



# Living Donor Liver Transplantation

## Wits Donald Gordon Medical Centre

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Wits University  
Donald Gordon  
Medical Centre

Patient-centred. Independent. Academic.

MEDICLINIC 





# The First



- 1963 C Henry Kempe presented Bennie Solis to Starzl
  - University of Colorado
  - Infectious Diseases Specialist
  - Defender of children
- Starzl suggested transplant – Kempe agreed
  - 1981 when moved to Pittsburgh, firmly supported moving program forward

**“The Puzzle People”**

# Bennie



- 3 year old
- BA

*“The day he was born, he began his slow walk to Calvary and was almost there...”*

**Thomas Starzl**

- 1<sup>st</sup> March 1963 attempted first liver transplant
- Died during explant procedure
  - Bleeding
    - Previous surgery
    - PHT
    - *Coagulopathy*

**“The Puzzle People”**

# The Early Days

- 4 further transplants 1963
- All died complications pulmonary embolic disease
  - EPCA thrombogenic!!!
  - “I saw and talked with the patient.....liver making large amounts clear bile.....was in better condition than the surgeons .....

**Willard Goodwin “*The Yellow Paper*” May 11 1963**

- Self imposed moratorium until first survivor
  - 1967

**“Revolution” in management of liver failure**

# Morio Kasai, MD, 1922-2008



# Thomas Stazi, 1926-2017

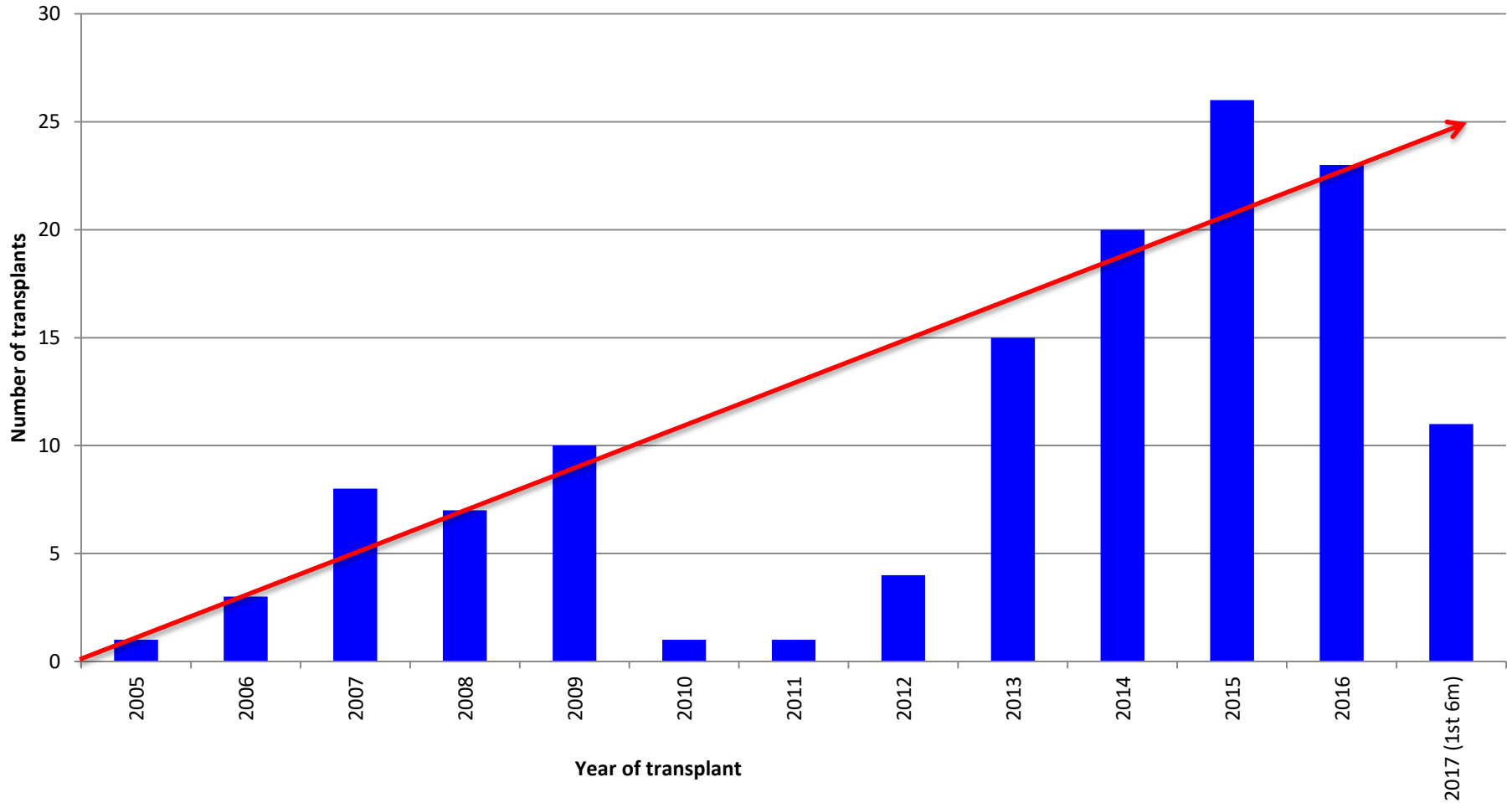


# November 2018

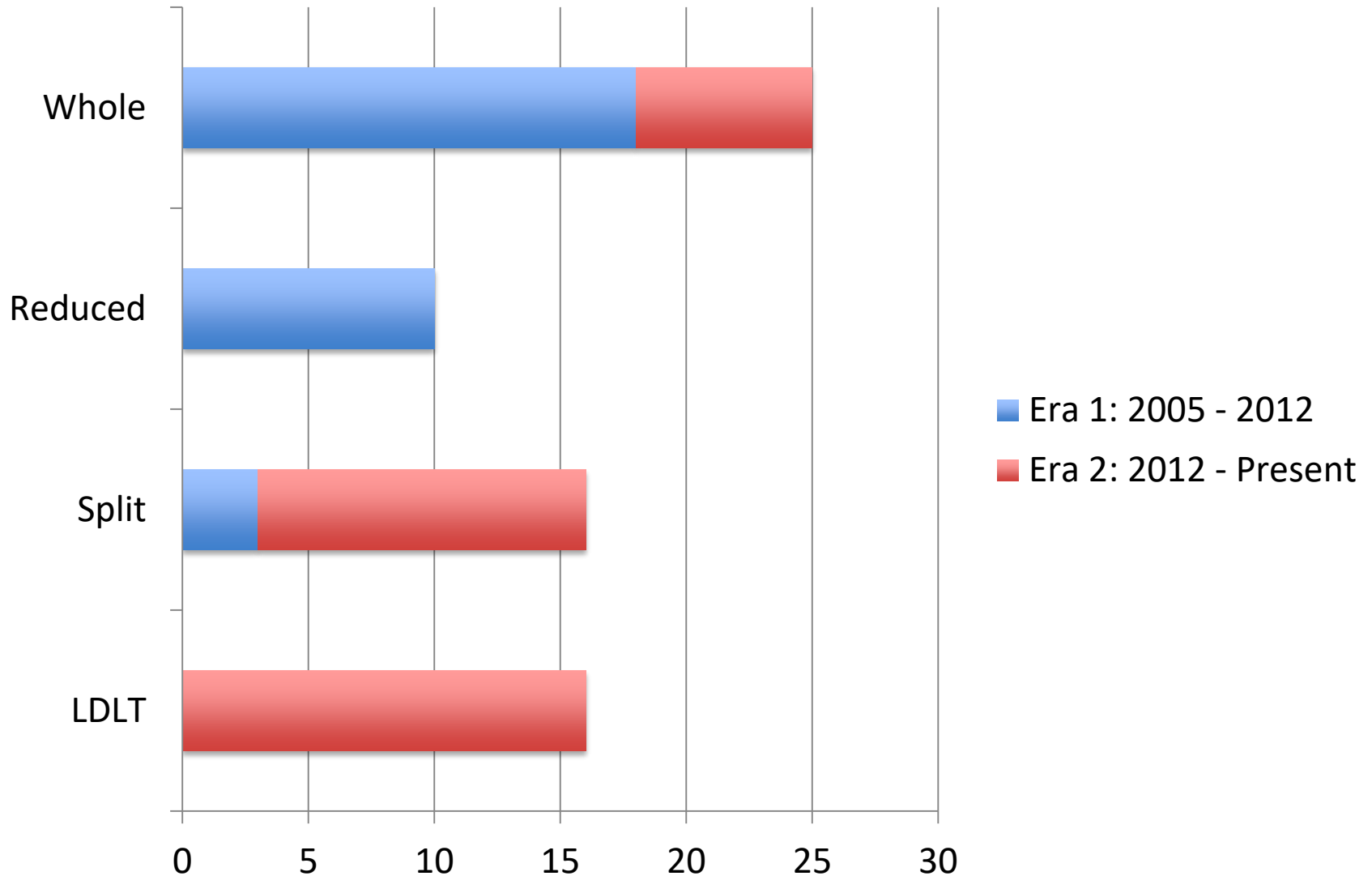


- 168 transplants
  - 8 re-transplants
- 101 Deceased Donors 61.6%
  - 50 Whole 30.5%
  - 34 Splits 20.7%
  - 17 Reduced 10.4%
- **65 Living Donors 38.4%**
- 20 fulminant hepatic failure
  - 16 well at last follow up

