Appendix A. Induction therapy

		DSA MFI			
		100	**500**	**2000**	**5000**
CDC	**NEG**	A	A	B + C	B + C
	POS	B + C	B + C	B + C + D	B + C + D

A – Interleukin-2 receptor antagonist (basiliximab)

B – Intravenous immunoglobulin (IVIg)

C – Anti-thymocyte therapy (thymoglobulin)

D – Plasmapheresis

Appendix B. Test performance characteristics of CDC and bead-based testing

CDC only		Rejection				
		Yes	No			
CDC	Positive	27 (6%)	58 (12%)	85	Sensitivity	26%
	Negative	75 (16%)	311 (66%)	386	Specificity	84%
		102	369	471		

MFI 100		Rejection				
		Yes	No			
Bead-based assay	Positive	8 (10%)	9 (12%)	17	Sensitivity	73%
	Negative	3 (4%)	58 (71%)	61	Specificity	87%
		11	67	78		

MFI 500		Rejection				
		Yes	No			
Bead-based assay	Positive	8 (10%)	8 (10%)	16	Sensitivity	73%
	Negative	3 (4%)	59 (76%)	62	Specificity	88%
		11	67	78		

MFI 2000		Rejection				
		Yes	No			
Bead-based assay	Positive	6 (8%)	4 (5%)	10	Sensitivity	55%
	Negative	5 (6%)	63 (81%)	68	Specificity	94%
		11	67	78		

MFI 5000		Rejection				
		Yes	No			
Bead-based assay	Positive	5 (6%)	4 (5%)	9	Sensitivity	45%
	Negative	6 (8%)	63 (81%)	69	Specificity	94%
		11	67	78		

Appendix C. Clinical input parameters

Clinical data		Base-case value (range used in sensitivity analysis)	Distribution used for probabilistic sensitivity analysis	References
Age-specific all-cause mortality among transplant recipients	Ages			(1)
	18-24	0.0017		
	25-44	0.0093		
	45-46	0.0271		
	65-74	0.0616		
	>75	0.1000		
Age-specific all-cause mortality among patients on dialysis	Ages			(1)
	18-24	0.0212		
	25-44	0.0233		
	46-64	0.0532		
	65-74	0.0763		
	>75	0.2350		
Probability of graft loss if no rejection after transplantation	Year			(2)
	0	0.02		
	1	0.02		
	2	0.02		
	3	0.02		
	4	0.04		
Probability of graft loss if AMR after transplantation	Year			(2)
	0	0.04		
	1	0.05		
	2	0.05		
	3	0.06		
	4	0.06		
Probability of cellular rejection after transplantation	Year			
	0	0.12		
	1	0.1		
	5	0.02		
	27	0.02		
Relative risk of graft loss if transplant glomerulopathy		6.2 (2.5-14.7)	Log-normal	(6)
Probability of test result:			Dirichlet	(3)
B-CDC negative		0.820 (0.784-0.855)		
B-CDC positive		0.180 (0.145-0.216)		
Probability of AMR if:			Dirichlet	(3)
B-CDC negative		0.194 (0.154-0.235)		
B-CDC positive		0.318 (0.217-0.419)		
Probability of test result/AMR			Dirichlet/Beta	(4)
MFI 100	Test	AMR		
CDC neg bead-based assay neg	0.654 (0.546-0.762)	0.039 (0.000-0.094)		
CDC neg bead-based assay pos	0.192 (0.103-0.282)	0.467 (0.209-0.724)		
CDC pos bead-based assay neg	0.128 (0.052-0.204)	0.100 (0.000-0.290)		
CDC pos bead-based assay pos	0.026 (0.000-0.061)	0.500 (0.000-1.000)		
MFI 500				
CDC neg bead-based assay neg	0.667 (0.560-0.773)	0.038 (0.000-0.092)		
CDC neg bead-based assay pos	0.179 (0.093-0.266)	0.500 (0.233-0.767)		
CDC pos bead-based assay neg	0.128 (0.052-0.204)	0.100 (0.000-0.290)		
CDC pos bead-based assay pos	0.026 (0.000-0.061)	0.500 (0.000-1.000)		
MFI 2000				
CDC neg bead-based assay neg	0.744 (0.645-0.842)	0.078 (0.002-0.136)		
CDC neg bead-based assay pos	0.103 (0.034-0.171)	0.500 (0.283-0.967)		
CDC pos bead-based assay neg	0.128 (0.052-0.204)	0.083 (0.000-0.290)		

