

Disclosures

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A Dynamic Calculator of Waitlist Outcomes for Adult Heart Transplant Candidates

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SRTR decision aids

Kidney Transplant Decision Aid

Introduction	Dialysis vs. Transplant	Living vs. Deceased Donor	Kidney Quality (KDPI) vs. Infectious Risk Kidneys	Deceased Donor Kidney Quality	Increased Infectious Risk Kidneys	Questions for Your Doctor	Calculate Your Risks
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Calculate Your Risks

What are your likely outcomes on the kidney transplant waiting list?

Choose the Transplant Program:

Adjust for Program-Specific Transplant Rate

Choose your age:

Choose your gender:
 Male
 Female

Choose your race:
 Asian
 Black
 Native American
 Pacific Islander
 White
 Multiracial

Choose your ethnicity:
 Latino
 Not Latino

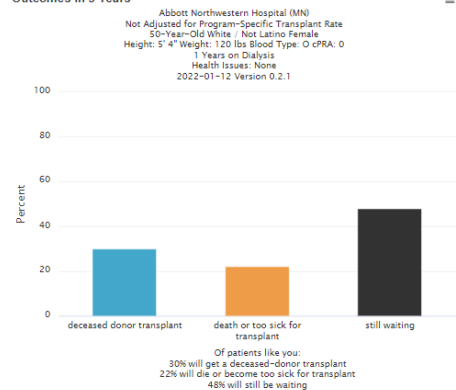
Enter your height:
 Feet: Inches:

Enter your weight:
 Pounds:

Choose your blood type:

How many years into the future do you want to predict?

Outcomes in 5 Years



Liver Waiting List Outcomes Calculator

What were the outcomes on the liver transplant waiting list? This tool shows actual patient experiences over the past two years. See more about these data [here](#).

Select Result Options to Display

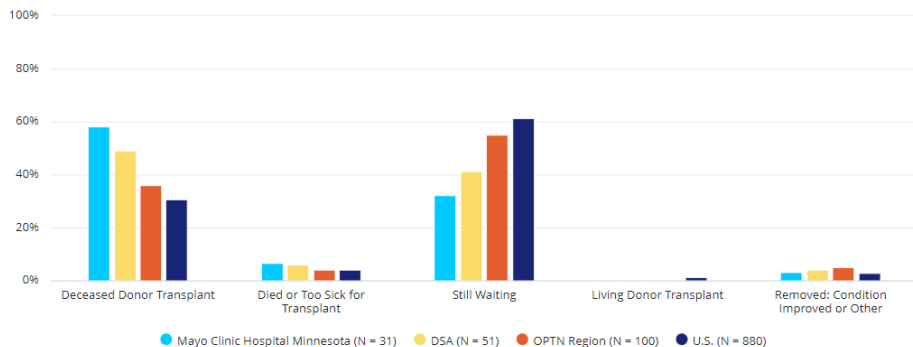
Center DSA OPTN Region Nation

How Many Days of Follow-Up Are You Interested In?