# UNIT GROWTH

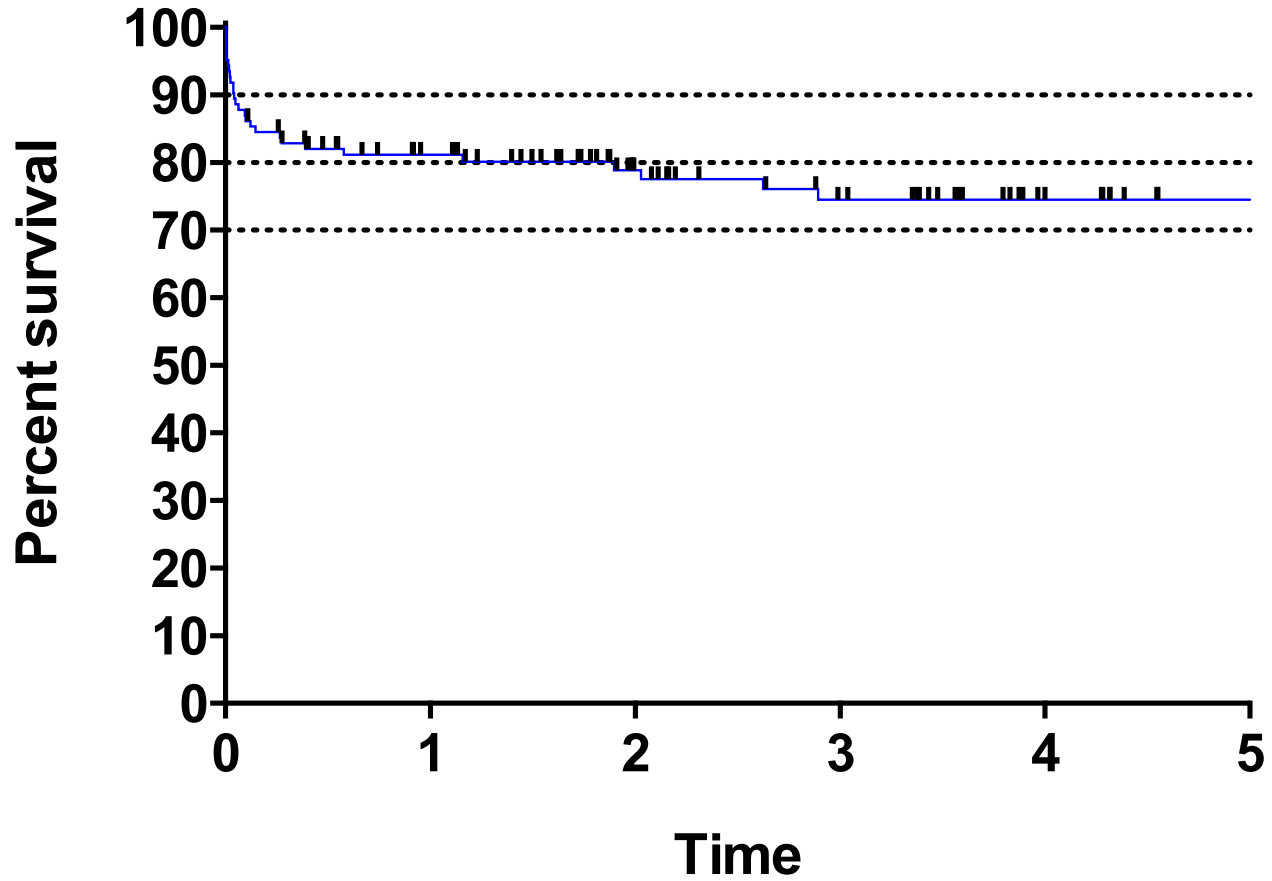


# GRAFT TYPE BY ERA



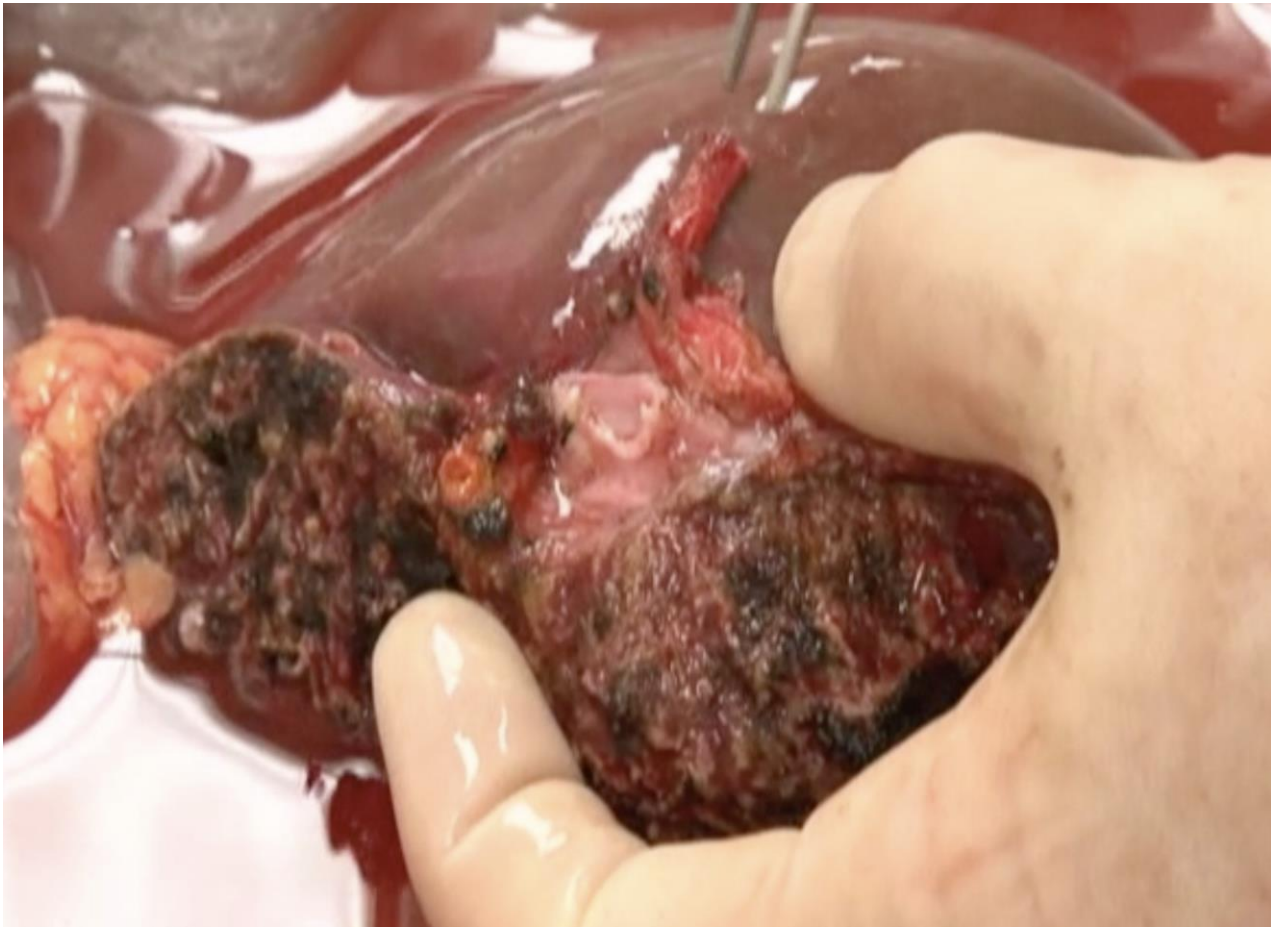


# Patient Survival



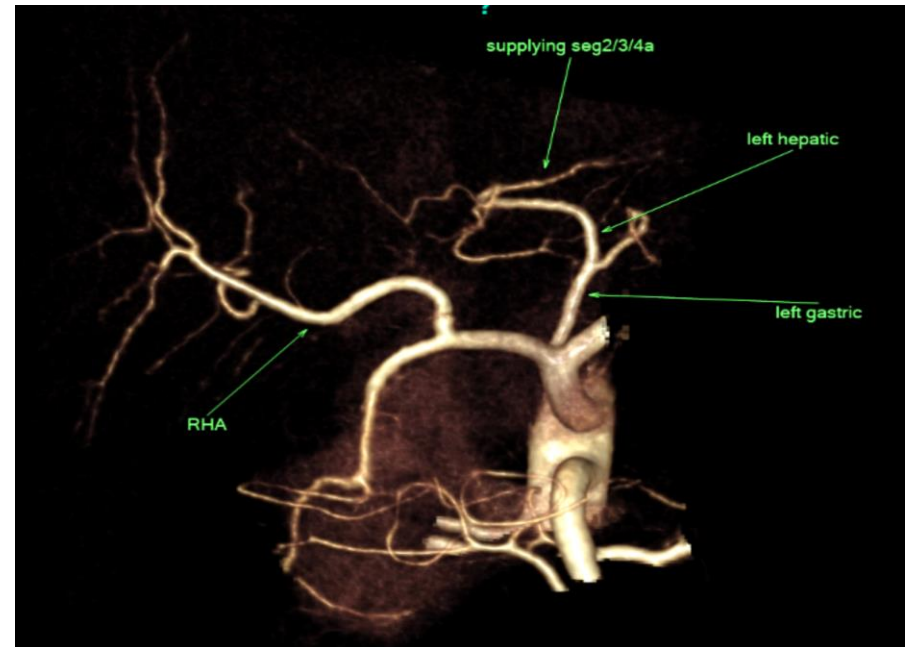
# Step 1

1. Successfully implemented LDLT



# Context Adult LDLT: Donor outcomes

- Paediatric programme established donor data
- 65 LD hepatectomies
  - Age < 50
  - BMI < 30
- Established protocol
  - Sociomedical questionnaire
  - MDT evaluation
    - Independent transplanting team
  - Anatomical suitability (CT)
    - Volumetric Assessment



# Donor Outcomes

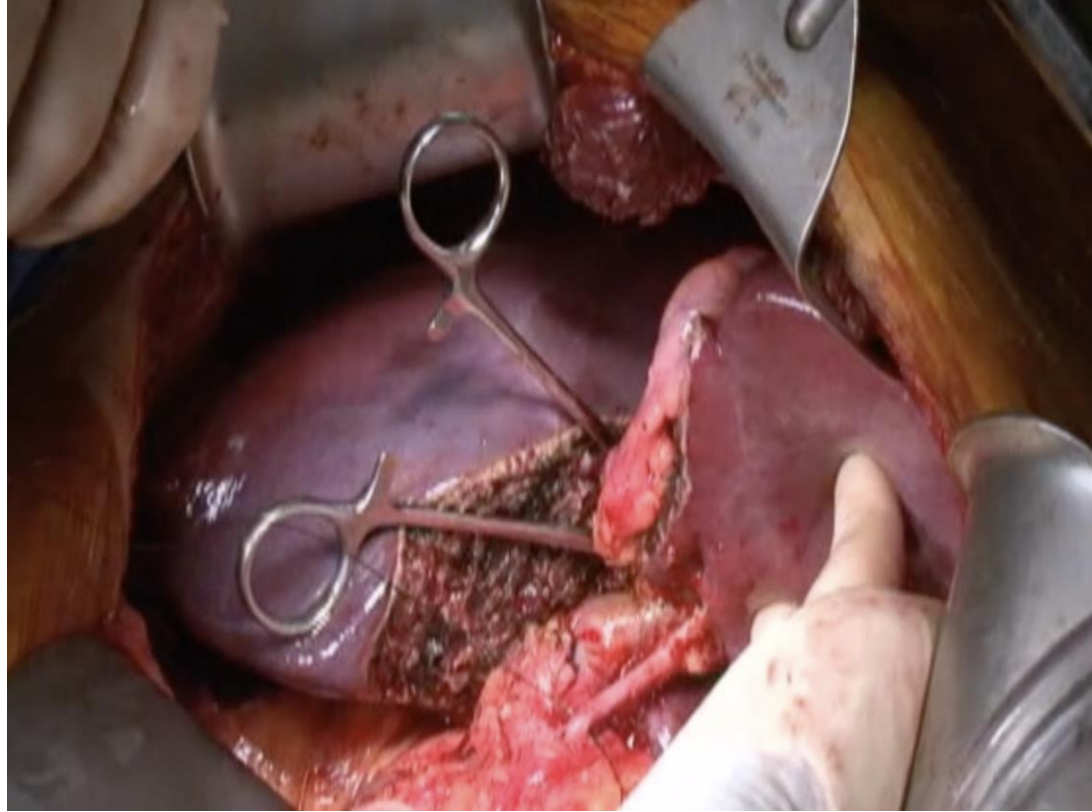
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- Liver biopsy
  - Only if radiological evidence of steatosis
- Biliary anatomical definition
  - Intra-operative cholangiogram