CDC pos bead-based assay pos MFI 5000	0.026 (0.000-0.061)	0.250 (0.000-1.000)	
CDC neg bead-based assay neg	0.756 (0.659-0.854)	0.085 (0.012-0.157)	
CDC neg bead-based assay pos	0.090 (0.025-0.154)	0.571 (0.197-0.946)	
CDC pos bead-based assay neg	0.128 (0.052-0.204)	0.100 (0.000-0.290)	
CDC pos bead-based assay pos	0.018 (0.000-0.061)	0.500 (0.000-1.000)	
Health state utilities			(1, 5)
Maintenance dialysis		0.62	
Transplantation – Year 1 (time-weighted average)		0.74	
Transplantation – after Year 1 (time-weighted average)		0.79	
Return to dialysis (graft loss)		0.62	
Death		0.00	Convention
Discount rate	Benefits	0.05 (0.03-0.08)	
	Costs	0.05 (0.03-0.08)	

References

1. Wong G, Howard K, Chapman JR, Chadban S, Cross N, Tong A, et al. Comparative survival and economic benefits of deceased donor kidney transplantation and dialysis in people with varying ages and co-morbidities. PloS one. 2012; **7**(1): e29591.
2. McDonald S, Russ G, Campbell S, Chadban S. Kidney Transplant Rejection in Australia and New Zealand: Relationships Between Rejection and Graft Outcome. American journal of transplantation : official journal of the American Society of Transplantation and the American Society of Transplant Surgeons. 2007; **7**(5): 1201-8.
3. Eng HS, Bennett G, Tsiopelas E, Lake M, Humphreys I, Chang SH, et al. Anti-HLA donor-specific antibodies detected in positive B-cell crossmatches by Luminex predict late graft loss. American Journal of Transplantation. 2008; **8**(11): 2335-42.
4. Fidler S. Pre-transplant Donor Specific Anti-HLA antibody present at time of renal transplantation is independently associated with antibody-mediated rejection, progressive graft dysfunction and patient death. Transplant Immunology. 2013; **28**(4); 148-53.
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6. Australian Government Department of Health and Ageing. Cost Report Round 14 version 6.0; 2012 Apr 01.

Appendix D. Cost input parameters

Cost data	Base-case value (range used in sensitivity analysis	References
Antibody testing		Personal communication (Department of Immunology, Royal Perth Hospital)
CDC crossmatch (reagent + scientist)	$200	
Solid phase bead-based assay (test kit + scientist)	$1508	
Dialysis		
Haemodialysis	$92,040	(1)
Transplantation (initial – year 1)		(1, 2)
Transplant procedure (recipient hospital)	$34,581	
Transplant procedure (donor hospital)	$3,000	
Induction therapy (Basiliximab)	$6,300	
Outpatient follow-up (36 visits)	$15,192	
Transplantation (after year 1)		
Immunosuppression/Induction		(2)
Azathioprine	$1,167.17	
Cyclosporine	$8,497.76	
Tacrolimus	$20,260.70	
Mycophenolate mofetil	$6,110.68	
Mycophenolic acid	$6,272.38	
Sirolimus	$14,717.09	
Everolimus	$9,948.09	
Prednisolone	$204.48	
Thymoglobulin	$7,600	
Intravenous Immunoglobulin (IVIg)	$2,520	
Plasmapheresis (Catheter + 6 exchanges)	$11,810	
Proportion of immunosuppression used		(3)
Year 1		
Azathioprine	0.00	
Cyclosporine	0.14	
Tacrolimus	0.86	
Mycophenolate mofetil	0.89	
Mycophenolic acid	0.08	
Sirolimus	0.01	
Everolimus	0.01	
Prednisolone	1.00	
Subsequent years		
Azathioprine	0.06	
Cyclosporine	0.23	
Tacrolimus	0.67	
Mycophenolate mofetil	0.78	
Mycophenolic acid	0.11	
Sirolimus	0.03	
Everolimus	0.03	
Prednisolone	0.92	
Cost of management of AMR		(1, 2, 4)
Transplant biopsy (2)	$200	
Methylprednisolone (3 doses)	$240	
Plasma exchange (6 exchanges)	$6,480	
Catheter insertion (for plasma exchange)	$5,330	
Intravenous Immunoglobulin (IVIg) (0.1mg/kg for 6 doses for 10% of patients)	$267	
Rituximab (single dose 375mg/m2 for 2% of patients)	$132	
Cotrimoxazole (6 months)	$2950	
Valganciclovir (6 months)	$170	

