Supplementary Appendix S1

Best-worst Scaling Survey Utility Functions

$$V_{attBF} = ASC_{attBF} + \beta_{att1} * Att1 + \beta_{att2} * Att2 + \beta_{att3} * Att3 + \beta_{att4} * Att4 + \beta_{att5} * Att5 + \beta_{GenderBest} * Gender + \beta_{AgeBest} * Age + \beta_{ARNoBest} * ARNo + \beta_{TxTimeBest} * TxTime + \beta_{TxNoBest} * TxNo + \beta_{DialBest} * Dial + \beta_{ComNoBest} * ComNo$$

$$V_{attWF} = e^{\lambda WF} * \left(ASC_{attWF} + \beta_{att1} * Att1 + \beta_{att2} * Att2 + \beta_{att3} * Att3 + \beta_{att4} * Att4 + \beta_{att5} * Att5 + \beta_{GenderWorst} * Gender + \beta_{AgeWorst} * Age + \beta_{ARNoWorst} * ARNo + \beta_{TxTimeWorst} * TxTime + \beta_{TxNoWorst} * TxNo + \beta_{DialWorst} * Dial + \beta_{ComNoWorst} * ComNo\right)$$

$$V_{attBS} = e^{\lambda BS} * (ASC_{attBS} + \beta_{att1} * Att1 + \beta_{att2} * Att2 + \beta_{att3} * Att3 + \beta_{att4} * Att4 + \beta_{att5} * Att5 + \beta_{GenderBest} * Gender + \beta_{AgeBest} * Age + \beta_{ARNoBest} * ARNo + \beta_{TxTimeBest} * TxTime + \beta_{TxNoBest} * TxNo + \beta_{DialBest} * Dial + \beta_{ComNoBest} * ComNo)$$

$$V_{attWS} = e^{\lambda WS} * \left(ASC_{attWS} + \beta_{att1} * Att1 + \beta_{att2} * Att2 + \beta_{att3} * Att3 + \beta_{att4} * Att4 + \beta_{att5} * Att5 + \beta_{GenderWorst} * Gender + \beta_{AgeWorst} * Age + \beta_{ARNoWorst} * ARNo + \beta_{TxTimeWorst} * TxTime + \beta_{TxNoWorst} * TxNo + \beta_{DialWorst} * Dial + \beta_{ComNoWorst} * ComNo\right)$$

Where:

- BF denotes that the parameter is associated with the best choice, BS the next best choice, WF the worst choice, and WS the next worst choice.
- $V_{att\#\#}$ is the attribute utility.
- $ASC_{att\#\#}$ is the attribute specific constant.
- β_{attn} is the attribute level coefficient with n=1 to 5 levels.
- $Attn$ is the attribute level with n=1 to 5 levels.
- $\beta_{Gender\#\#}$ is the attribute coefficient for the covariate $Gender$. Other covariates are: Age, number of years since the last transplant ($TxTime$), the number of transplants ($TxNo$), the number of years on dialysis prior to transplantation ($Dial$); and the number of comorbidities ($ComNo$).
- $Best$ denotes that the coefficient is associated with the best and the next best choice and $Worst$ that it is associated with the worst and the next worst choice.

– $\lambda BS, \lambda WF, \lambda WS$ are scales for the 'next-best', 'worst' and 'next-worst' choices respectively and are inversely related to the error variance. The scale value for the 'best' choice is given a value of '1'.