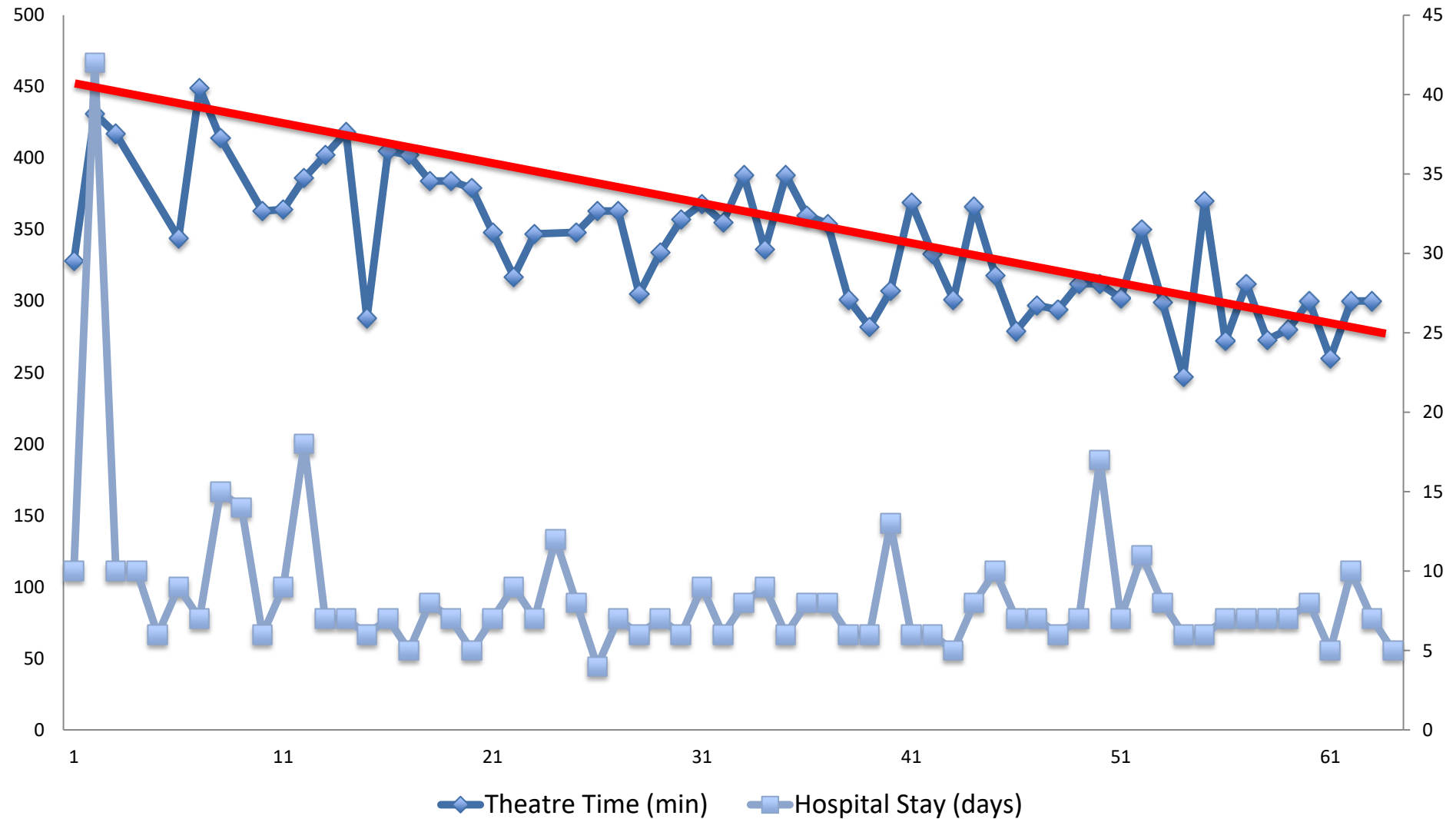


# Donor Outcomes

- 50 female
- 15 male
- 51 parents
  - 43 of these mothers
- Remainder bar 2 were related
- Donor profile impacted by fact that recipients are kids



# Theatre Time



## Post Operative Morbidity

			Number	%
Total no. of complications			20	30.7
Clavien Grade				
	I		11	55
	II		2	10
	IIIa		2	10
	IIIb		3	15
	IV		2	10
	V		0	0

### Grade IV Complications

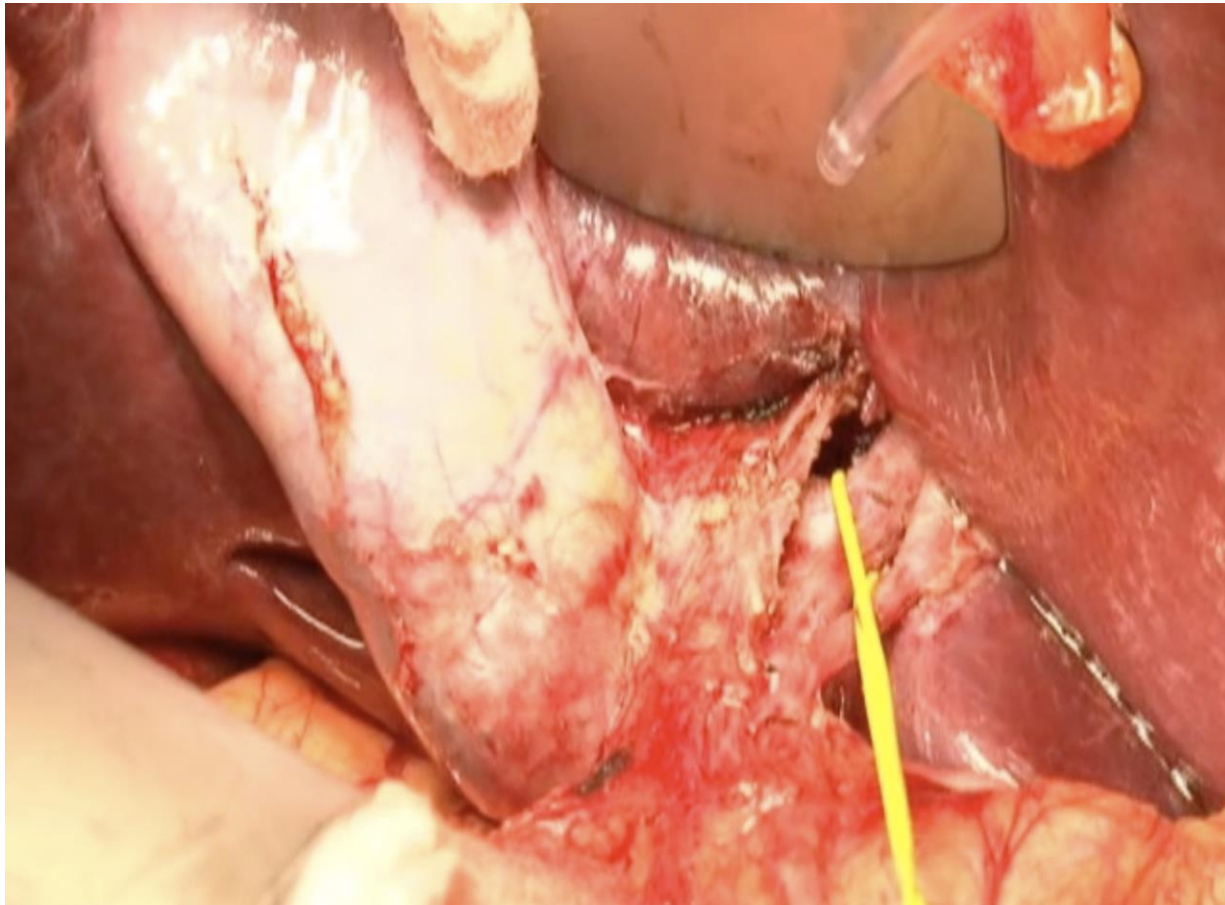
Bowel perforation with multiple laparotomies, TPN, abdominal wall reconstruction

Respiratory arrest due to inadvertent opioid overdose

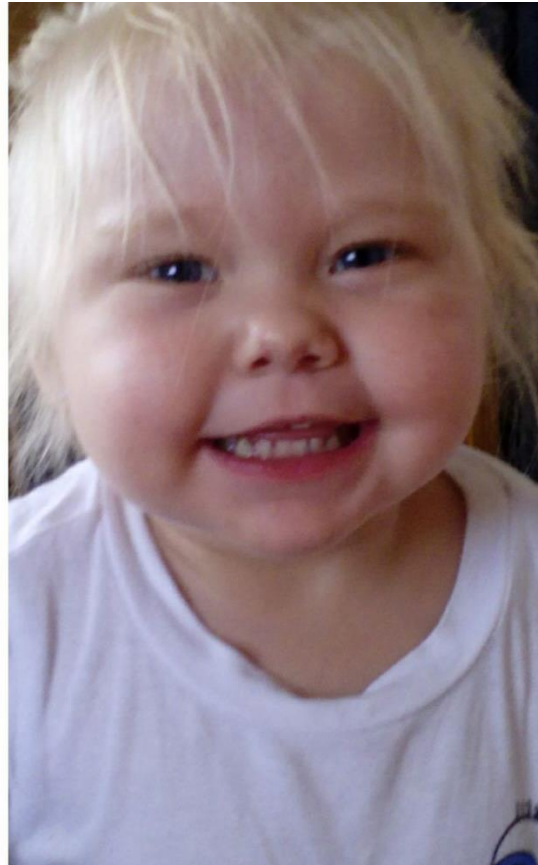
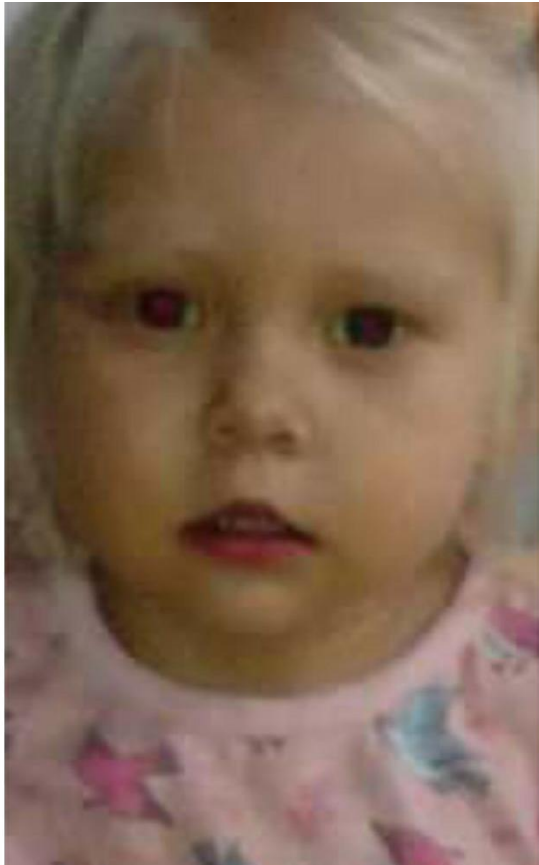