Outpatient follow-up (18 visits)	$7,596	
Cost of management of cellular rejection		(1-5)
Transplant biopsy (1)	$100	
Methylprednisolone (3 doses)	$240	
Thymoglobulin (7 days for 5% of patients)	$511	
Outpatient follow-up (18 visits)	$7,596	
Cost of graft loss and return to transplant		(1)
Catheter insertion	$5,330	
Haemodialysis	$92,040	
Nephrectomy (50%)	$3,413	
Cost of death		(1, 2)
Hospitalisation (14 days)	$7,457	
Medications (morphine, prochlorperazine, metoclopramide, ondansetron, largactil, hyoscine)	$11,271	

References

1. Australian Government Department of Health and Ageing. Cost Report Round 14 version 6.0; 2012 Apr 01.
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3. Clayton P, Campbell S, Hurst K, McDonald S, Chadban S. The 35th Annual ANZDATA Report 2012: Chapter 8 Transplantation; 2012 June.
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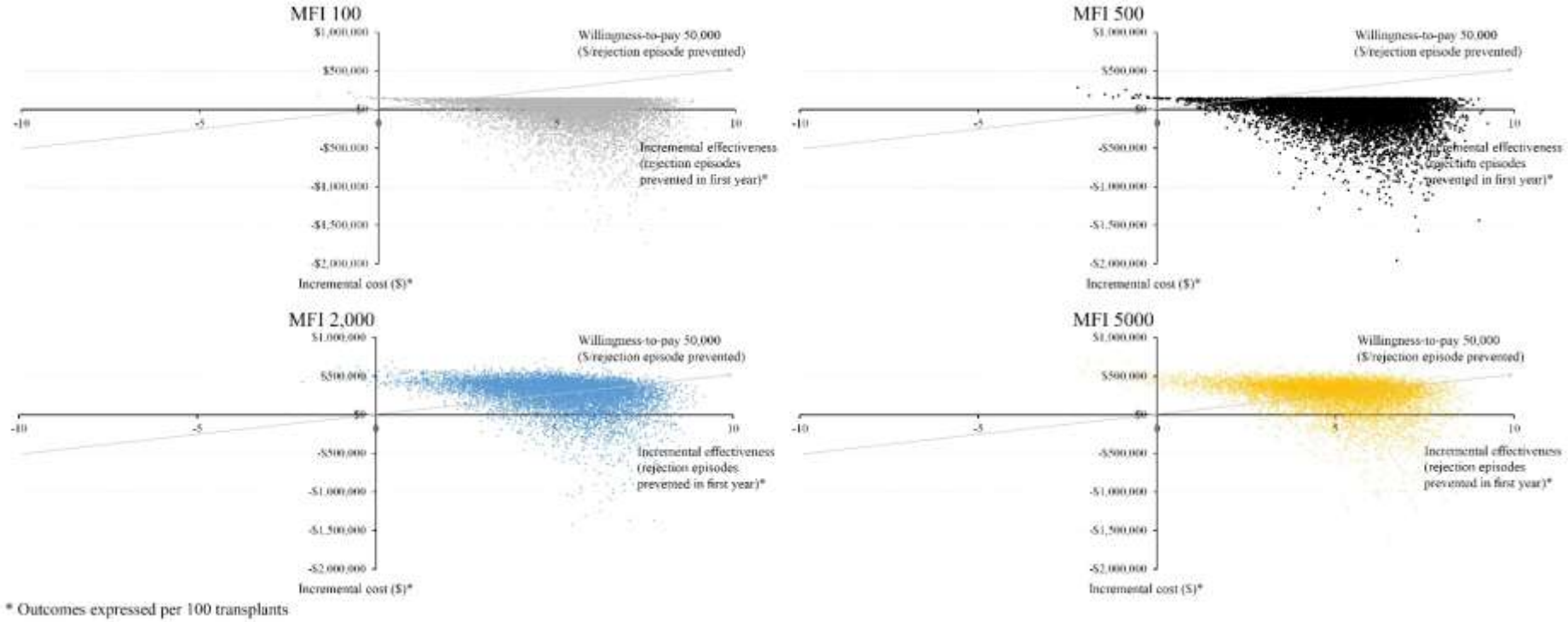
5. Morton RL, Howard K, Webster AC, Wong G, Craig JC. The cost-effectiveness of induction immunosuppression in kidney transplantation. Nephrology Dialysis Transplantation. 2009; **24**(7): 2258-69.

