# Impact of Transplantation in Children

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## Pediatric Liver Transplantation
- Common reasons for liver transplantation (LT):
  - Biliary atresia - obstruction of bile flow
  - Genetic and metabolic disorders
  - Acute liver failure
  - Liver tumors
- About 600 each year in North America
  - Most are deceased donor
  - 60-70 are living donor
- 1/3 of patients have 1 episode of acute rejection in the 1st year; 66% by 10 years
  - 15% have biliary complications
- May receive a whole liver or a smaller piece

### Long-Term Outcomes
- Most children achieve normal growth and pubertal development
  - Women can have successful pregnancies
- At 10 years post-transplant:
  - 23% of patients had repeated a grade or been held back in school
  - Most patients (63%) on single immunosuppressive therapy
  - Chronic rejection in 9%
  - Re-transplantation in 12%

### Cognitive Outcomes
- 1/3 of children have below average IQ and receive special educational support (2x expected rate)
- 1/4 of children have attention and executive deficits (3x expected rate)

### Risk Factors
- Diagnosis: it’s unclear which diagnoses fare better but diseases with direct impact on the brain like metabolic disorders seem to do worse
- Early age at disease onset/transplant: young brain is vulnerable to injury
- Malnutrition/growth delays: early malnutrition can affect the brain as well as the body

## How are the Liver and Brain Connected?
- A main job of the liver is to clean the blood
  - When the liver doesn’t work, the blood is no longer “clean” and toxins travel to the brain
  - This can lead to hepatic encephalopathy (brain swelling) which can:
    - Range from subtle cognitive changes (slowed thinking, inattention) to coma
    - Be episodic, persistent, or minimal in chronic liver disease
- The liver also helps with metabolism (processing nutrients)
  - When the liver doesn’t work, important nutrients are not absorbed
  - This can lead to malnutrition of body and brain and growth delays

## Comorbidities Related to Immunosuppression
- Post-transplantation lymphoproliferative disease (5%)
- Kidney dysfunction (9%)
- Impaired linear growth (23%) associated with on-going steroid therapy
- Up to 25% with elevated lipids

## What is a Successful Outcome?
- Healthy liver
- No medication complications
- Normal growth and development
  - School and peer activities
  - Psychological adaptation
  - Maintain healthy family life

## Future Goals:
Optimize outcomes for long-term survivors and minimize complications