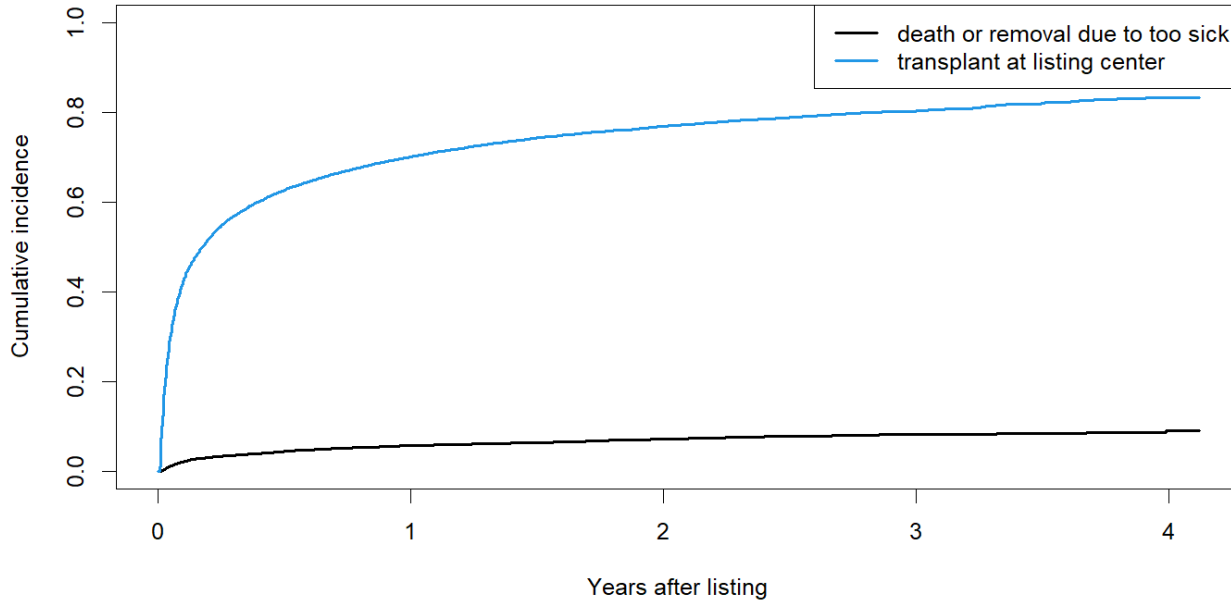
Patient Outcomes at 90 Days

Center: Mayo Clinic Hospital Minnesota; MELD score range: 25-29; Blood type: O; Age range: 18-54; Exception status: All patients within this MELD range.



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Competing risks on heart waiting list



Aim

Develop a **patient-friendly** calculator to predict personalized outcomes **on the heart transplant waiting list** that can be **updated as patient status evolves**

1. Patient-friendly
2. For transplant candidates
 - Personalized waiting time estimates
 - Time scale in months not years

Cohorts for modeling

Inclusion criteria:

- Age 18+ at listing
- Listed from 10/18/2018 – 5/31/2022
- Active within a month of listing
- No prior solid organ transplants
- No prior listings for kidney, liver, lung
- Earliest listing per person

Probabilities estimated by **random forest**

Three **landmark** cohorts:

1. Listing model: All candidates at first active status (**N=14,054**)
2. 6-month model: All candidates still waiting at 6 months (**N=3,947**)
3. 1-year model: All candidates still waiting at 1 year (**N=2,322**)



Patient-friendly predictors of waitlist outcome

Measured at listing:

Age
Gender
Blood type
Race/ethnicity
Primary diagnosis
Height, weight, cPRA
ECMO, IABP, inotropes, ventilator
On VAD
Diabetes, dialysis, cerebrovascular disease
History of cancer
Transplant center

Measured at first active status:

