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Clinical and Economic Benefit of CMV Matching in Kidney Transplant: A Decision Analysis

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Disclosures

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I have financial relationship(s) within the last 12 months relevant to my presentation with:

CareDx - Consultant

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Scientific Direct - Advisor

AND

My presentation does not include discussion of off-label or investigational use.

I do not intend to reference unlabeled/unapproved uses of drugs or products in my presentation.

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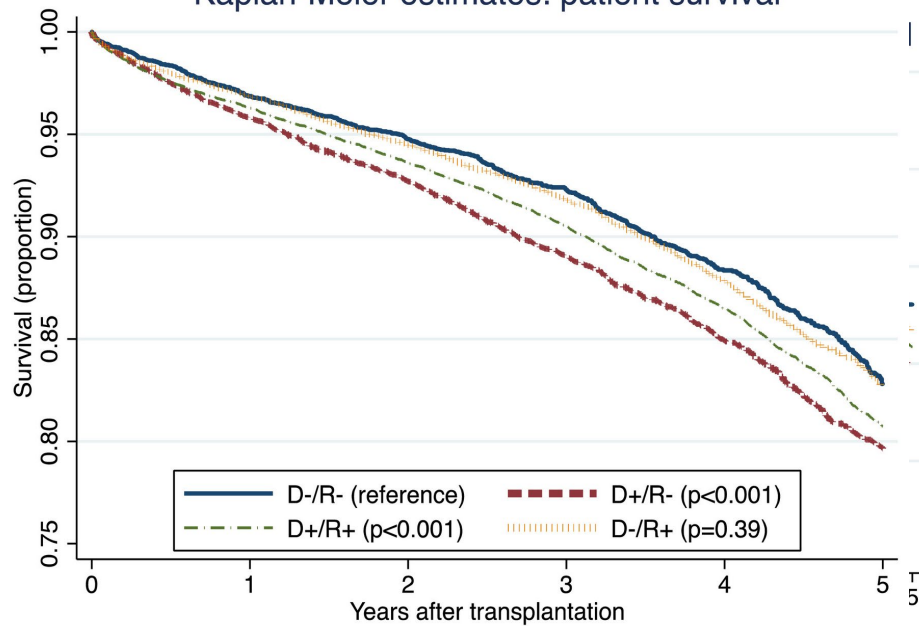
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Cytomegalovirus In Kidney Transplant

Cytomegalovirus (CMV) is a major cause of morbidity and mortality after solid organ transplant

- Despite prophylaxis with valganciclovir, CMV infection increases the risk of death and graft loss
- Highest risk is in CMV-negative recipients (CMV R-) who receive CMV donor + (CMV D+) kidneys
- Increased graft failure (D+/R- vs. D-/R-: hazard ratio [HR] = 1.17, $P = .01$)
- All-cause mortality (HR = 1.18, $P < .001$)
- Infection-related mortality (HR = 1.38, $P = .03$)

Kaplan-Meier estimates: patient survival

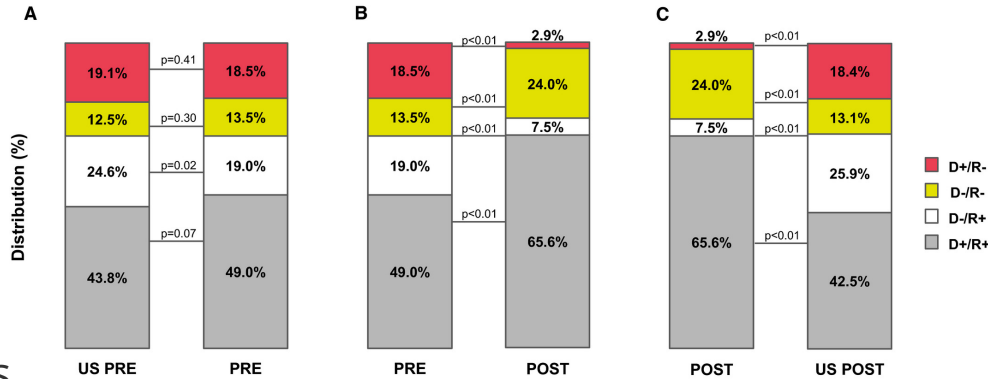


Leaphorn et al. *AJT*. 2019. 2:573-584

Benefits of CMV Donor and Recipient Matching

Preferentially transplanting CMV D – organs into CMV R- recipients reduces the risk of posttransplant CMV infection and associated graft loss

