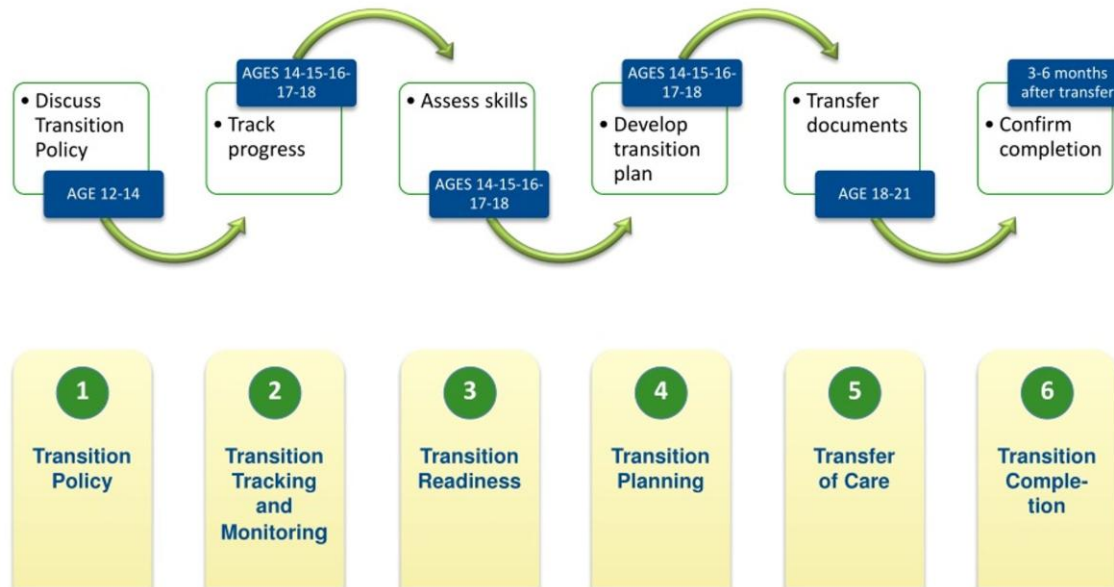
SOCIETAL PAPER: HEPATOLOGY

CME

Health Care Transition for Adolescents and Young Adults With Pediatric-Onset Liver Disease and Transplantation: A Position Paper by the North American Society of Pediatric Gastroenterology, Hepatology, and Nutrition

*Jennifer Vittorio, MD, [†]Beverly Kosmach-Park, DNP, [‡]Lindsay Y. King, MD, MPH, [§]Ryan Fischer, MD,
^{||}Emily M. Fredericks, PhD, [¶]Vicky L. Ng, MD, ^{**}Amrita Narang, MD, ^{††}Sara Rasmussen, MD,
and ^{†††}John Bucuvalas, MD

Six Core Elements of Transition



American Academy of Pediatrics

Six Core Elements framework to guide providers in building adolescents' ability to manage their own medical needs

Children's Wisconsin Resources



Children's Hospital and Health System Patient Care Policy and Procedure

This policy applies to the following entity(s):

☒ Children's Hospital and Health System

SUBJECT: Transition Planning for Youth with Special Health Care Needs (YSHCN) to Adult Health Care Setting

Table of Contents

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II. Recommended Transition Team Roles:	3
III. Goals and Objectives	3

Transition Letter

Dear {Parents/Patient}

It's time to talk transition! We are writing to inform you about our transition planning process, which will help you build skills and confidence so you can be ready to care for your transplant as an adult. Moving into adulthood can be both exciting and challenging.

At our center, preparation for transition begins for patients who are at least 12 years old and are at least one year post transplant. Starting early allows time to create a transition plan with your team which will help {NAME} become more independent throughout the next few years. This plan will be tailored to meet {NAME's} developmental needs. Our team will use various tools, such as surveys and checklists to better assess these needs

process. You can expect to meet with various members of the multidisciplinary team including the Provider, Social Worker, Dietician, Pharmacist, Psychologist, and Transplant Coordinators. We have enclosed a survey for your review. We will ask you to



Starting the Education Process



Six Core Elements framework recommends beginning at age 12



Some of the first steps focus on laying out the plan

What information do we want patient to learn?

What skills do we want them to develop?



