

Decision support tool for assessing absolute risk of cancer transmission from deceased kidney donors

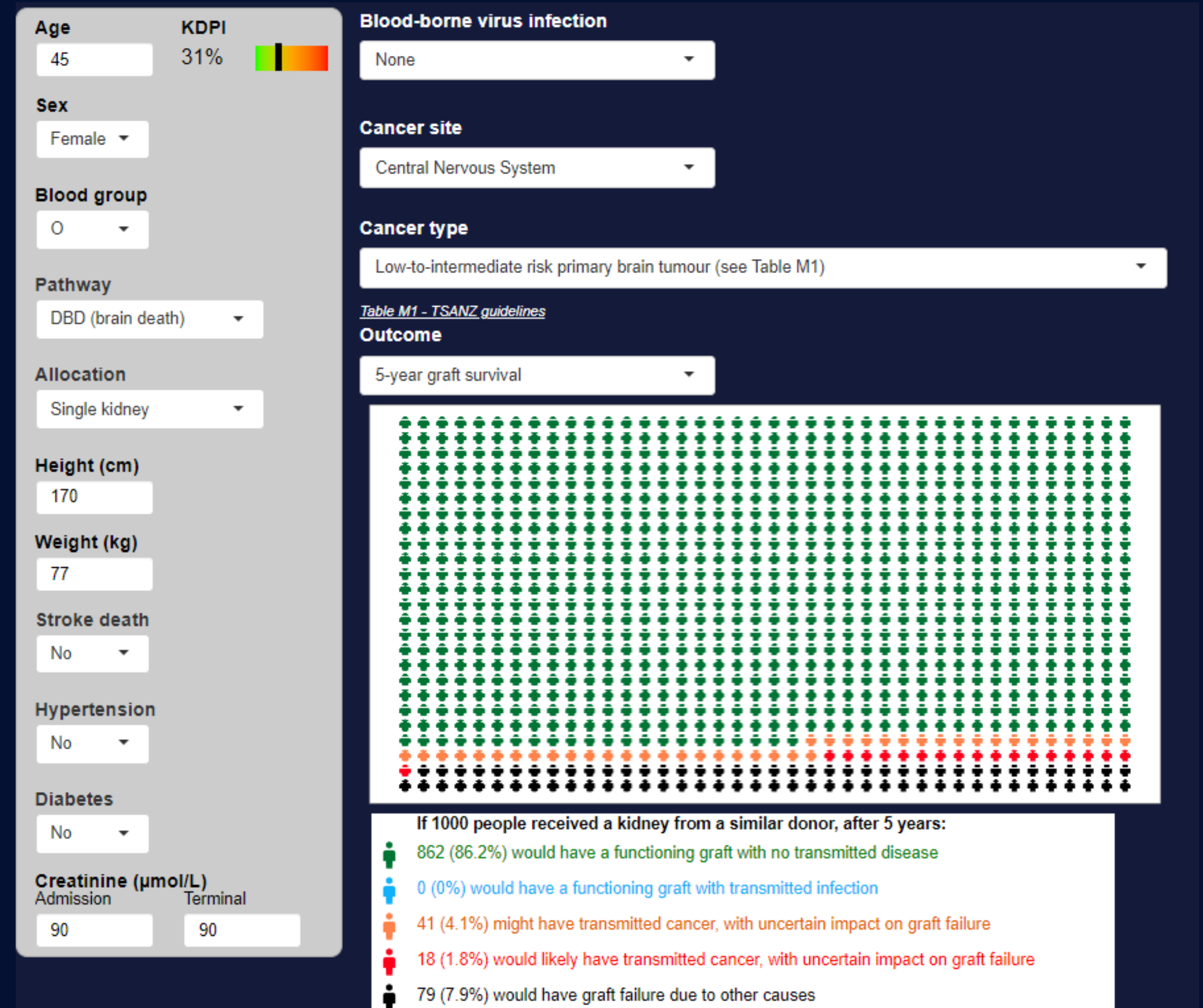
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Evidence