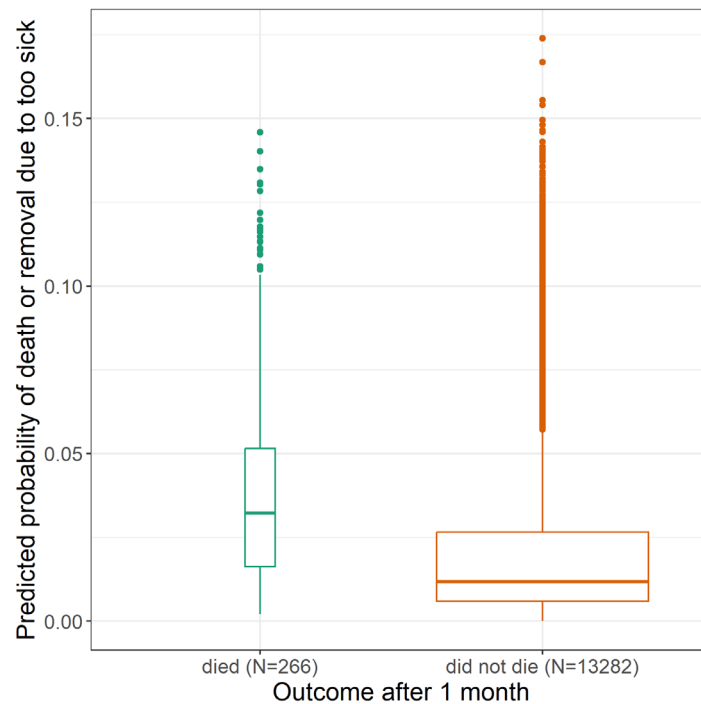
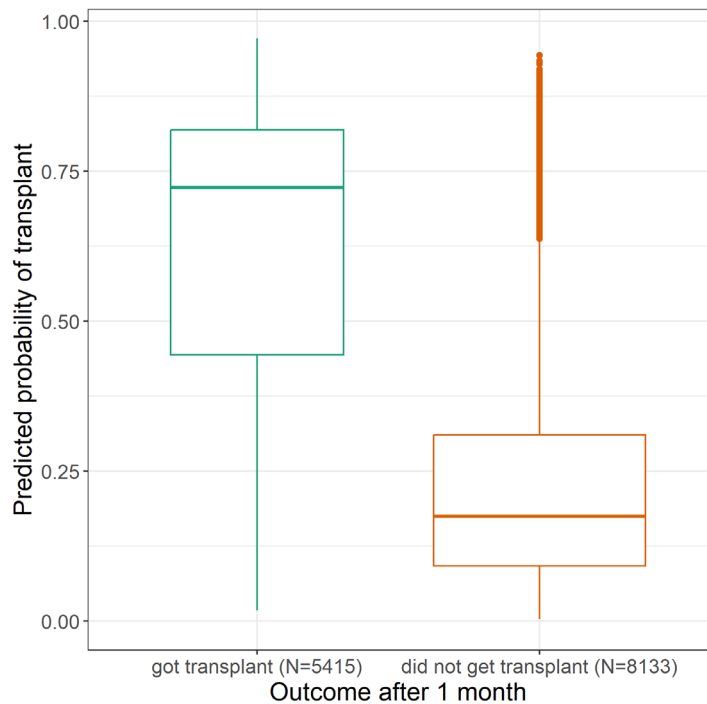
Medical urgency status
Qualifying criteria for status

Updated at 6 months and 1 year:

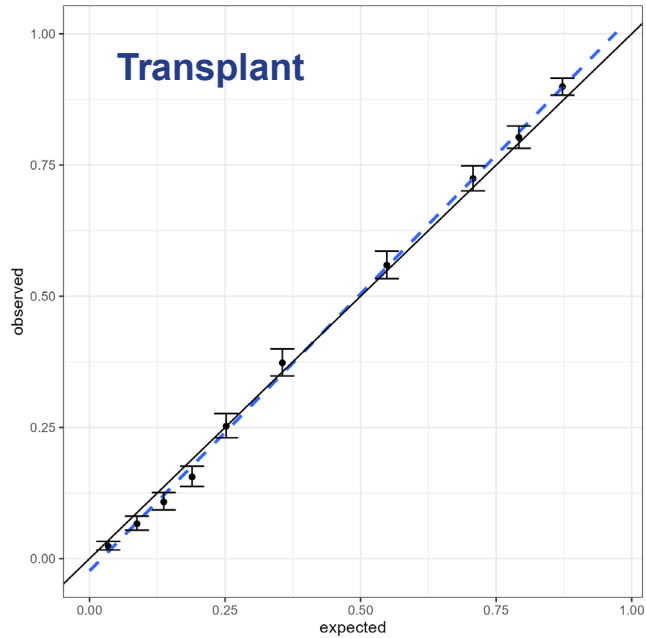
Medical urgency status
Qualifying criteria for status
cPRA
On dialysis
On ventilator