Getting buy-in for step-wise vs immediate approach

Developmental context is important

Education Framework

Domain	Early Adolescence (12-14 years)	Middle Adolescence (14-16 years)	Late Adolescence (16-18 years)
Personal Health Knowledge	• Date of transplant • Living vs. deceased donor • Medical condition that led to transplant	• Names of key lab tests • Target ranges of labs • Reasons for drawing labs	• History of biopsies and rejection episodes • Treatments approaches for rejection episodes
Adherence and Medication Knowledge	• Names of medications • Reason for taking medications • What strategies caregivers use to support adherence	• Medication dosages • Medication side effects • Strategies patient/parent use together to support adherence	• Name of pharmacy/delivery methods for medications • Adherence strategies patient can use independently
Navigating Health Care System	• Names of care team members • Roles of care team members	• Available methods for contacting care team • Answering common questions from medical team in clinic	• Accessing medical records • Strategies for scheduling appointments/labs • Health insurance information
Health Communication	• How to give brief summary of medical condition/transplant • Emergency contact name and phone number	• How to share medical information with peers in event of emergency	• Disclosure of medical conditions to schools/employers

Personalizing the Plan



Education about health care needs builds on foundational concepts

- Knowing what “rejection” means builds motivation for learning about personal history of rejection
- Confidence in one’s own understanding of their health makes it easier to share with others

Patients will be ready for advanced topics and discussions at different times

- Age guidance should be viewed as just that – guidance

Avoid assumptions

- More time post transplant may not mean increased knowledge

Transition Documentation

Flowsheets

File Add Rows LDA Avatar Add Col Insert Col Last File

Vital Signs (Simple) Time-Out LDAs (All) Motility Checklist Bleeding

Search (Alt+Comma)

Hide All Show All

Service Area

Health Care-Medical Management

Health Care-Medication Management

Health Care-Equipment Management

Health Care-Adult Decision Making

Adult Services

Financial

Education

Employment

Transportation

Recreation

Office Visit from 9/16/2024 in Main Campus Live	
9/16/2024	
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Service Area

Service area completing assessment	Liver Transplant
Provider completing assessment	
Learner	Patient; Parent/Guardian

Health Care-Medical Management

Able to describe medical condition/disability	Patient needs help; Caregiver does now
Identifies symptoms caused by condition	Patient received information; Caregiver do...
Recognizes how illness impacts daily life	Patient does now
Knows how to access information about medical condition	Patient needs help; Caregiver does now
Manages medical condition independently at home	Patient needs help; Caregiver does now
Schedules and keeps track of medical appointments	Caregiver does now
Has list of health care providers & phone numbers	Caregiver does now
Knows how to access medical records	Caregiver does now
Initiates call to provider to report problems or give status...	Caregiver does now
Knows emergency contacts and carries phone numbers	Caregiver does now
Follows provider Plan of Care	Patient does now
Has copy of clinical summary	Caregiver received information
Understands nutrition basics	Patient does now
Understands dangers of tobacco, alcohol, drug use	Caregiver does now
Understands sexuality, pregnancy and birth control	Caregiver does now

Health Care-Medication Management

Knowledgeable of name & purpose of medications and ...	Caregiver does now; Patient needs help
Independent taking medication	Patient needs help
Fills prescriptions independently	Patient needs help
Calls for refills independently	Caregiver does now

Resources and Tools



Pediatric Transition Portal

July 24, 2019

This guide prepares adolescents and young adults (AYAs) and parents/guardians for a successful transition to adult care.

Type: [Patient Resources](#), [Pediatric](#) COP: [Pediatric](#)

- American Society of Transplantation
 - Transition Portal
 - Medical summary template
 - Education plans by age
- Standardized measures
 - Transition Readiness Assessment Questionnaire (TRAQ)
- Technology
 - Telehealth
 - Medisafe app



	No, I do not know how	No, but I want to learn	No, but I am learning to do this	Yes, I have started doing this	Yes, I always do this when I need to
Managing Medications					
1. Do you fill a prescription if you need to?					
2. Do you know what to do if you are having a bad reaction to your medications?					
3. Do you take medications correctly and on your own?					
4. Do you reorder medications before they run out?					
Appointment Keeping					
5. Do you call the doctor's office to make an appointment?					
6. Do you follow-up on any referral for tests, check-ups or labs?					
7. Do you arrange for your ride to medical appointments?					
8. Do you call the doctor about unusual changes in your health (For example: Allergic reactions)?					
9. Do you apply for health insurance if you lose your current coverage?					
10. Do you know what your health insurance covers?					
11. Do you manage your money & budget household expenses (For example: use checking/debit card)?					
Tracking Health Issues					
12. Do you fill out the medical history form, including a list of your allergies?					
13. Do you keep a calendar or list of medical and other appointments?					
14. Do you make a list of questions before the doctor's visit?					
15. Do you get financial help with school or work?					
Talking with Providers					
16. Do you tell the doctor or nurse what you are feeling?					
17. Do you answer questions that are asked by the doctor, nurse, or clinic staff?					
Managing Daily Activities					
18. Do you help plan or prepare meals/food?					
19. Do you keep home/room clean or clean-up after meals?					
20. Do you use neighborhood stores and services (For example: Grocery stores and pharmacy stores)?					