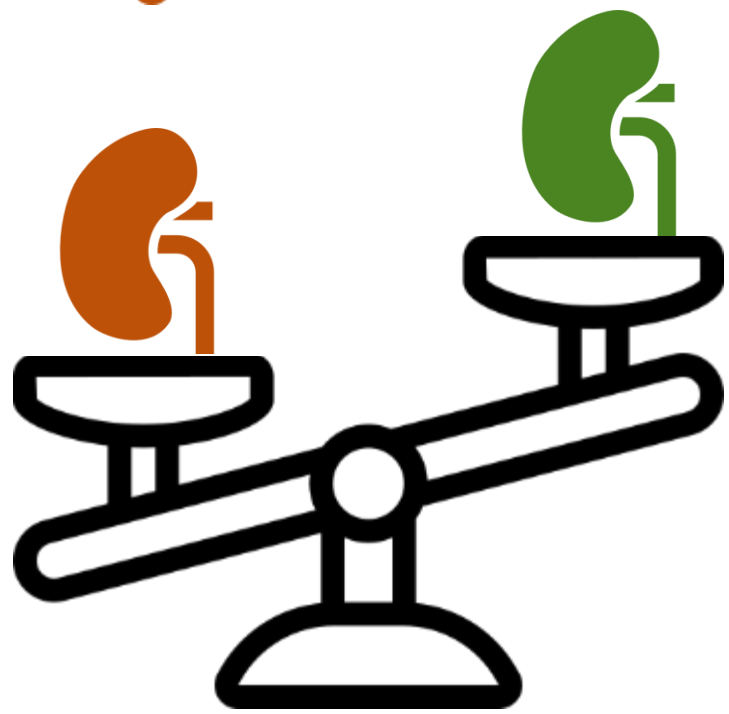
Health
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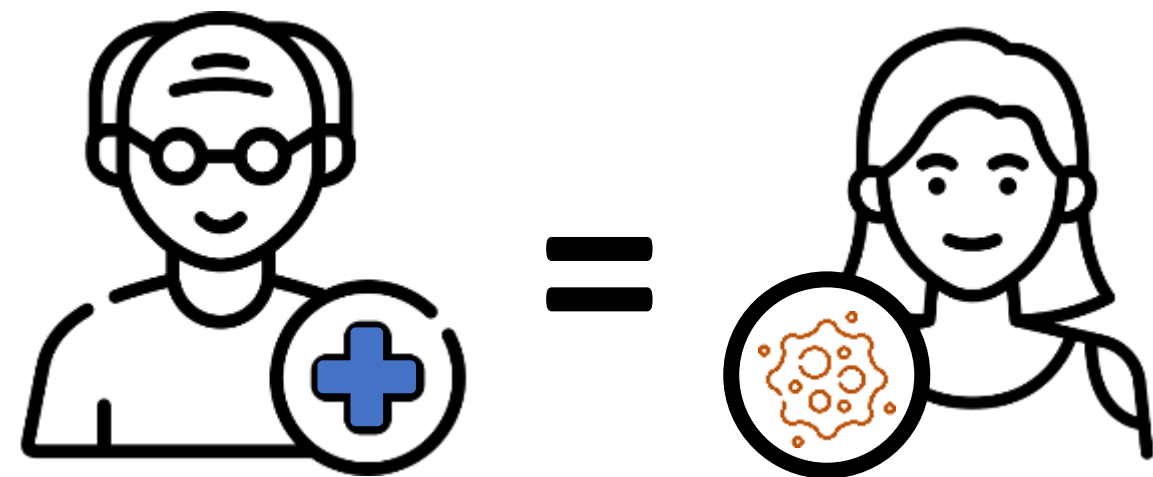
Expanding the cadaveric donor pool



Donor to recipient disease transmission risk concern → potential donors with cancer transmission risk to recipient



Many potential donors declined due to perceived higher relative risk of graft failure/death



Many donors without cancer are accepted despite having similar absolute risk (e.g. due to age)