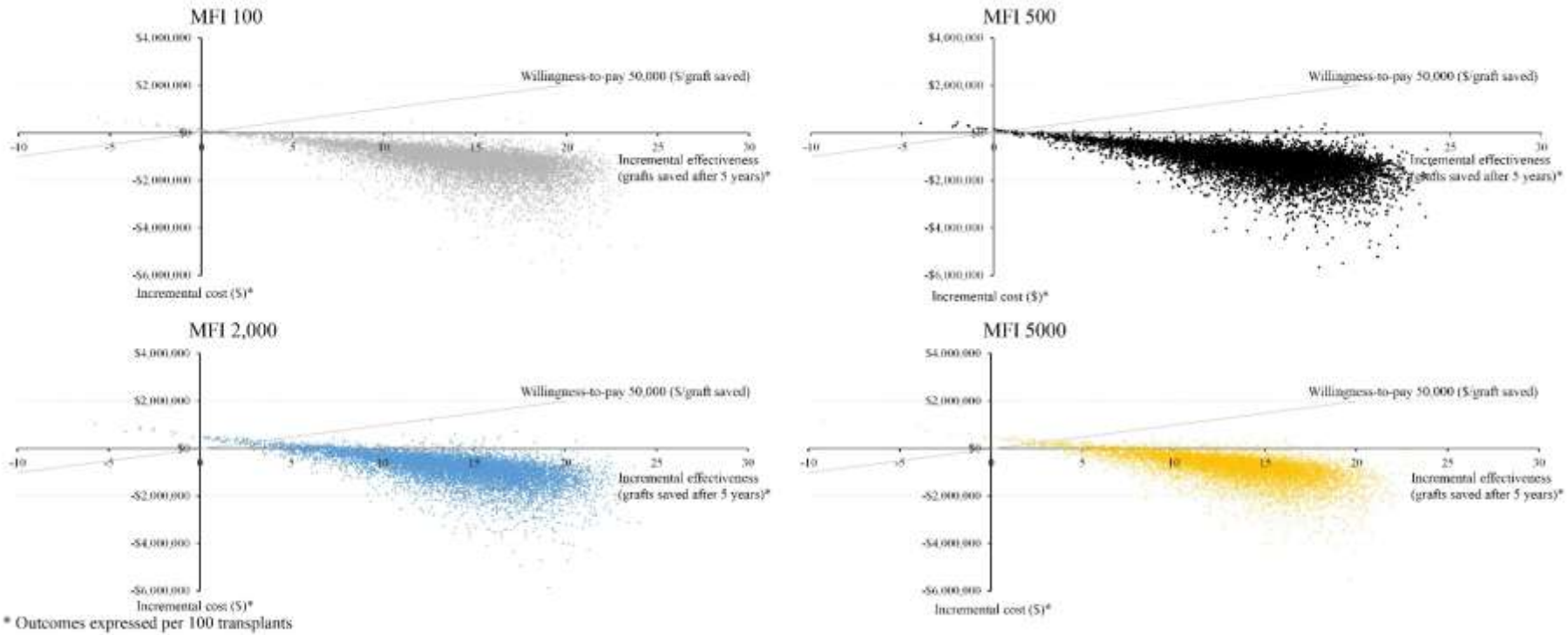
Appendix E. Probabilistic sensitivity analysis demonstrating the uncertainty of the incremental benefits of the solid phase bead-based assay as an add-on test to CDC for identifying pre-transplant DSA using various MFI thresholds in:

(i) Rejection episodes in the first year



* Outcomes expressed per 100 transplants

(ii) Grafts saved after 5 years



* Outcomes expressed per 100 transplants

(iii) Quality-adjusted life-years