Strategies for Success

Structured transition programs

- Education, readiness assessments, gradual responsibility shift

Use of transition readiness tools

- TRAQ
- Medication specific sections

Multidisciplinary support is critical

- Nursing, psychology, social work, pharmacy

Technology shows promise in improving adherence

- Apps, text reminders, telehealth check-ins

Family involvement is key

- Gradual shift rather than abrupt withdrawal of parental support

How can a pharmacist help?

Medication Adherence in Adolescents

- Several studies have suggested that medication adherence remains a challenge for adolescents
- Should be a core component that is assessed and reviewed in the transition period, given high risk of unexpected graft loss
- Nguyen C. & colleagues surveyed 32 adolescents and young adults (AYA) complete

Medication Adherence in Adolescents

Themes	Illustrative quotes
Challenges expressed by AYAs	
Difficulty remembering to take medications on time	"It's easier in the school year because you are getting up early... but during the summer, it's kind of more relaxed... and it can be a little bit more difficult."—22 years old "I have to take my medications four times a day. When I am on my own I have a hard time remembering, so my mom reminds me to do it."—14 years old "If I don't get up and take them right away, then I'll say to myself that I will remember to take them when I get up, but then I forget and I do other things."—15 years old "I think as you get older, you kind of get more busy with different school things so I think it can be a problem to take them at night."—24 years old
Learning the steps required for medication management	"To begin with, [my coordinator] helped me learn my pills by color, by name, by dose and when they are due. I can tell I'm getting better at remembering these details which makes me feel good."—12 years old "I'm going to want my parents there to help with everything because I have problems that prevent me... I have issues remembering or just saying stuff normally....I have a hard time being social because I have anxiety and stuff like autism... and stuff that makes it hard for me to be able to do it on my own now."—22 years old "Obviously, I know my dad is not going to let me forget to take my meds, so sometimes I just wait for him to remind me."—17 years old "You have to decide to either take your meds or you don't ... you need to know it's your responsibility for life."—24 years old

Role of a Pharmacist

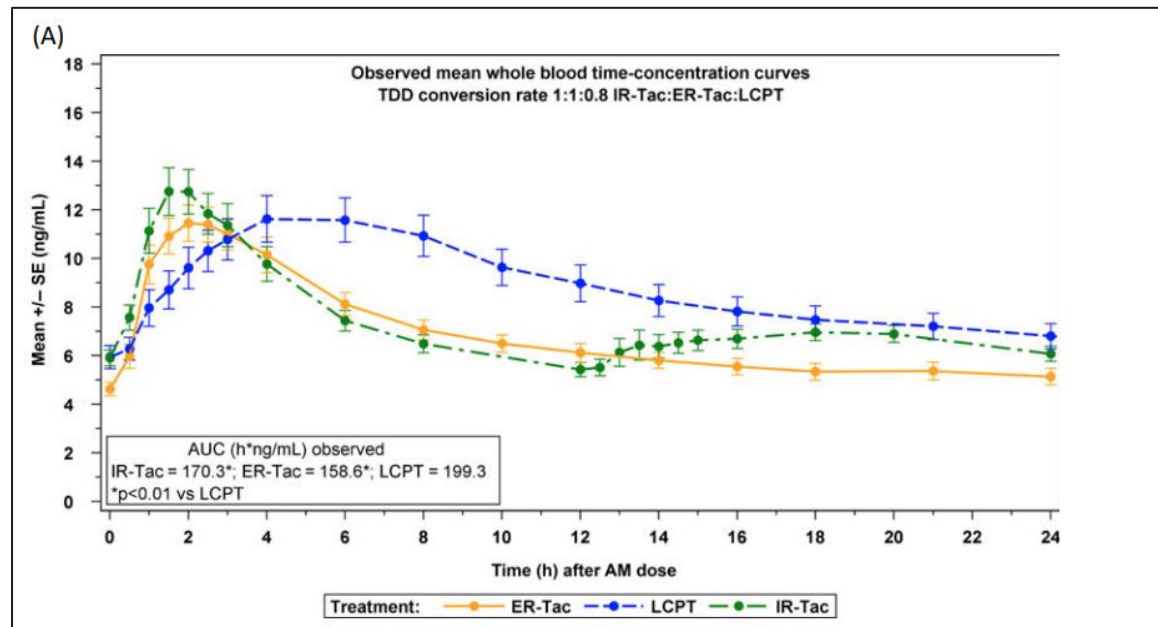
- Huntsman et al studied 27 pediatric heart transplant patients transitioning to an adult clinic
- Transplant pharmacists documented medication list errors in 19 patients
- All 19 patients (100%) had med list errors identified and corrected by pharmacists
- Underscored need for accurate medication history upon transition to adult clinic and potential role for a pharmacist