# Step 2

1. Successfully implemented LDLT
2. Demonstrated donor safety







# Position Statement

- Constraints to Transplant

- Socioeconomic
- Religious
- Cultural beliefs

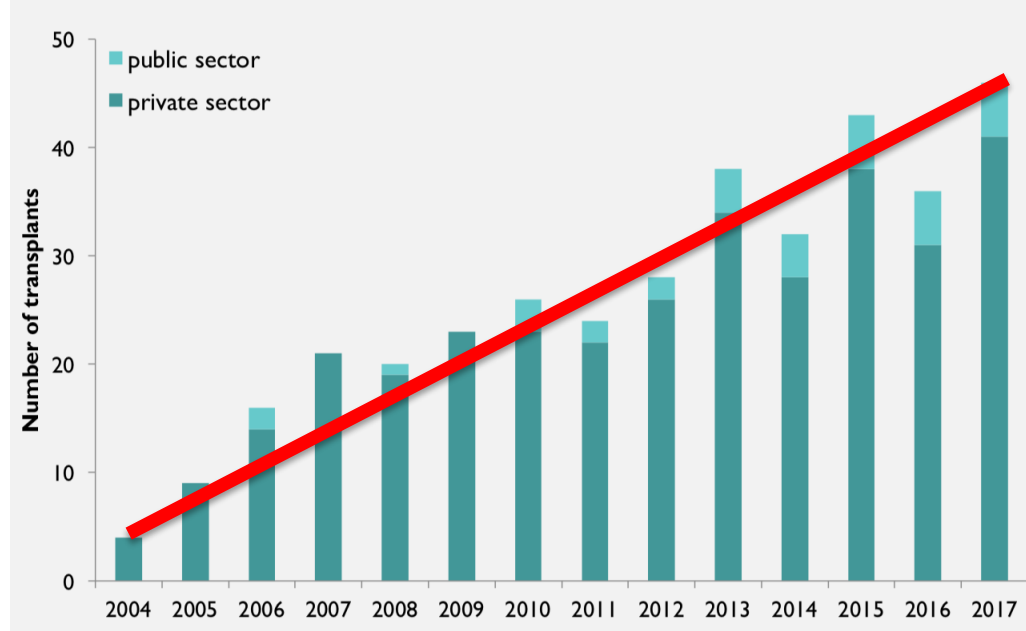
Adversely impact deceased organ donation

- Context wait list mortality of 20%

- LDLT crucial to paediatric population

**Fulminant hepatic failure**

# Adult Need



- 10% Waiting list death
  - As compared to 20%
- Ability improve organ access
- Proven donor outcomes
  - Balance risk of LDLT
    - Wait list death
    - Morbidity and mortality of transplant

Can this experience translate to our adult population?

# Step 3

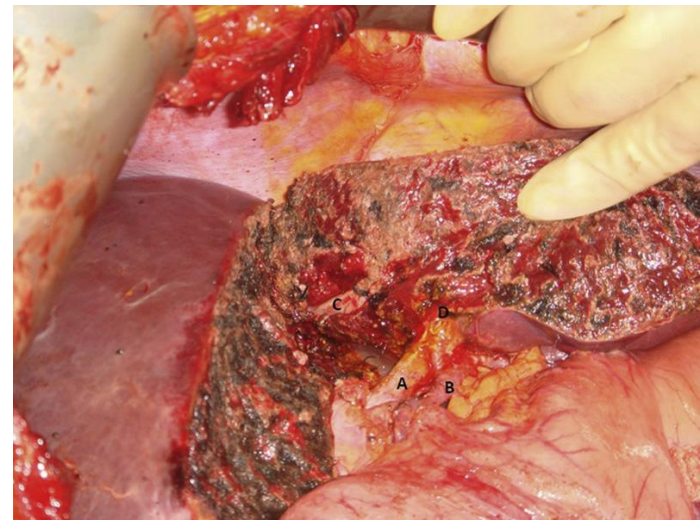
1. Successfully implemented LDLT
2. Demonstrated donor safety
3. Recipient need

# Concepts

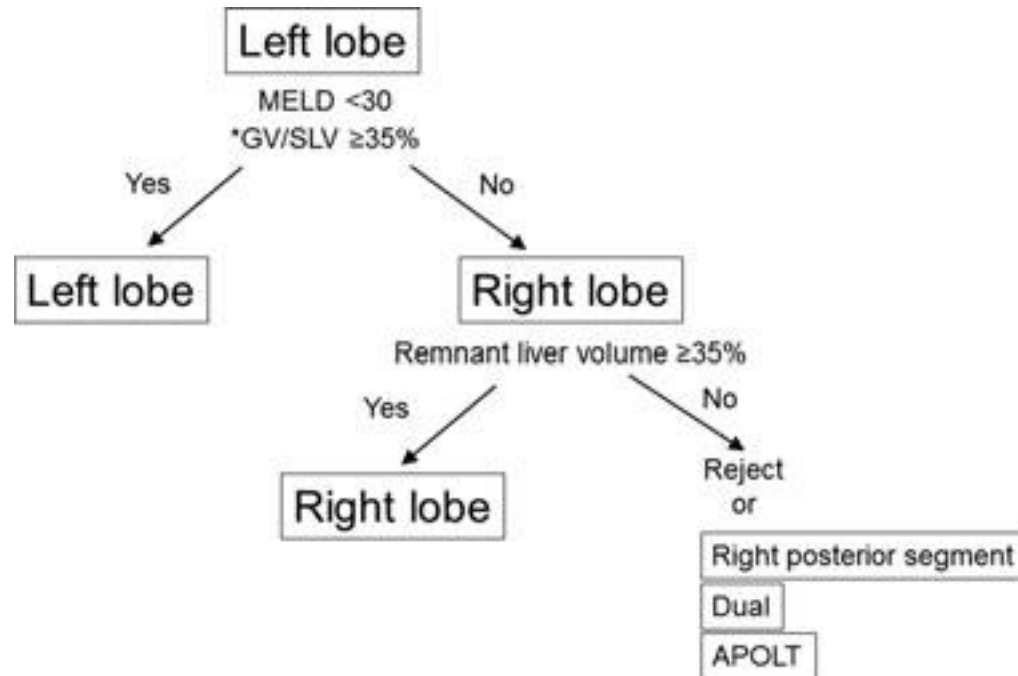
- Makuuchi et al 1<sup>st</sup> successful LL A-A LDLT in 1993
- Concerns
  - GRWR < 0.8
  - Survival 82.1% to 54.5% at 3 months!

## Tanaka et al Yonsei Med Journal 2004

- Similar Kiuchi et al
- Significant trend RL grafts
  - Associated risks



# Graft Selection



**Figure 1: Graft selection algorithm in Kyushu University.** \*A left lobe graft of GV/SLV <35% was considered to be used when the donor was younger than 40 years old or recipient's liver function was good or low MELD score without severe portal hypertension. APOLT = auxiliary partial orthotopic liver transplantation

# Donor Risk

- 34 RL donor deaths worldwide
- Morbidity
- Difference in opinion between East and West
  - West
    - **Significantly increased M and M**
  - East
    - **No significant difference**
- Balance donor safety with recipient outcomes

**Increased risk after RL donation must be taken seriously**



**KYUSHU**  
UNIVERSITY

## Retrospective analysis

- 200 LL LDLT's
- 112 RL LDLT's
- Donor Morbidity
- Survival
- Complications





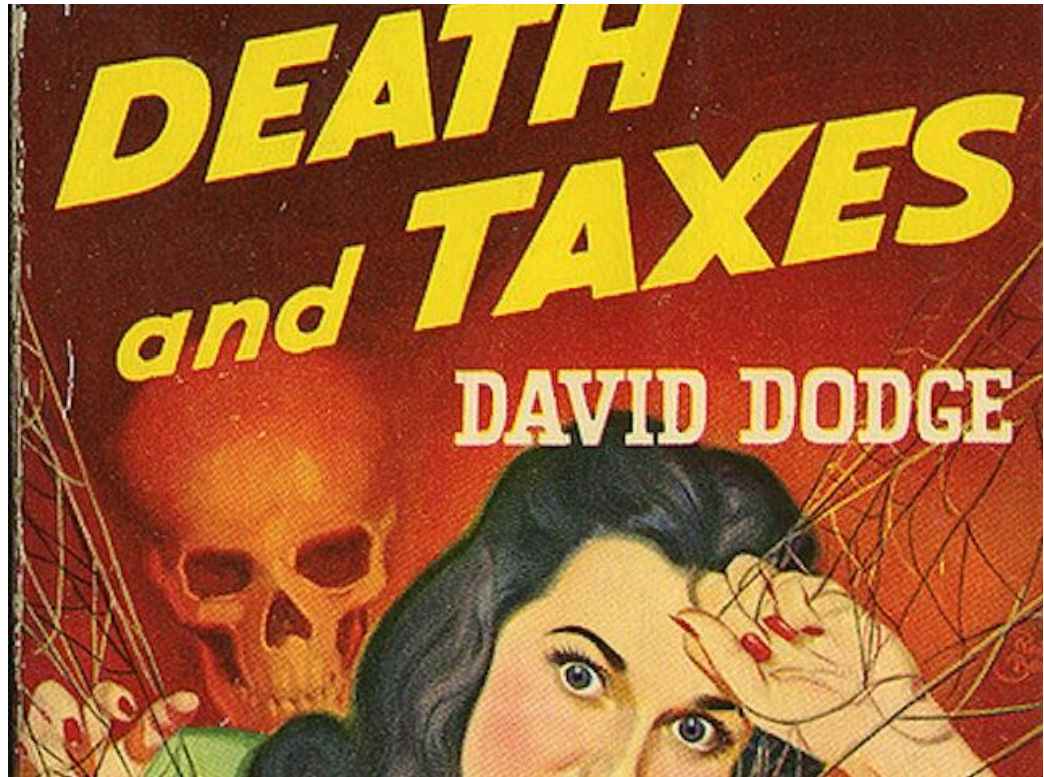
# Donor Morbidity

- Left

– 36.0%

- Right

– 34.8%



- Discussion point as strong argument in US that morbidity significantly higher with RL