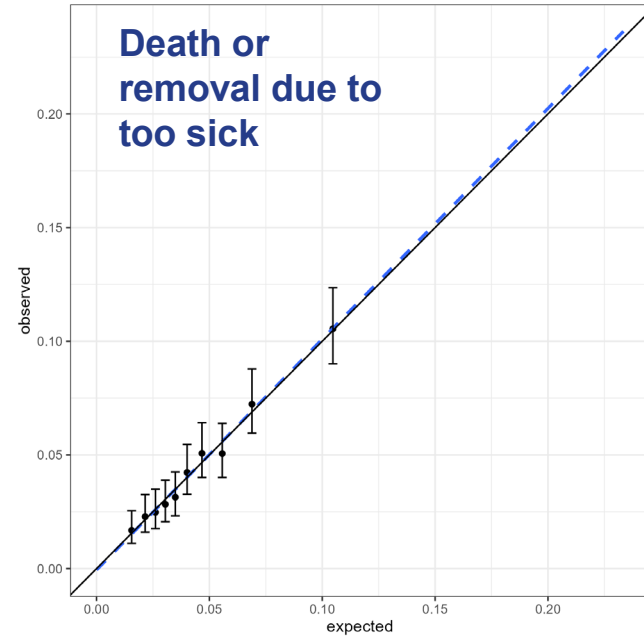
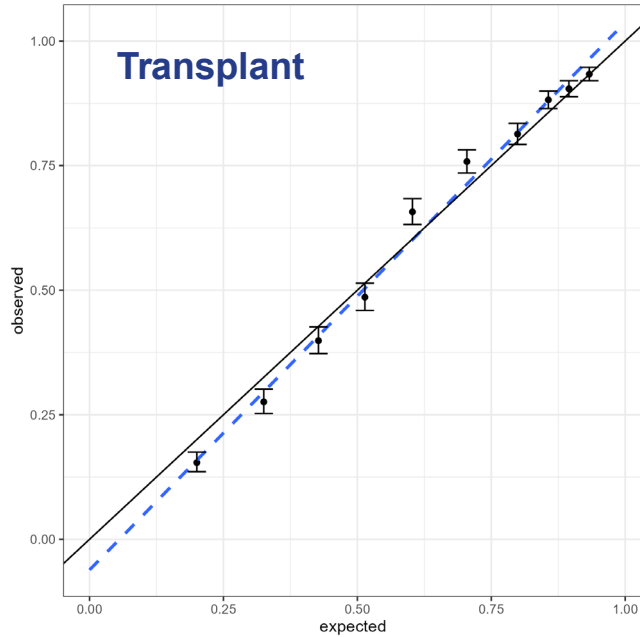
Discrimination: 1 month after first active