Supplementary Appendix S2

Utility function for a Yes selection to the question "If you were offered a treatment that resulted in all of the above outcomes, would you take it?":

$$V_{yes} = ASC_{yes} + \beta_{inf} * Inf + \beta_{wgt} * Wgt + \beta_{Gastro} * Gastro + \beta_{Mood} * Mood + \beta_{CVD} * CVD + \beta_{diabetes} * Diabetes + \beta_{Graft} * Graft + \beta_{Dying} * Dying + \beta_{cancer} * Cancer$$

Supplementary Appendix S3

Benefit/harms trade-off for graft survival and the risk of occurrence of the adverse outcomes were estimated following the overall approach described by de Bekker-Grob, Rose and Bliemer (2013) (1). The benefit/harm traded off or the marginal rates of substitution (MRS) can be estimated from the following equation:

$$MRS = \frac{\Delta graft}{\Delta att} = -\frac{\frac{dUa}{datt}}{\frac{dUg}{dgraft}} = -\frac{\beta_{att}}{\beta_{graft}}$$

Where U is the attribute level coefficient (rather than the utility as in a discrete choice experiment) and if a linear relationship with the attribute level is assumed:

$$U_a = \beta_{att} * risk + constant$$

$$U_g = \beta_{graft} * years + constant$$

The pilot study (2) indicated that the relationship between attribute level coefficients may not be linear for all attributes. A first order exponential decay curve was fitted to the adverse outcome coefficient curves using GraphPad Prism V6 while the relationship for years of graft duration was modelled as linear. The general equation for first order exponential decay is:

$$U_a = (Y0 - plateau) * e^{(-\beta att * risk)} + plateau$$

The derivative of this function is:

$$-k * (Y0 - plateau) * e^{(-k*risk)}$$

Therefore an estimate of the MRS is given by the following:

$$MRS = \frac{\Delta graft}{\Delta att} = -\frac{-k*(Y0-plateau)*e^{(-\beta att*risk)}}{\beta_{graft}}$$

Where Y0 is equal to the attribute level coefficient model at 0% risk obtained from the MNL, and *plateau* is the Y value at infinite X obtained from the curve fit. As the MRS is a ratio, the confidence limits were estimated using the Krinsky Robb procedure as described by de Bekker-Grob, Rose and Bleimer (1).

1. de Bekker-Grob EW, Rose JM, Bliemer MC. A closer look at decision and analyst error by including nonlinearities in discrete choice models: implications on willingness-to-pay estimates derived from discrete choice data in healthcare. *Pharmacoeconomics*. 2013; 31(12):1169-1183.
2. Howell M, Wong G, Rose J, et al. Eliciting patient preferences, priorities and trade-offs for outcomes following kidney transplantation: a pilot best–worst scaling survey. *BMJ Open*. 2016; 6:e008163.

Supplementary Tables

Supplementary Table S1 Attribute level coefficients from a multinominal logit model of the best-worst scaling survey.