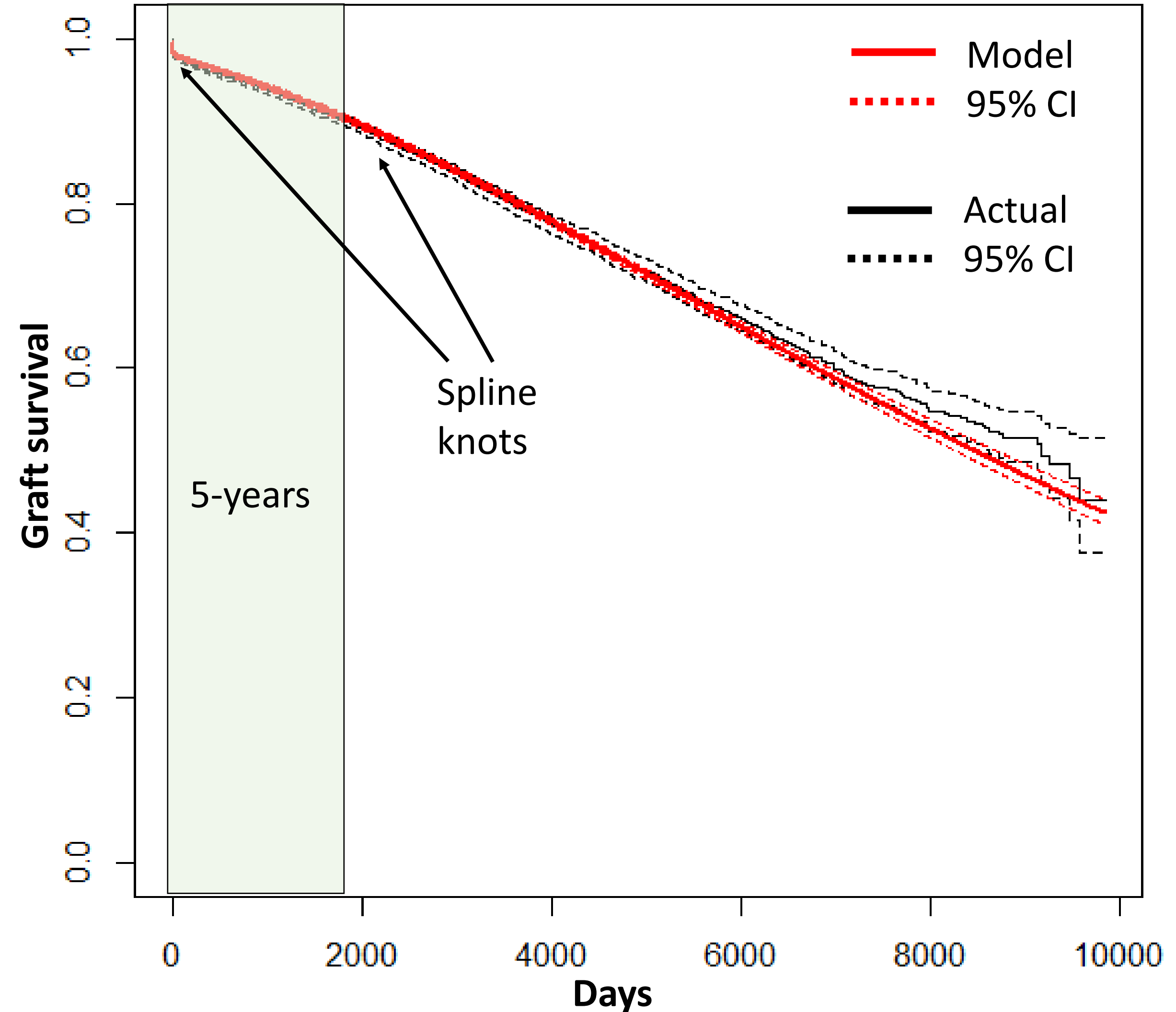
Aim: Develop a tool to assist with accepting or declining donor kidneys based on absolute risk of cancer transmission

Modelling absolute risks

ANZDATA → donor characteristics
→ 1 and 5y graft survival

Parametric survival → absolute risk

Best model → spline with 2 knots
(lowest AIC + best visual fit)