- The number of CMV D- exceeds CMV R- recipients nationally
- Selective allocation reduces CMV D+/R- transplant
- Preferential allocation of CMV D- donors did not negatively impact transplant rates in a pilot study



A: US vs. OPO Deceased Donor CMV Serology Pre-Pilot
B: OPO Pre vs. Post Pilot Deceased Donor CMV Serology
C: US vs. OPO Deceased Donor CMV Serology Post-Pilot

[Lockridge et al. AJT. 2020;20:3502-3508](#)

Purpose/Design of study

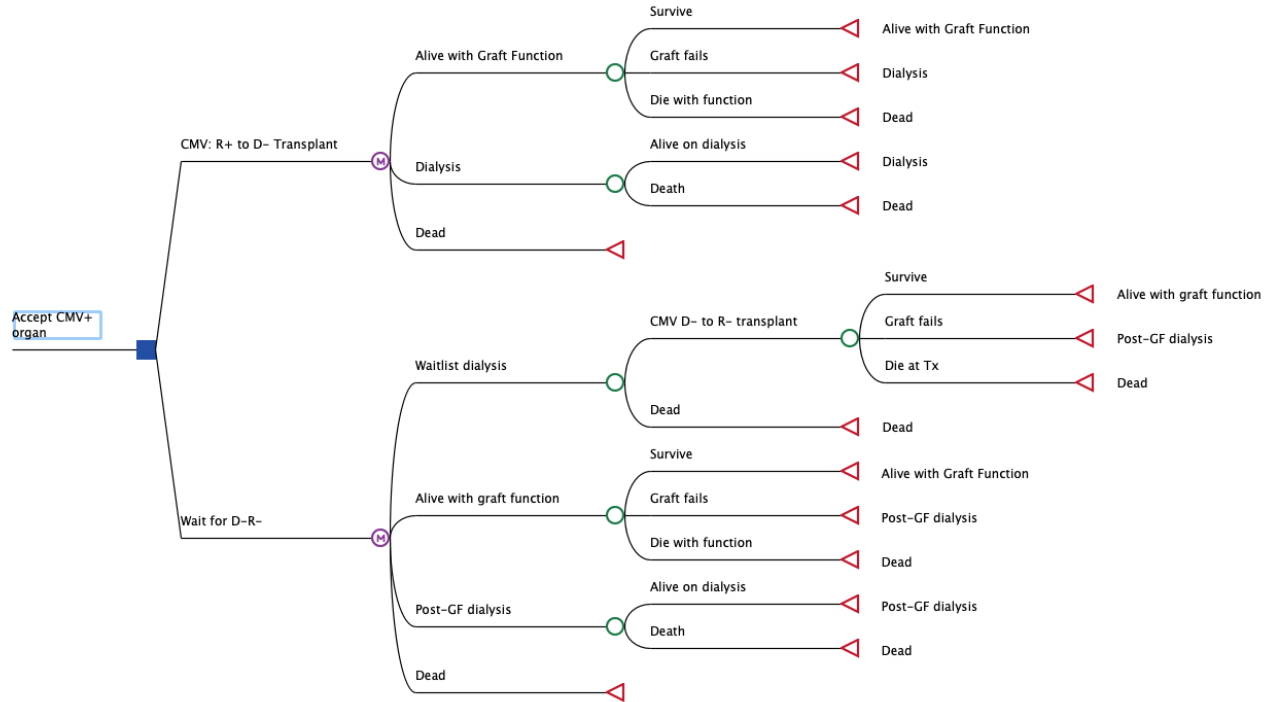
Purpose:

Assess the potential clinical and economic implications of a national allocation policy to preferentially allocate CMV D- kidneys to CMV R- candidates

Design:

- Markov decision analytic model
- Survival input: Leaphorn et al. *AJT* 2019, based on UNOS analysis
- Economic inputs: Linked Medicare-SRTR data to determine differential cost of D+/R- vs. D-/R- transplant
- Additional input: Pharmaceutical costs, utilities (dialysis, transplant), discount rate (3%)