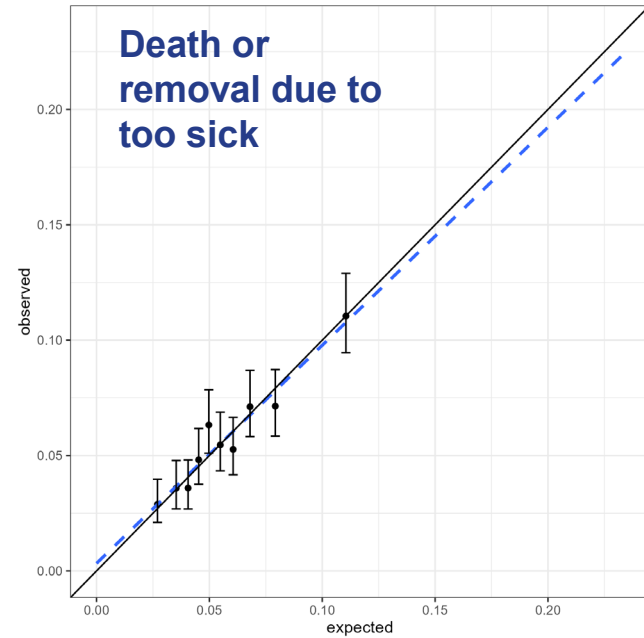
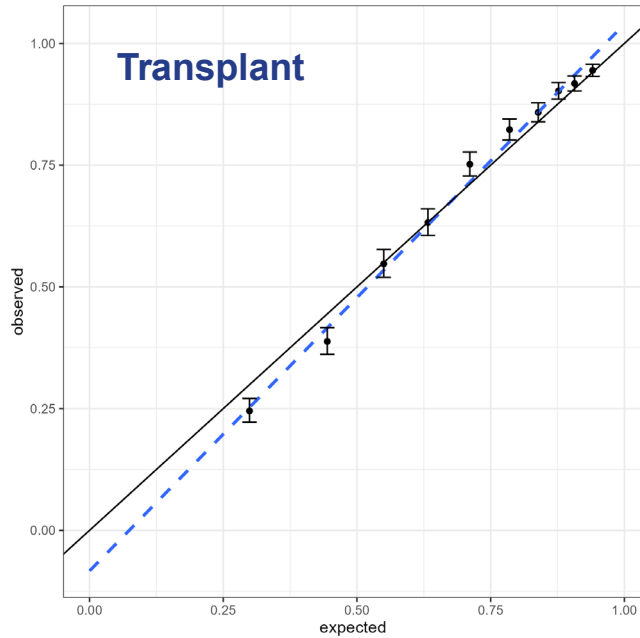
Calibration: 1 month after first active



Calibration: 6 months after first active



Calibration: 1 year after first active



Heart calculator prototype

Figure 1: Predicted outcomes after 6 months on waiting list, averaged across transplant centers, for a 50-year-old man of average height and weight, blood type O, with cardiomyopathy, initially listed at status 4 with a VAD.

What are your likely outcomes after 6 months on the heart transplant waiting list?

Next steps:
Patient input
SRTR website

Choose your age:
50

Choose your gender:
Male

Enter your height (cm):
180

Enter your weight (kg):
90

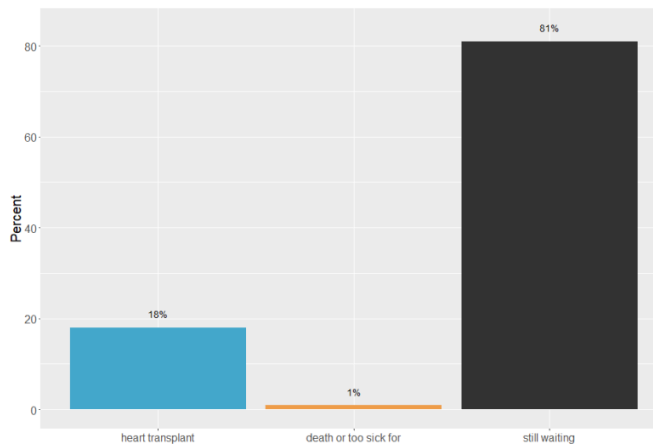
Choose your blood type:
O

Choose your diagnosis:
Cardiomyopathy

Choose your status:
Status 4

Check any that apply to you:

On VAD Diabetes
 On ECMO On dialysis
 On ventilator



Of patients like you:
18% will get a transplant
1% will die or become too sick for transplant
81% will still be waiting



Transplantation

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Landmark random forest for competing risks

Random forest for competing risks (Ishwaran et al. 2014)

- Machine learning method that pools estimates across forest of decision trees to reduce variance of a single decision tree; flexibly identifies interactions from data
- Sun et al. (2020) advocate for random forest instead of Cox in landmark analyses
- Generalizability and model performance can be evaluated in “out-of-bag” estimates, without reducing sample size for modeling