# Recipient Survival

**LL**

**RL**

- 1 Year: 85.6% 89.8%
  - 5 Year: 77.9% 71.3%
  - 10 Year: 69.5% 70.7%
- **Wide Caval anastomosis**
  - **SAL (8%) – abandoned**
  - **Splenectomy (36%)**
  - **2 HPCS**

**MELD > 30 = Consider RL over LL**

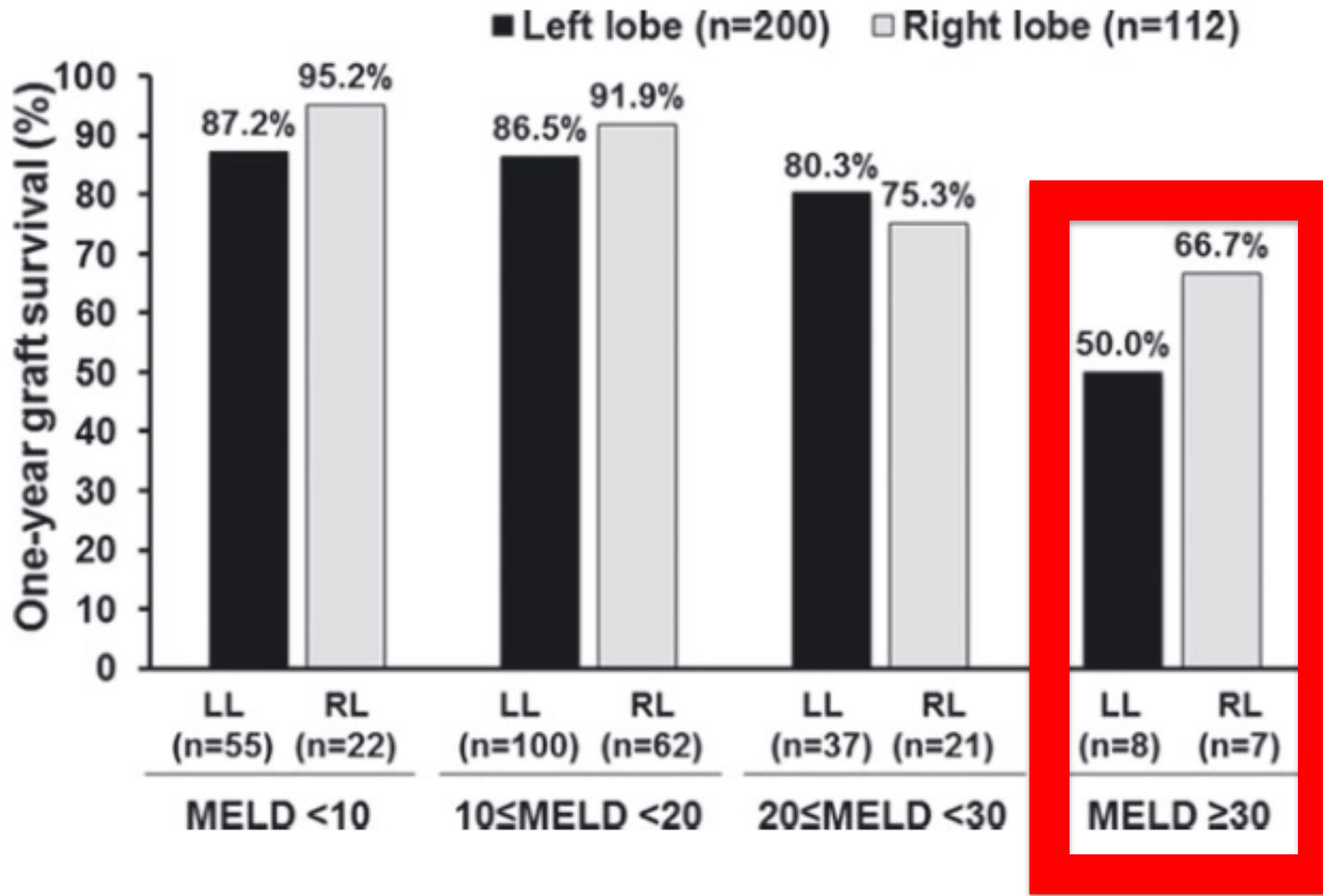
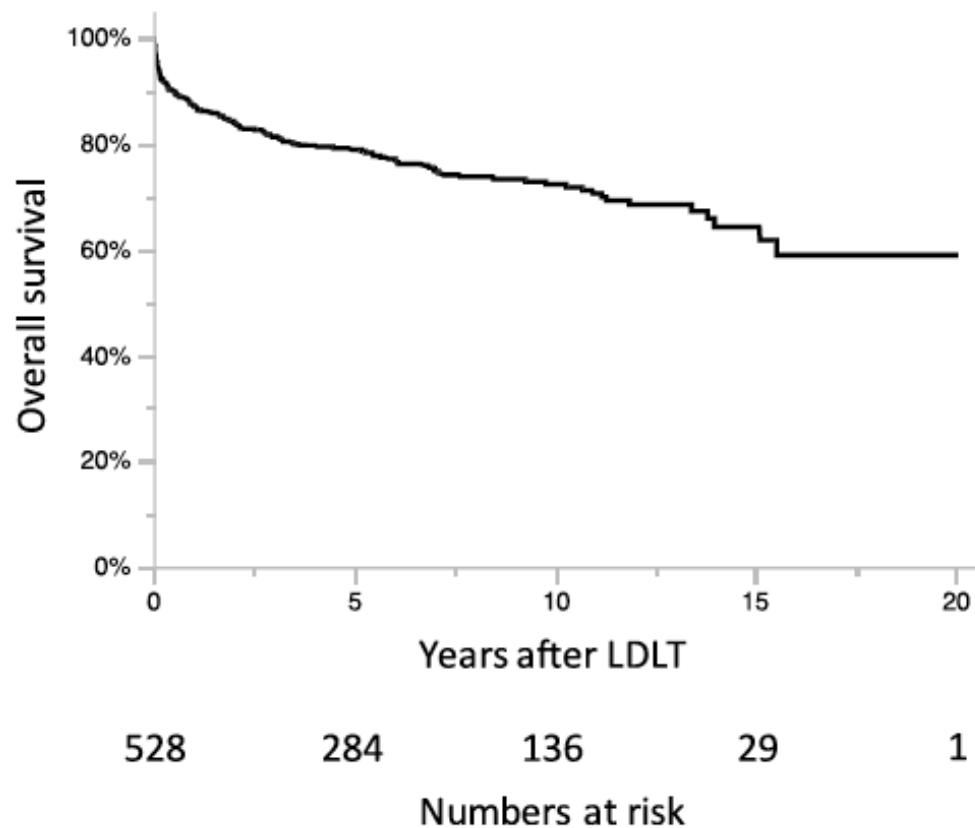


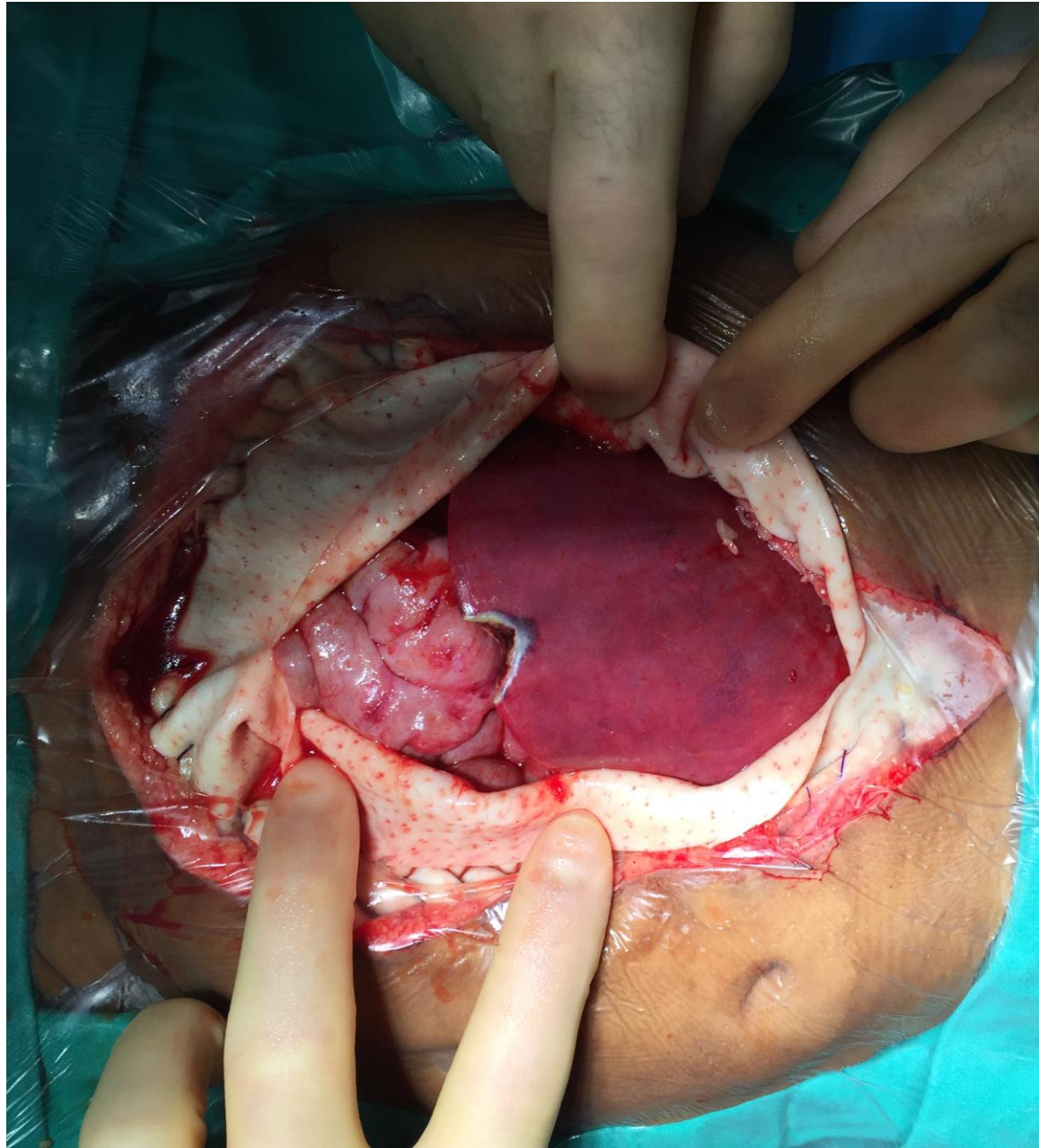
Figure 4: Comparison of LL and RL graft survival rates according to MELD score. There was no significant difference between the two types of graft at any level of the MELD score.