	Value	β	SE	P	95%CI	Preference Score* (Normal)	95%CI
Dying	0%	6.52	0.37	<0.001	(5.79,7.25)	1.00	(0.92,1.08)
	25%	0.896	0.25	<0.001	(0.41,1.38)	0.41	(0.36,0.46)
	75%	-1.19	0.26	<0.001	(-1.70,-0.68)	0.20	(0.14,0.25)
	100%	-1.39	0.27	<0.001	(-1.92,-0.86)	0.17	(0.12,0.23)
Graft	25y	3.81	0.30	<0.001	(3.23,4.39)	0.72	(0.66,0.78)
	15y	1.37	0.22	<0.001	(0.94,1.80)	0.46	(0.42,0.51)
	5y	-1.28	0.21	<0.001	(-1.68,-0.88)	0.19	(0.14,0.23)
	1y	-3.06	0.25	<0.001	(-3.54,-2.58)	0.00	(-0.05,0.05)
Cancer	0%	4.66	0.33	<0.001	(4.01,5.31)	0.81	(0.74,0.87)
	10%	0.336	0.29	0.25	(-0.23,0.90)	0.35	(0.30,0.41)
	30%	-0.983	0.28	<0.001	(-1.54,-0.43)	0.22	(0.16,0.27)
	50%	-1.65	0.30	<0.001	(-2.23,-1.07)	0.15	(0.09,0.21)
CVD	0%	3.92	0.37	<0.001	(3.19,4.65)	0.73	(0.65,0.80)
	10%	1.35	0.35	<0.001	(0.66,2.04)	0.46	(0.39,0.53)
	30%	-0.175	0.33	0.59	(-0.82,0.47)	0.30	(0.23,0.37)
	50%	-1.63	0.34	<0.001	(-2.29,-0.97)	0.15	(0.08,0.22)
Mood	0%	3.79	0.32	<0.001	(3.17,4.41)	0.72	(0.65,0.78)
	25%	0.634	0.29	0.03	(0.07,1.20)	0.39	(0.33,0.44)
	75%	-0.798	0.28	<0.001	(-1.35,-0.24)	0.24	(0.18,0.29)
	100%	-1.5	0.29	<0.001	(-2.06,-0.94)	0.16	(0.10,0.22)
Infection	0%	3.26	0.37	<0.001	(2.53,3.99)	0.66	(0.58,0.74)
	10%	1.69	0.34	<0.001	(1.02,2.36)	0.50	(0.43,0.57)
	30%	0.528	0.34	0.12	(-0.14,1.20)	0.37	(0.30,0.44)
	50%	-1.39	0.36	<0.001	(-2.10,-0.68)	0.17	(0.10,0.25)
Gastro	0%	3.13	0.33	<0.001	(2.49,3.77)	0.65	(0.58,0.71)
	25%	1.51	0.31	<0.001	(0.90,2.12)	0.48	(0.41,0.54)
	75%	0.023	0.31	0.94	(-0.59,0.63)	0.32	(0.26,0.39)
	100%	-1.44	0.34	<0.001	(-2.11,-0.77)	0.17	(0.10,0.24)
Diabetes.	0%	2.18	0.29	<0.001	(1.62,2.74)	0.55	(0.49,0.61)
	10%	0.297	0.27	0.27	(-0.23,0.82)	0.35	(0.30,0.41)
	30%	-0.759	0.28	0.01	(-1.31,-0.21)	0.24	(0.18,0.30)
	50%	-1.89	0.29	<0.001	(-2.46,-1.32)	0.12	(0.06,0.18)
Weight	0%	1.88	0.27	<0.001	(1.35,2.41)	0.52	(0.46,0.57)
	25%	0.817	0.27	<0.001	(0.28,1.35)	0.40	(0.35,0.46)
	75%	-0.193	0.26	0.45	(-0.69,0.31)	0.30	(0.25,0.35)
	100%	-0.608	0.27	0.03	(-1.14,-0.07)	0.26	(0.20,0.31)

* Obtained by normalizing β to the range 0 'worst' to 1 'best'.
CVD -cardiovascular disease

Supplementary Table S2. Attribute coefficients and odds ratios calculated using a mixed logit multinominal model for the Yes/No choice for the question at the end of each of 10 scenarios – "If you were offered treatment that resulted in all of the above outcomes, would you take it?". Odds ratio >1 implies that on average participants are more likely to choose YES and <1 more likely to choose NO given an increase in attribute level.

Variables	Coefficients					
	β	SE	P	Odds ratio	95% LCL	95% UCL
YES	2.14	1.32	0.11			
Serious infection	0.003	0.035	0.94	1.00	0.94	1.07
Weight gain	0.006	0.009	0.54	1.01	0.99	1.02
Diarrhea/nausea	-0.007	0.009	0.45	0.99	0.98	1.01
Depression/anxiety	-0.022	0.012	0.07	0.98	0.96	1.00
CVD	-0.023	0.024	0.36	0.98	0.93	1.03
Diabetes	0.011	0.028	0.70	1.01	0.96	1.07
Graft survival	**0.430**	0.118	**<0.001**	**1.54**	**1.22**	**1.94**
Dying	**-0.042**	0.015	**0.04**	**0.96**	**0.93**	**0.99**
Cancer	-0.039	0.024	0.10	0.96	0.92	1.01