R Shiny – building a tool for clinicians



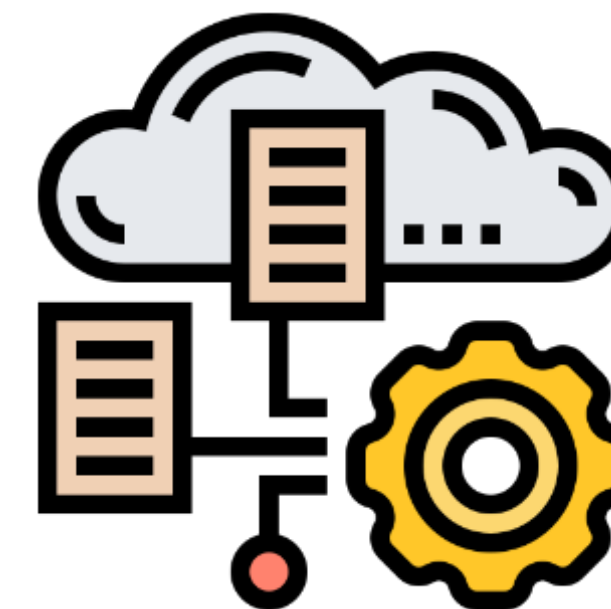
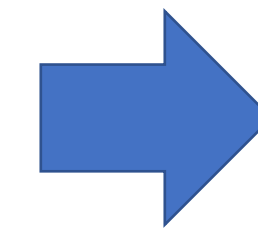
“Shiny is an R package that makes it easy to build interactive web apps straight from R”

Age
45

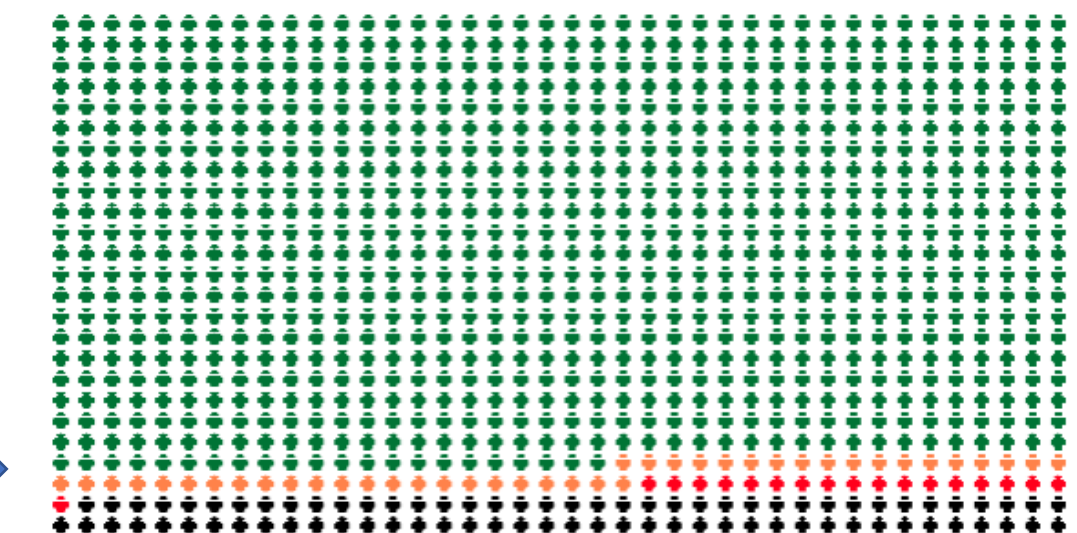
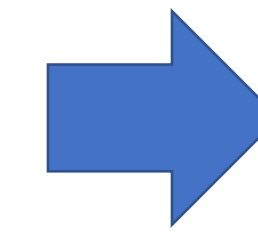
Sex
Female ▼

Blood group
O ▼

User input



Feed into model



If 1000 people received a kidney from a similar donor, after 5 years:

- 862 (86.2%) would have a functioning graft with no transmitted disease
- 0 (0%) would have a functioning graft with transmitted infection
- 41 (4.1%) might have transmitted cancer, with uncertain impact on graft failure
- 18 (1.8%) would likely have transmitted cancer, with uncertain impact on graft failure
- 79 (7.9%) would have graft failure due to other causes

Real-time output

Age
45

Sex
Female

Blood group
O

Pathway
DBD (brain death)