Role of a Pharmacist

- Prestidge E. & colleagues, who successfully implemented a transition clinic, incorporated pharmacist-based care
 - Pill box teaching
 - Develop medication alarms/reminders
 - Link medication administration to daily routine
 - Assist in simplifying medication regimen
 - Review doses, timing, drug and food interactions, adverse events, and indications
 - Provide instructions for missed or late doses and medication refills
 - Assess patient adherence

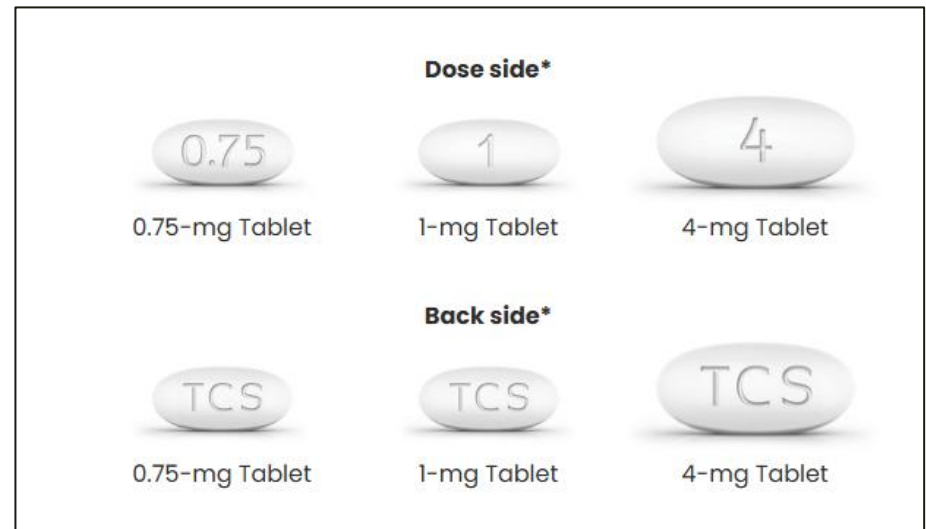
Envarsus XR

- Extended-release formulation of tacrolimus, taken once-daily
- Shown to improve neurotoxicity and adherence rates



Envarsus XR Considerations

- Strengths: 0.75 mg, 1 mg, 4 mg tablets
- Can NOT crush; no liquid or IV formulation
- Conversion from IR:
 - 80% of total daily dose of IR
 - Dose Converter | ENVARSUS XR® (tacrolimus extended-release)



Envarsus XR Considerations



ENVARSUS XR 30-Day Free Trial Card*,†

Patients new to ENVARSUS XR may receive a one time per life time free trial.



Bridge Program*

The [Bridge Program](#) will provide ENVARSUS XR at no cost to eligible patients who are experiencing a temporary delay in coverage.



Pay as little as \$0 for ENVARSUS XR*,‡

If your patient has commercial insurance, they may be eligible for our \$0 Co-pay Card.



Patient Assistance Program (PAP)*

Veloxis has a patient assistance program to provide ENVARSUS XR at no cost to eligible patients who meet certain criteria.

