

# MACHINE PERFUSION FOR LIVER TRANSPLANTATION

Can machine perfusion improve clinical outcomes and expand donor liver availability?

## What is Machine Perfusion?

Machine perfusion is a novel technique to better preserve donor livers, particularly high-risk livers, using oxygen-rich fluids rather than storing them on ice.

There are three types of machine perfusion:

1. Hypothermic oxygenated machine perfusion (**HOPE**): cold preservation with oxygen
2. Normothermic machine perfusion (**NMP**): warm perfusion with oxygen
3. Normothermic regional perfusion (**NRP**): warm perfusion done inside the body before organs are removed.



## Methods

Meta-analysis of 10 randomized controlled trials (n=1513)



Population

Recipients of high-risk livers including donation after circulatory death (DCD) or brain death (DBD)



Intervention

HOPE; NMP; NRP



Comparator

Standard cold storage (SCS)



Outcomes

Patient survival, graft survival, graft-related liver complications

## Clinical Effectiveness

HOPE vs SCS



- Reduces **graft failure and early liver complications** in high-risk DBD livers
- Unclear patient survival impact
- Moderate to low quality evidence



NMP vs SCS



- Reduces **early liver complications**
- Unclear graft and patient survival impact
- Low quality evidence



NRP vs SCS



- Improves **graft and patient survival and reduces liver complications** in DCD livers
- Low quality evidence, all from non-randomised studies



## Impact on donor pool



42% of discarded livers potentially salvageable in Quebec.



A UK trial found that 71% of previously discarded livers were successfully transplanted using NMP.

## Conclusions

The TAU Policy Committee **approved** the following recommendation:

- There is **justification for considering the implementation of machine perfusion technologies within the transplant program in Quebec to improve clinical outcomes and address the critical issue of organ shortage**. A cost-effectiveness analysis at the provincial level is needed.