Allocation
Single kidney

Height (cm)
170

Weight (kg)
77

Stroke death
No

Hypertension
No

Diabetes
No

Creatinine ($\mu\text{mol/L}$)
Admission: 90 Terminal: 90

KDPI
31%

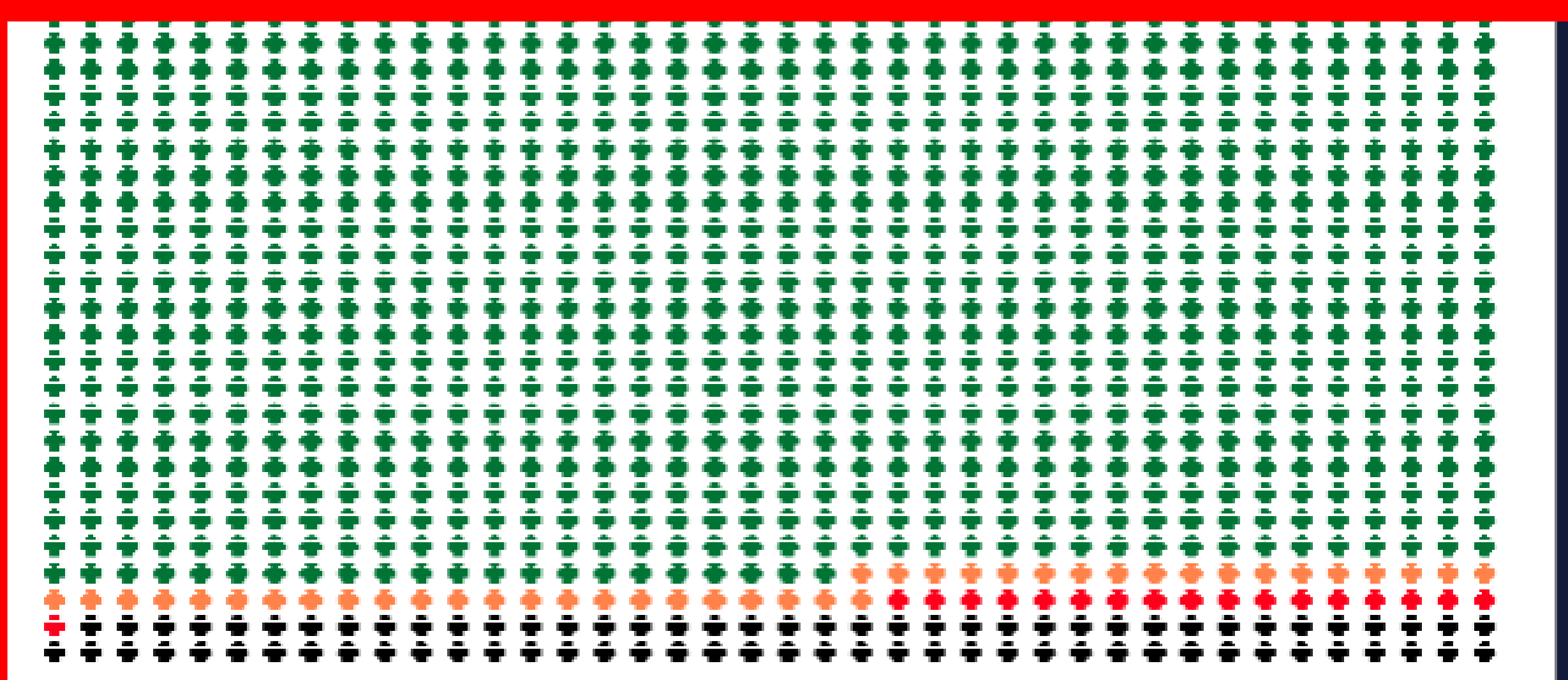
Food-borne virus infection
None

Cancer site
Central Nervous System

Cancer type
Low-to-intermediate risk primary brain tumour (see Table M1)

[Table M1 - TSANZ guidelines](#)

Outcome
5-year graft survival



If 1000 people received a kidney from a similar donor, after 5 years:

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- 0 (0%) would have a functioning graft with transmitted infection
- 41 (4.1%) might have transmitted cancer, with uncertain impact on graft failure
- 18 (1.8%) would likely have transmitted cancer, with uncertain impact on graft failure
- 79 (7.9%) would have graft failure due to other causes