Conclusions

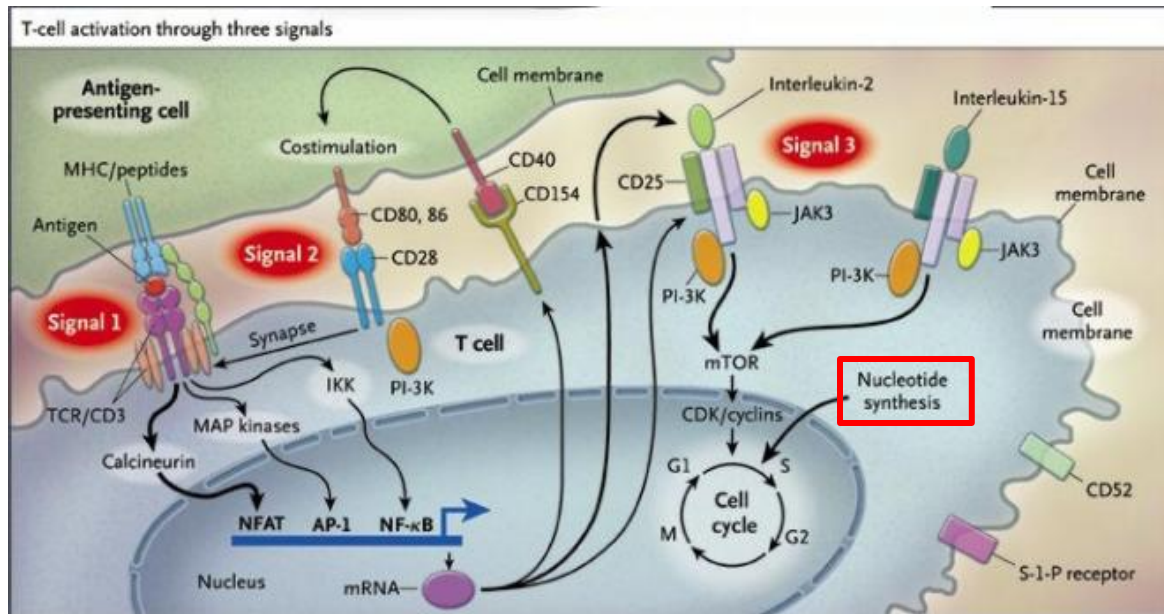
- Periods of transition from pediatric to adult care are associated with high rates of non-adherence and subsequent graft failure
- Potential barriers include developmental, psychosocial, and financial concerns, in addition to hindrance from caregivers and providers
- In addition to various other strategies for a successful transition, utilization of a transition clinic and transition coordinator have proven to be beneficial
- In light of higher rates of graft loss during this time period, pharmacists can play a core role in reinforcing medication understanding and adherence

Contraception and solid organ transplant

Fertility in solid organ transplant recipients

- Male patients: recovery of hypogonadism by ~ 12 months post transplant
- Female patients: return to fertility can happen as early as 2 months post-transplant in those of childbearing age
- Pregnancy is possible but **risky**
- Increased risk for preeclampsia, hypertension, graft rejection or failure across all organ groups

Mycophenolate mofetil (MMF)



- Inhibitor of inosine monophosphate dehydrogenase (IMPDH), which inhibits de novo guanosine
- Blocks purine synthesis
- T and B lymphocytes are dependent on this pathway for proliferation

MMF and fatherhood

Objective	Compare outcomes of men exposed to MMF or not at the time of conception
Study population	155 men exposed to MMF, 195 men not exposed to MMF at time of conception
Average exposure to MMF	1.42 ± 0.3 g/day
Outcomes	No difference in mean gestational age, malformations, neural tube defects, need for cesarian section, or any other outcomes
Conclusion	MMF is safe for men attempting to conceive a child

MMF and pregnancy

Parameter	General population	Transplant recipients not on MMF	Transplant recipients on MMF
Birth defects	3 – 5%	4 – 6%	~14%
Early miscarriage	8 – 20%	~13- 22%	28 – 64%

- Congenital malformations: microtia-external auditory canal atresia, facial clefts, cardiac, skeletal, eye, tracheoesophageal, and facial anomalies

Mycophenolate Risk Evaluation and Mitigation Strategy (REMS)

- Step 1: Document education on mycophenolate risks
 - Higher risk of miscarriage in first 3 months
 - Higher risk for birth defects
 - Congenital Malformations: external ear, cleft lip, cleft palate
 - Anomalies of distal limbs, heart, esophagus, kidney, nervous system

Mycophenolate Risk Evaluation and Mitigation Strategy (REMS)

- Step 2: Educate females of reproductive potential
 - Acceptable contraception must be used during entire treatment and for 6 weeks after the cessation of mycophenolate