- 528 recipients
- Patient survival
  - 1, 3, 5, and 10 years
- 87.8%
- 81.8%
- 79.4%
- 72%



# LARGE FOR SIZE SYNDROME

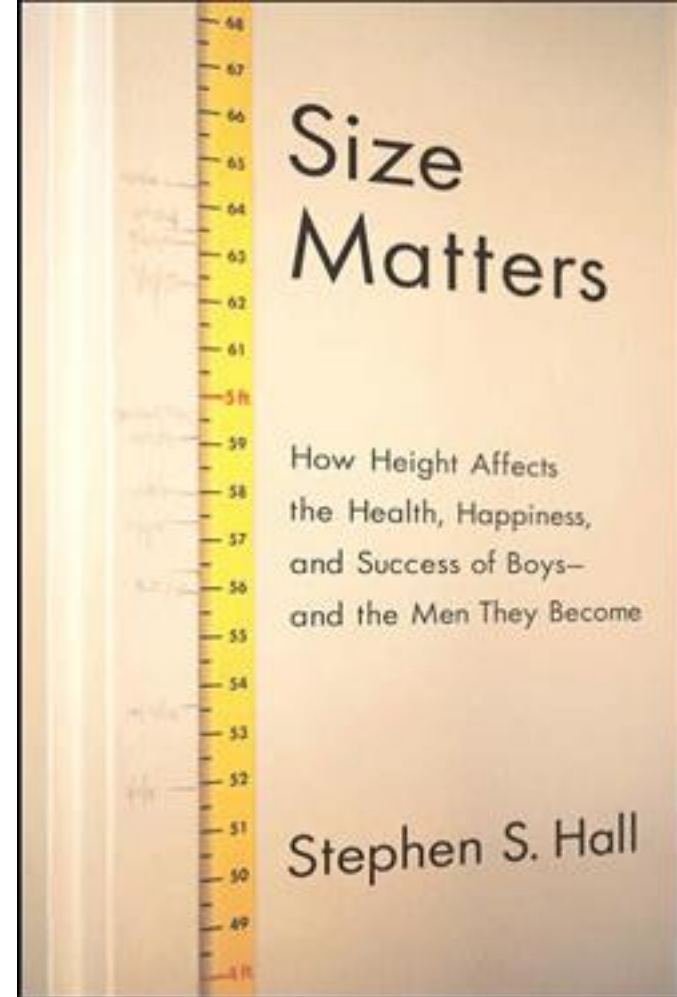
- 8 cases
  - 4 Whole grafts
  - 1 Living Donor
    - Radiology
- 2 split
- 1 CLKT



- Alluded to ductal diameter of 150 microns as potentially prognostic for drainage
  - 10 of 14 with ducts > 200 $\mu$  drained
  - Only 1 of 13 < 150 $\mu$

***“Size may be of great significance”***

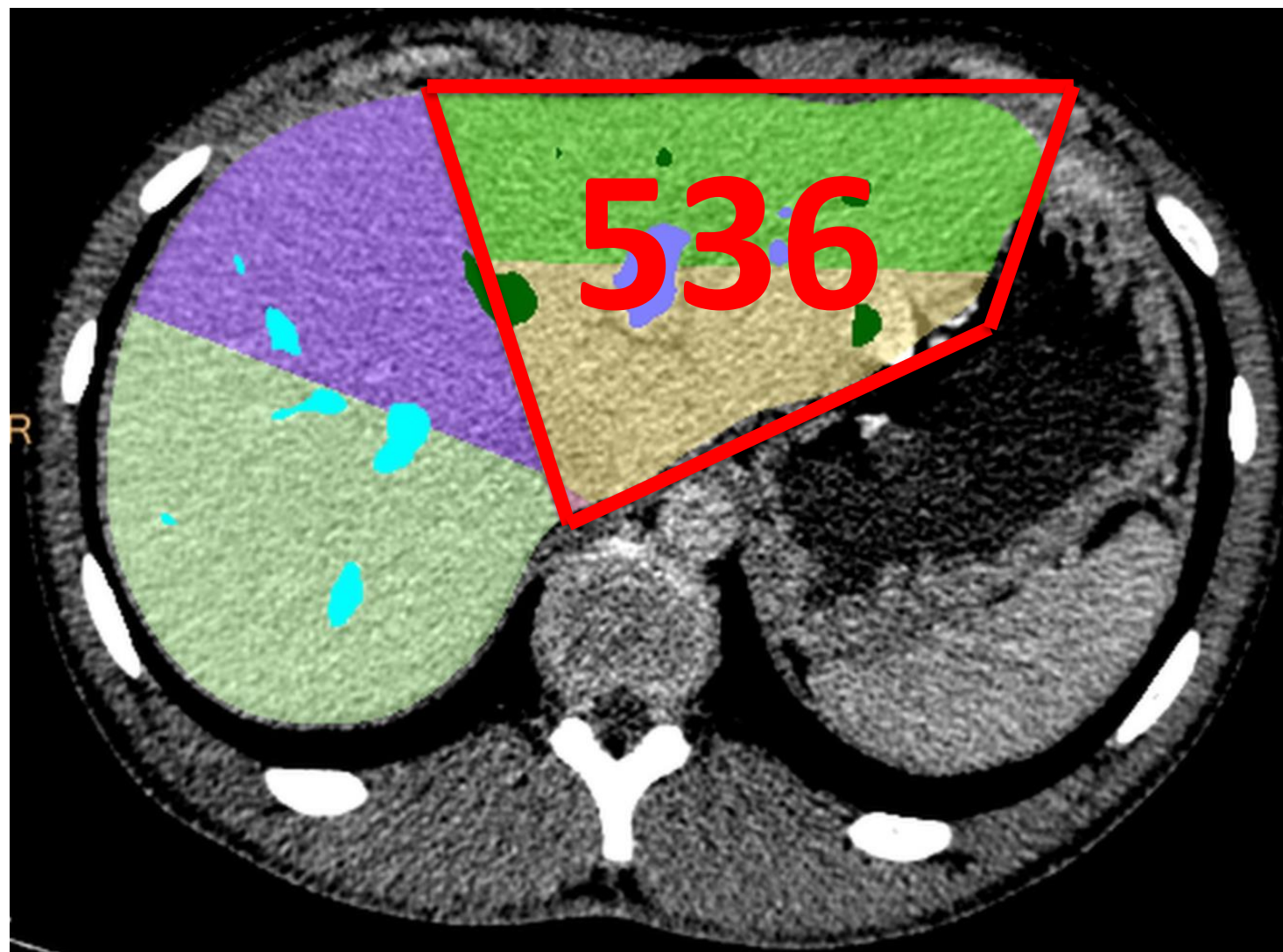
- All cured cases surgery before 4 months of age





“Not a few cases .... Might be curable if portoenterostomy carried out before 4 months of age, preferably within 3 months after birth”