Comparison donor

* Expanded criteria donor

Blood-borne virus infection

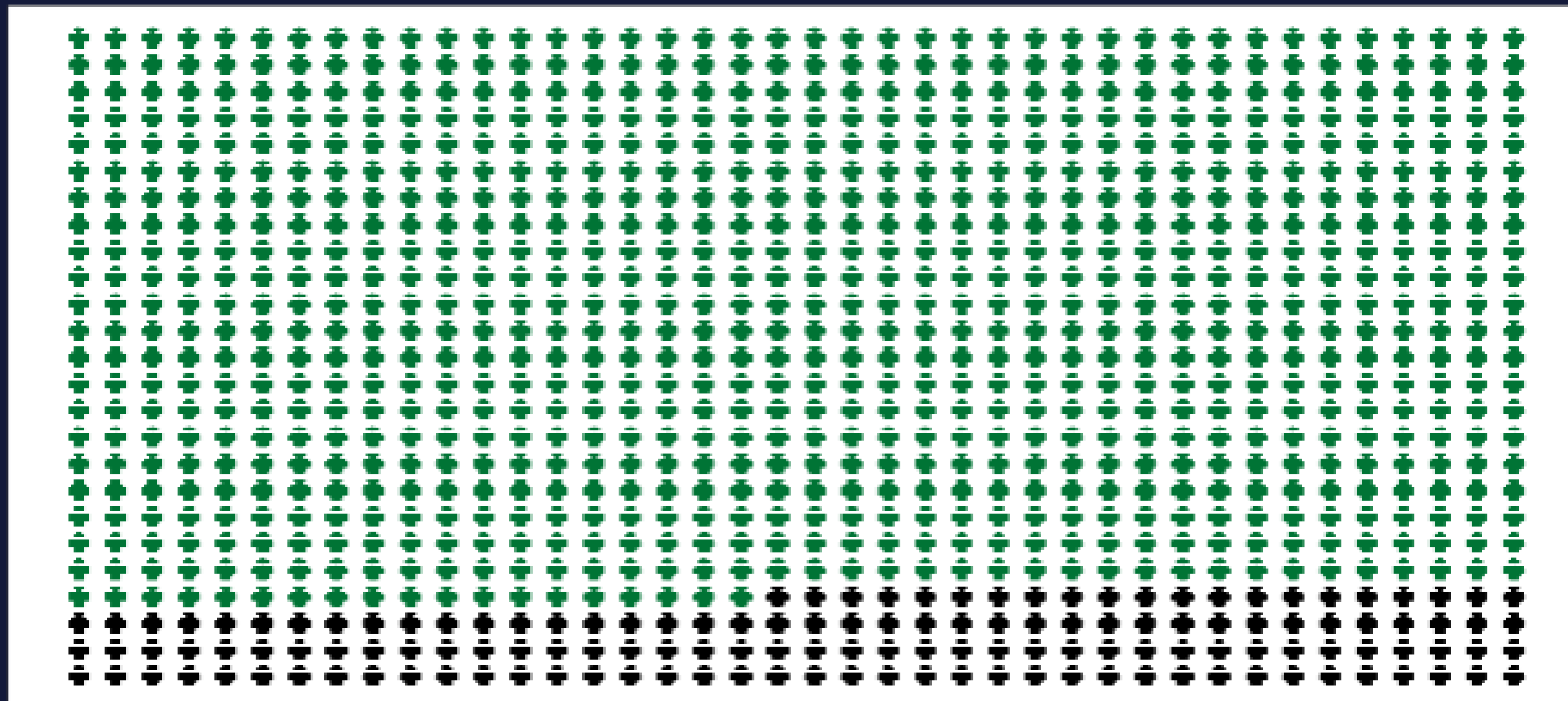
None

Cancer site






None

Cancer type

NA



If 1000 people received a kidney from a similar donor, after 5 years:

-  859 (85.9%) would have a functioning graft with no transmitted disease
-  0 (0%) would have a functioning graft with transmitted infection
-  0 (0%) might have a transmitted cancer, with uncertain impact on graft failure
-  0 (0%) would likely have transmitted cancer, with uncertain impact on graft failure
-  141 (14.1%) would have graft failure due to other causes

Age

65

KDPI

84%



Sex

Male

Blood group

O

Pathway

DBD (brain death)

Allocation

Single kidney

Height (cm)

170

Weight (kg)

77

Stroke death

No

Hypertension

Yes

Diabetes

No

Creatinine ($\mu\text{mol/L}$)

Admission

90

Terminal

90

Example: Low-intermediate risk cancer

Donor A

45y female

KDPI: 31%

Glioblastoma

2 - 6.4% transmission risk

5-year graft survival: 86.2%

VS.