ACCEPTABLE BIRTH CONTROL OPTIONS	
Guide your patients to choose from the following birth control options for use during treatment with mycophenolate:	
Option 1 Use Method Alone ■ Pick one item from (A) ▶ <u>Most effective</u> : Less than 1 pregnancy per 100 women in one year	A  Intrauterine Device (IUD)  Tubal Sterilization  Vasectomy
Option 2 Use Hormone & Barrier ■ Pick one item from (B) <u>and</u> one item from (C1) or (C2) shown below ▶ 4-7 pregnancies per 100 women in one year	B  Progesterone Only Injection  Birth Control Pill  Birth Control (Progesterone) Patch  Vaginal Ring  Progesterone Only Implant
Option 3 Use Two Barriers ■ Pick one item from (C1) <u>and</u> one from (C2) ▶ <u>Least effective</u> : 13 or more pregnancies per 100 women in one year	C 1  Female Condom  Male Condom 2  Female Diaphragm with Spermicide  Female Birth Control Sponge  Cervical Cap with Spermicide

Mycophenolate Risk Evaluation and Mitigation Strategy (REMS)

- Step 3: Check pregnancy status
 - Immediately before starting mycophenolate and at follow up visits
- Step 4: Report any pregnancies to mycophenolate pregnancy registry

Mycophenolate and oral contraceptives (OCs)

- Mycophenolic acid (MPA) undergoes enterohepatic circulation
- Secondary peak at 6 to 12 hours after dose
- Active glucuronide metabolites are excreted into bile by multidrug resistance related protein 2 (MRP2)
- Undergoes deglucuronidation back to MPA by colonic bacteria

Mycophenolate and OCs

- Estrogen competes for transporters in gut to be taken up for enterohepatic recycling
- Less enterohepatic recycling → more excreted in first pass metabolism
- Decreased serum levels of estrogen → decreased effectiveness of contraception

Summary and recommendations

- Mycophenolate is not associated with birth defects in children of males on this medication
- Mycophenolate exposure is associated with early miscarriage and birth defects in fetuses
- Education on the risks of taking mycophenolate and proper contraception during use of this drug is essential

Family planning in solid organ transplant recipients

- Studies abroad reported rates of unplanned pregnancy in solid organ transplant recipients of 48.5% - 92.9%
- Study from 2013 had 71% planned pregnancy rate
- Increased fertility after transplant in women of childbearing age highlights need for education from healthcare team about contraceptive options

Contraception and fertility awareness among women with solid organ transplants

Objective

- Assess awareness regarding post-transplantation fertility and determine what contraceptive methods were recommended post transplant

Design

- Telephone of patients at Nebraska Medical Center
- Women aged 19 – 49
- Telephone survey with 19 multiple choice questions about reproductive health

Contraception and fertility awareness among women with solid organ transplants

Population

- 183 women responded to survey
- 40% kidney transplant, 32% liver transplant, 28% other transplants
- Average age at transplant was 29 years
- Average time from transplant to survey was 10 years

Results

- 44% of women were aware they could become pregnant post transplant
- After transplant, 37% of women were counseled on contraception, 52% of these women had method recommended by provider

Contraception and fertility awareness among women with solid organ transplants

Results (cont.)

- 62% of patients aged 15-44 were using contraception at time of survey
- Female sterilization was utilized by 27% of patients, 28% of patients utilized oral contraceptives

Conclusions and study implications

- Overall, women poorly informed of contraceptive options and fertility post transplant
- Pharmacists can have a role in discussion of safe options and fertility awareness

Contraception in solid organ transplantation

- American Society Of Transplantation (AST) guidelines (2005) acknowledge barrier method as most widely accepted form of contraception
- International Society of Heart and Lung Transplant (2023) states barrier methods alone are not adequate, hormonal oral contraceptives, injection and intrauterine devices also carry risks
- CDC guidelines (2024) recommend using the highest effective birth control for those at increased risk for adverse health events as a result of pregnancy
 - Includes 2 years within solid organ transplant operation

CDC guidance – CKD with current nephrotic syndrome, hemodialysis and peritoneal dialysis

No Restriction	Benefit > Risk	Risk > Benefit	Avoid
• Cu-IUD*	• LNG-IUD • Implant • POP	• DMPA	• DRSP • POP with hyperkalemia • COC

*For patients on peritoneal dialysis, Cu-IUD falls in the (B>R) category

COC = combined oral contraceptive; CKD = chronic kidney disease; Cu-IUD = copper intrauterine device; DMPA = depot medroxyprogesterone acetate; DRSP = drospirenone; IUD = intrauterine device; LNG-IUD = levonorgestrel intrauterine device POP = progestin-only pill

CDC guidance – Solid organ transplant with no graft failure

No Restriction	Benefit > Risk	Risk > Benefit	Avoid
• Cu-IUD • LNG-IUD	• Implant • DMPA • POP • COC	• DMPA (with risk factors for or history of fracture)	• COC (with Budd-Chiari syndrome)