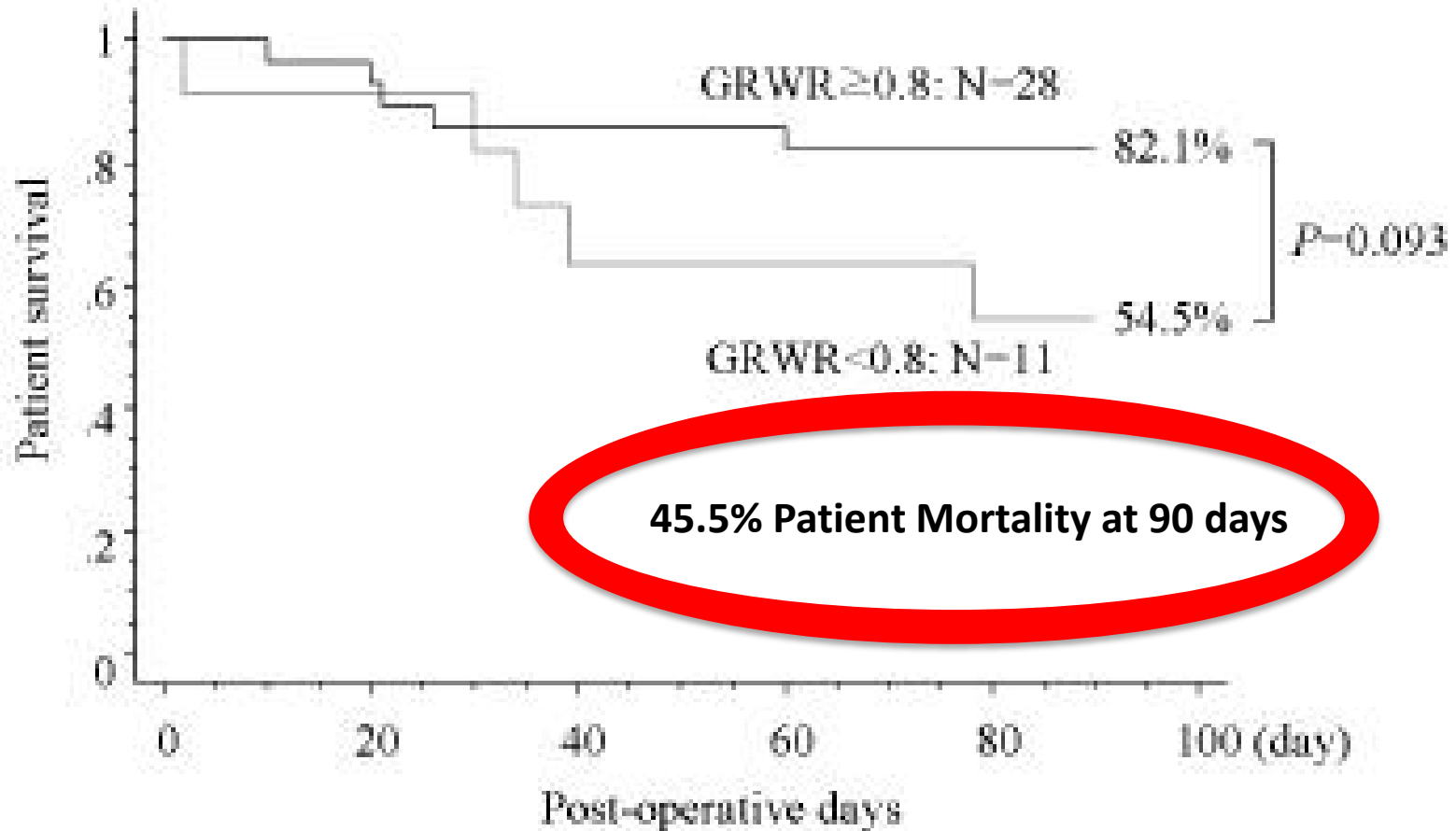


# Small For Size Syndrome



 Segment 2	<u>50%</u>	325.1 cc	536.0 cc
 Segment 3	<u>50%</u>	211.0 cc	

# Kyoto: Poor Outcomes.....

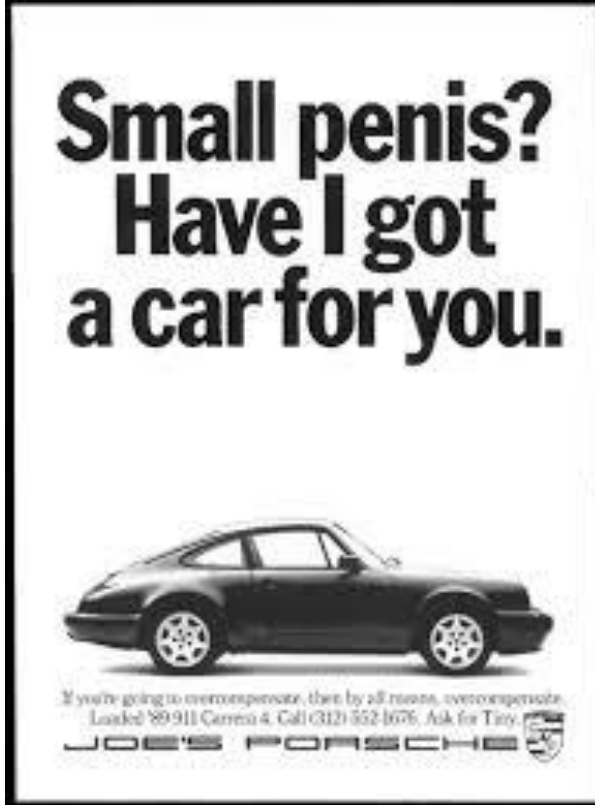


# SFSS

- Not purely a function of size
  - Primary Graft Dysfunction

- Technical
- Anatomical
- Immunological
- Hepatitis related issues

**EXCLUDED**



Ikegami et al. Am J Transplant 2012 12 1886 – 1897

- Inpatient status
- Donor age > 45
- MELD > 20
- PVP > 20mmHg
- Blood loss > 10 litres

**RISK FACTORS**

Ikegami et al. Journal of the American College of Surgeons 2013 216(3) 353 - 362



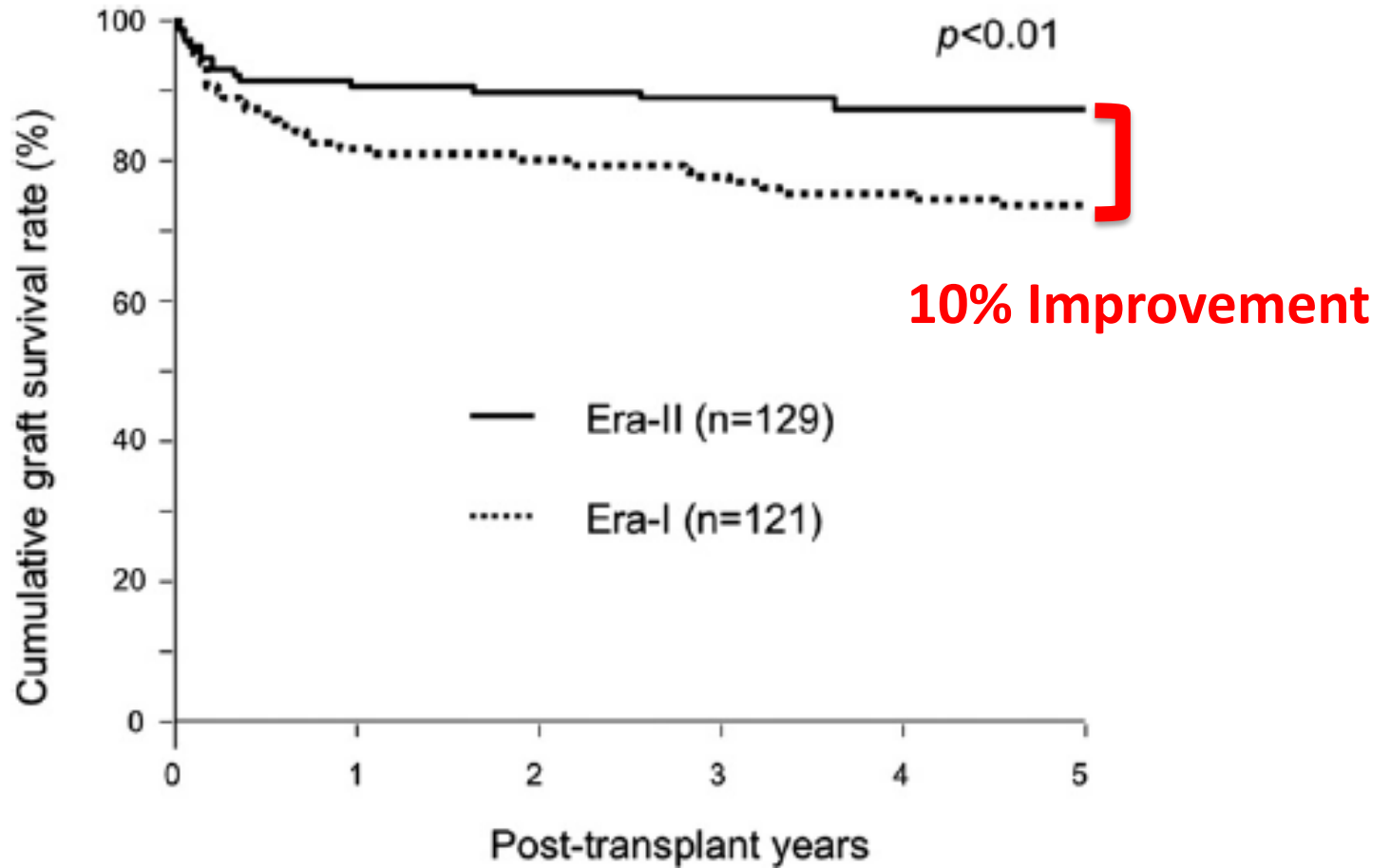
# Consolidation

- Approach to optimizing outcomes and preventing recipient morbidity
  - Graft Inflow Modulation/Portal Flow Modulation
    - Applied to individual patient
  - Variety of techniques
    - **Indirect**
      - Hepatic Venous Outflow optimization
      - Splenic Artery Ligation
      - Splenectomy
      - Shunt ligation
    - **Direct**
      - Hemi Porto Caval Shunt

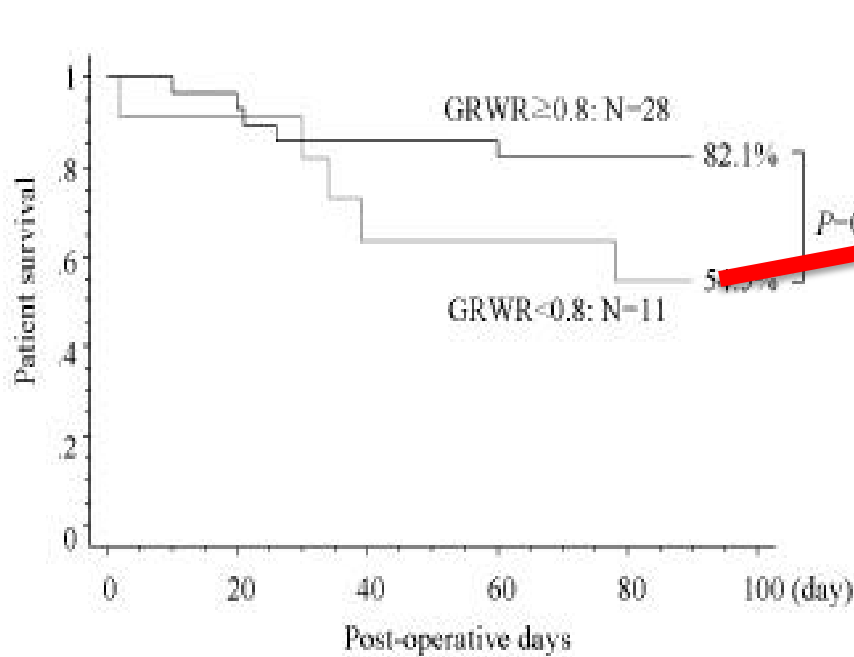


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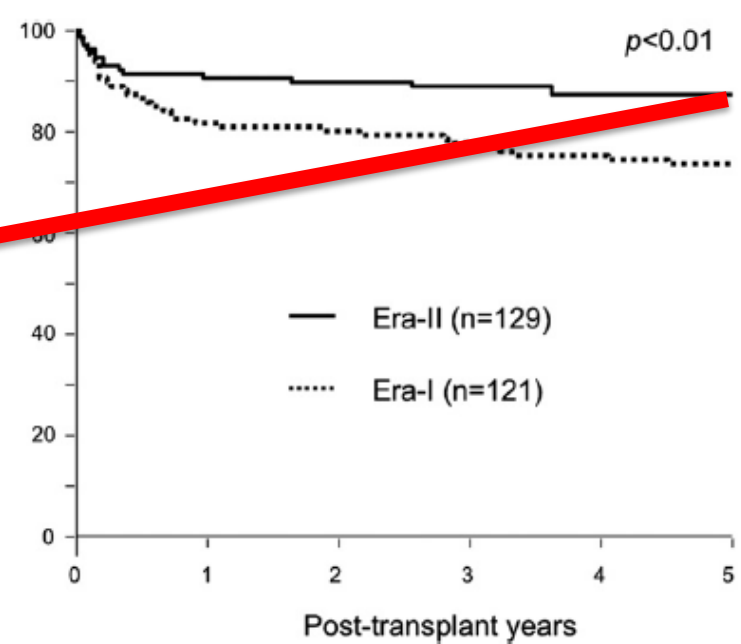
# Cumulative Graft Survival