Donor B

65y male (expanded criteria)

Hypertension

KDPI: 84%

No cancer

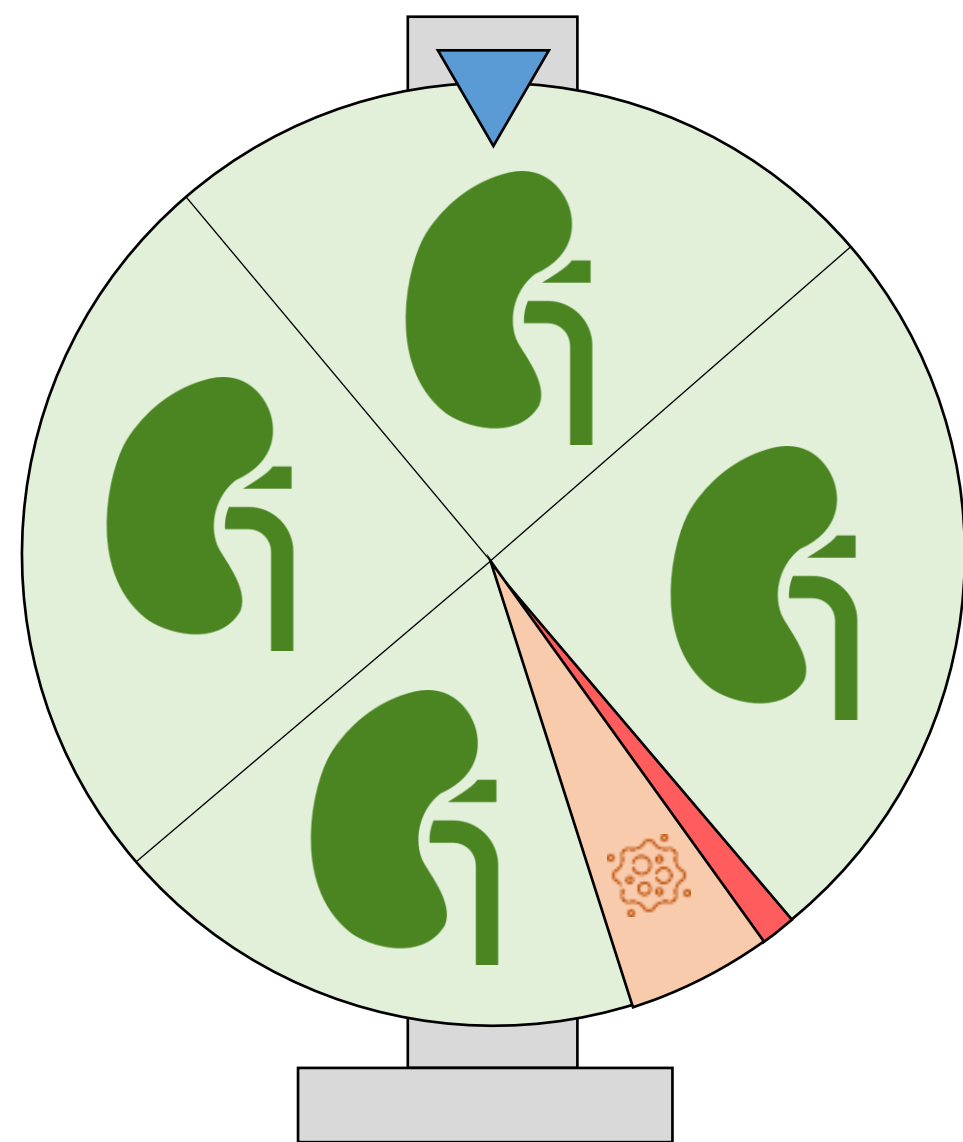
5-year graft survival: 85.9%

Future work

Pilot testing + trial in real clinical scenarios

Build a similar tool for potential recipients

- Recipient characteristics
- Multiple outcomes (graft survival, survival, quality of life)



vs.



Questions?



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