CDC guidance – Solid organ transplant with graft failure

No Restriction	Benefit > Risk	Risk > Benefit	Avoid
• Cu-IUD (C) • LNG-IUD (C)	• Cu-IUD (I) • LNG-IUD (I) • Implant • DMPA • POP	• DMPA (with risk factors for or history of fracture)	• COC

CDC guidance – Solid organ transplant & emergency contraception

No Restriction	Benefit > Risk
• Cu-IUD • LNG • UPA • COC	• Cu-IUD (if graft failure present)

Cu-IUD = copper intrauterine device

LNG = levonorgestrel (Plan B)

UPA = ulipristal acetate (Ella)

COC = combined oral contraceptive

International Society of Heart and Lung Transplantation (ISHLT) guidance

- Half of pregnancies in heart and lung transplant patients are unplanned
- Education should begin during pre-transplant evaluation period if applicable
- Disturbances to fertility resolve in 2-6 months following transplant
- Effective contraception should be recommended immediately

International Society of Heart and Lung Transplantation (ISHLT) guidance

"Preconception counseling for all individuals of childbearing age encompasses pregnancy intention, contraception, timing of conception after transplant, maternal risks including those unique to transplant recipients, fetal risks, and psychosocial support for optimal shared decision-making."

ISHLT guidance

Method	Consensus	Alone or with barrier method	Notes
IUD	Preferred	Alone	Highly effective, lack of drug interactions
DMPA	Not recommended >2 years	Use with barrier method	Decreased bone density, delayed return to fertility, weight gain
Implant	Acceptable	Use with barrier method	Rapid return to fertility

ISHLT guidance

Method	Consensus	Alone or with barrier method	Notes
POPs	Not recommended given diminished efficacy with non-adherence	Use with another method	Short ½ life, less efficacious if taken >3 hours past dosing time
COCs	Not recommended as sole method	Use with barrier method	CI: hyper-coagulable states, history of stroke or thrombosis, liver disease Avoid: transplant related CAD or HTN Inhibits CYP3A4 Less efficacious

CI: contraindicated

CAD= coronary artery disease

HTN= hypertension

Copper Intrauterine Devices (Cu-IUD)

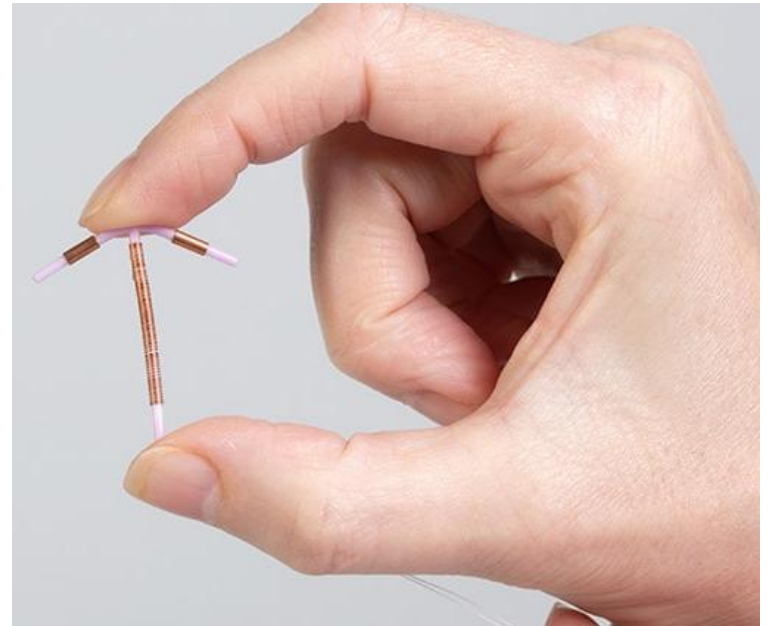
- Copper ions are spermatotoxic, inhibit motility of sperm
- Alternative mechanism: the copper stimulates an inflammatory reaction in the uterus

Benefits

- No hormones
- Highly effective
- Lasts 10 years

Risks

- Theoretical infection risk
- Theoretically less effective in immunosuppressed
- May be considered more invasive



Levonorgestrel Intrauterine Devices (LNG-IUD)