# Conclusion

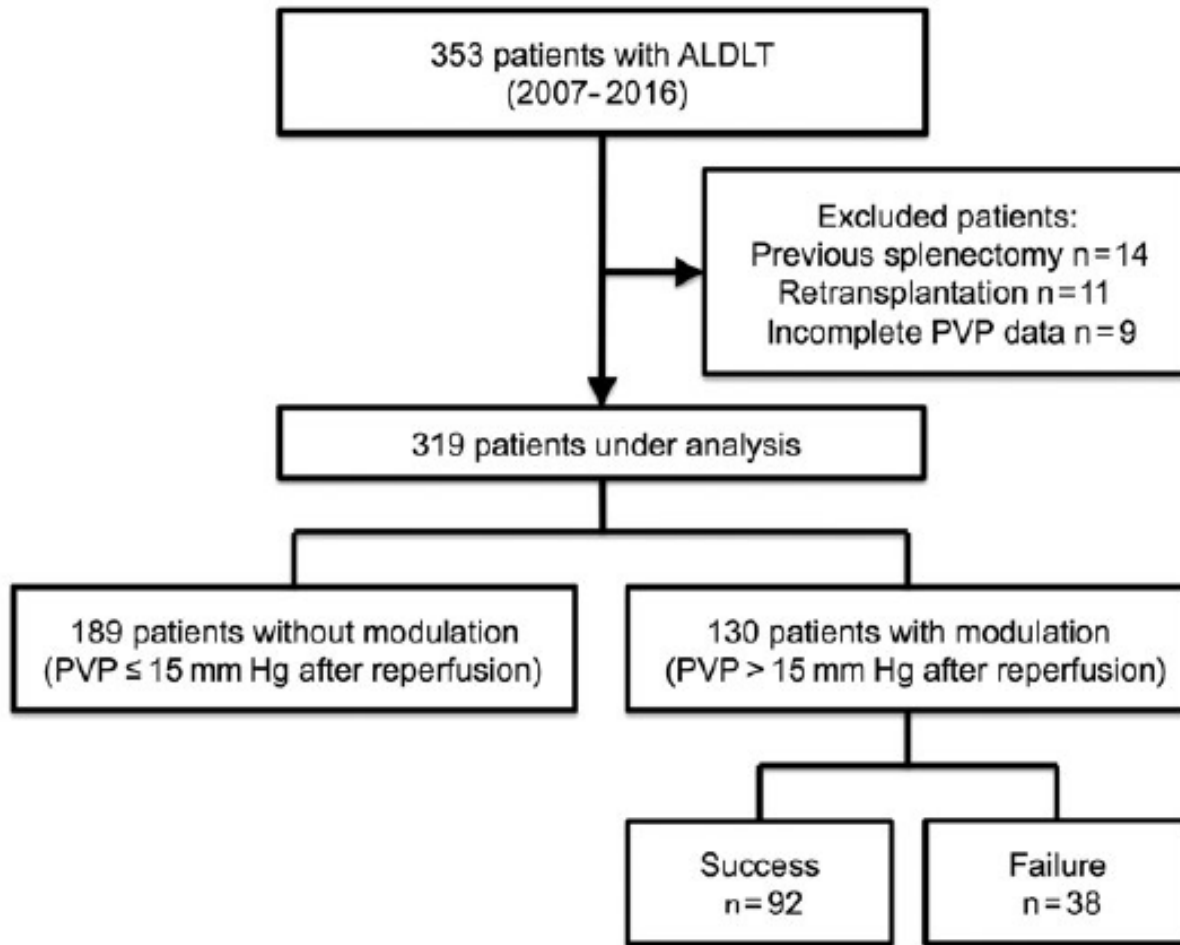


Tanaka et al 2004

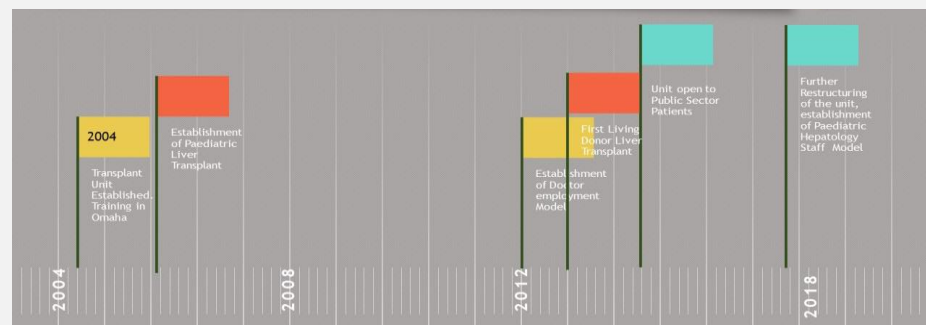
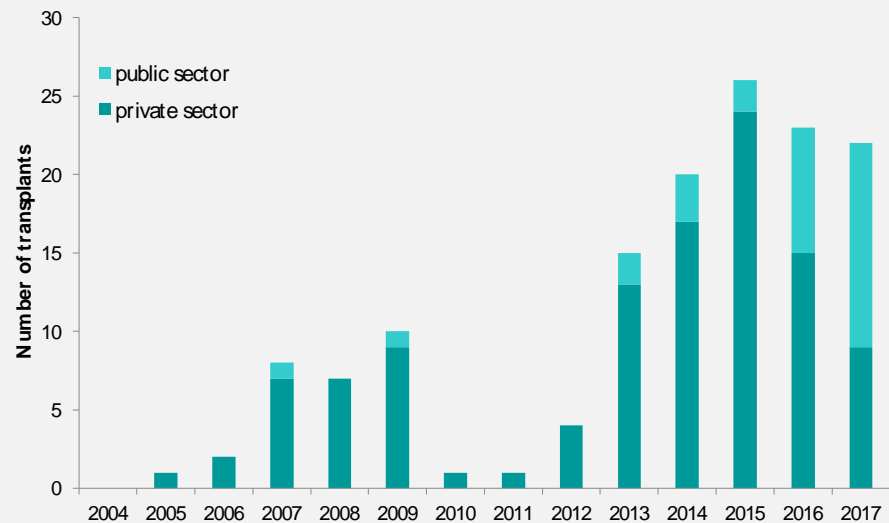
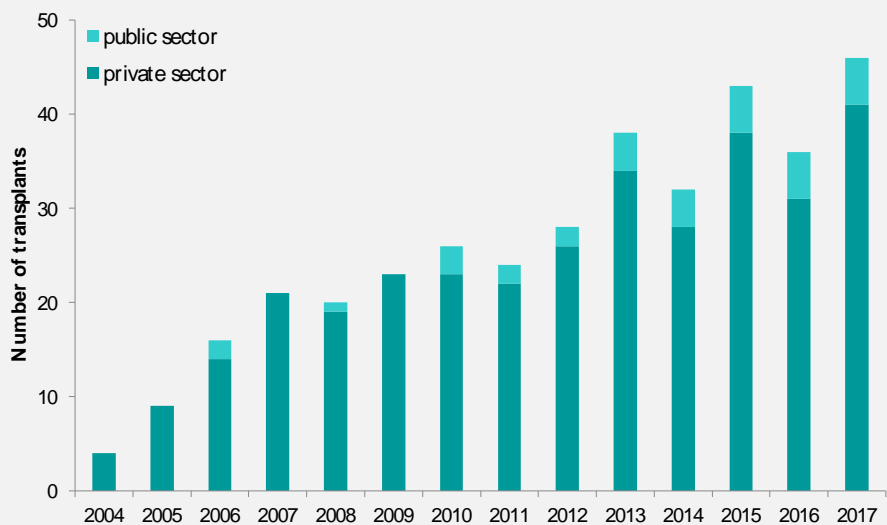


Ikegami et al 2013

# PVP Modulation



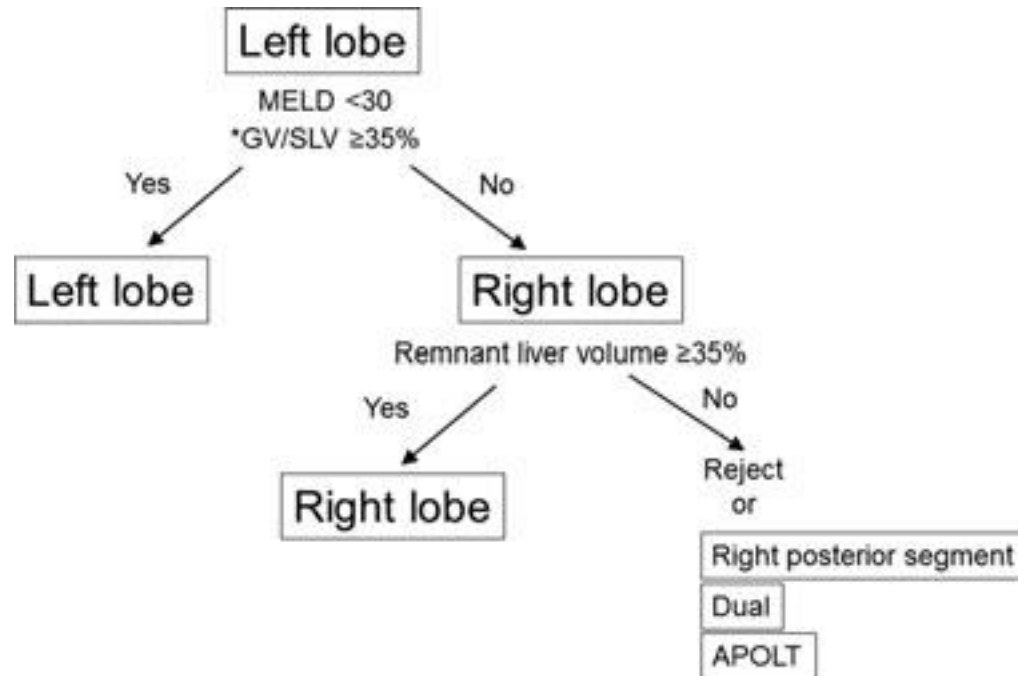
# ACCESS TO TRANSPLANTATION



# WDGMC Transplant Unit

- Proven donor safety large cohort living donors
- Significant impact organ availability
  - Organ of choice 40% paediatric patients
- Despite lower wait list mortality
  - Similar pressure DD organs adult population
- Appropriate embark adult LDLT programme

# Graft Selection



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