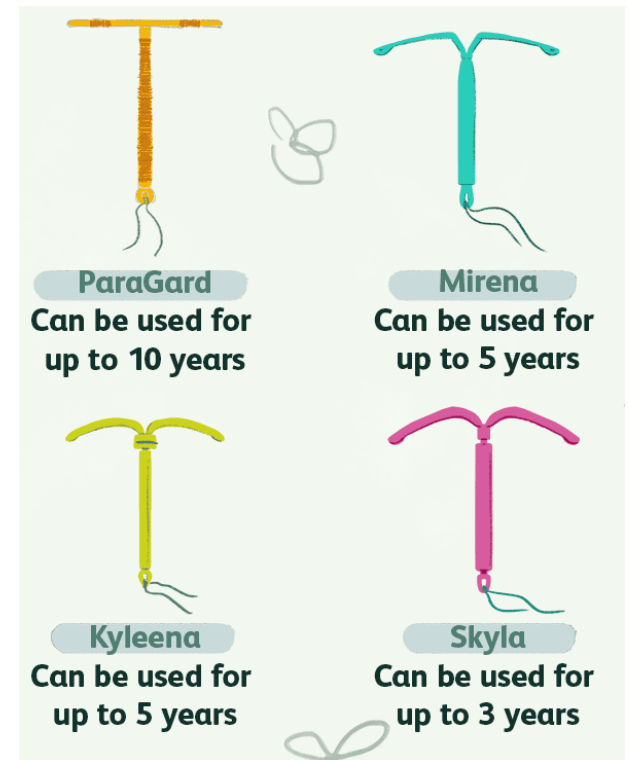
- Mechanism: local effects of progestin cause thickened cervical mucous, glandular atrophy, slowed tubal motility

Benefits

- Highly effective
- Last 3 – 5 years
- No utilization of immune response
- Local effect, less systemic absorption of hormones

Risks

- Theoretical infection risk
- May be considered more invasive



LNG-IUD

Study	Methods	Results
Ramhendar et al	11 kidney transplant recipients with LNG-IUD Median duration: 38 months	• No unplanned pregnancy • No documented infection
Huguelet et al	2 kidney, 2 cardiac, 1 liver, 1 small bowel recipient with LNG-IUD Duration range: 1 – 32 months	• No unplanned pregnancy • No documented infection
Paulen et al	21 kidney, 2 liver transplant recipients with LNG-IUD Median duration: 49.3 months	• No unplanned pregnancy • No documented infection

Implant: Etonorgestrel (Nexplanon)

- Progestin within flexible implant placed in arm

Benefits

- Highly effective
- Lasts 3 years

Risks

- Theoretical infection risk
- Menstrual disturbances reported
- May be considered more invasive



Implant: Etonorgestrel (Nexplanon)

Study	Methods	Results
Lew et al Case control study	Outcomes: pregnancy pattern, post-transplant infections Groups: Etonorgestrel users (n=24), no hormonal contraceptives (n=24)	• No insertion site infections • No difference in graft rejection, failure, or infection of any kind • 3 discontinuations due to side effects

Depot medroxyprogesterone acetate (DMPA): injection

■ Progesterone delivered by intramuscular injection

Benefits

- Lasts 12 weeks
- More effective than the pill

Risks

- Decline in bone mineral density
- Menstrual disturbances
- Weight gain
- Pain with injections



Progestin only pills (POP)

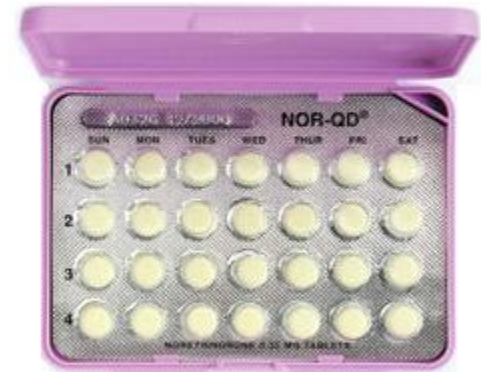
- Oral pill, progesterone only

Benefits

- Non-invasive
- No estrogen content

Risks

- Lower efficacy
- Must take within 3 hour time window
- Extensively metabolized in liver



Combined oral contraceptives

- Oral pill containing estrogen and progesterone

Benefits

- Non-invasive
- More flexibility with schedule

Risks

- Lower efficacy than long acting methods (9% failure rate)
- Metabolized through CYP 3A4, affects immunosuppression levels
- MMF may lower efficacy
- Risk of thromboembolism



Summary and recommendations

- The transition from pediatrics to adults is a high risk time period for both medication non-adherence and other risky behaviors
- When possible, a pharmacist should be involved in education of these patients and should be involved to identify areas for medication regimen optimization
- A process should be identified to ensure patients of appropriate age are educated about contraception

Questions?