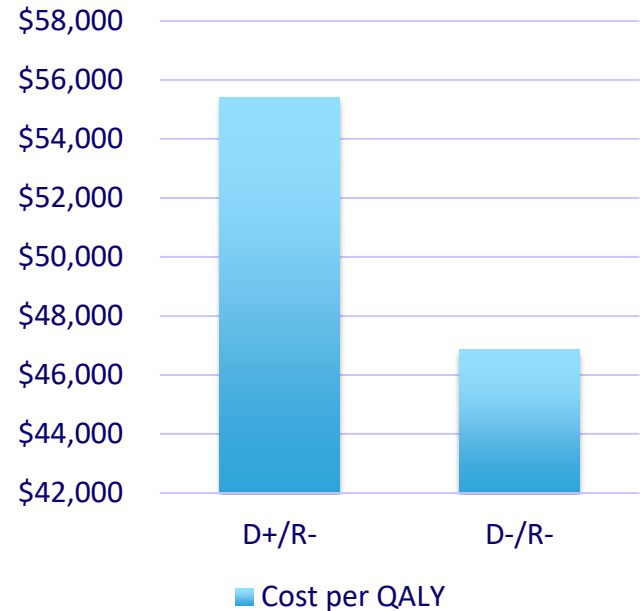
Model Overview



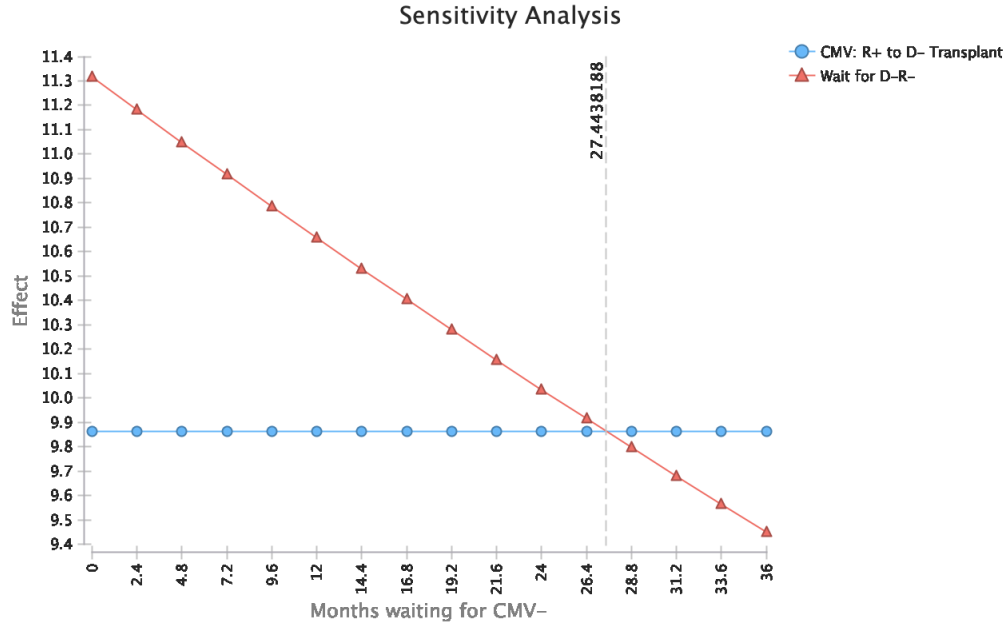
Results

- Expected survival increased with D-/R- transplants: **14.3 years vs 12.6 years**
- CMV D-/R- transplant increased quality of life-adjusted survival: **11.3 QALYs vs 9.8 QALYs**
- CMV D-/R- transplant less expensive than D+R- procedures: **\$529,512 vs \$542,963**

**Thus, D-R- transplant is a dominant strategy:
less expensive and more effective**



How long can you wait for CMV- Donor?



Limitations

Markov model based on general survival data

- There may be differences in quality of the organ for CMV D- vs. D+
- Did not specifically model differences by race/ethnicity
- Sensitive to assumptions about the cost of prophylaxis and differential rates of posttransplant survival



Conclusions

- Prospective matching for CMV status results in **cost savings** and **longer posttransplant survival**
 - Waiting up to 30 months for a CMV D- organ was associated with equivalent long-term survival
- In 2018, 2699 D+/R- and 3890 D-/R+ deceased donor kidney transplants were performed
 - Reallocating CMV D- donors to CMV R- patients would save **\$36,304,249** in expenditures and increase survival by **4,048** QALYs
 - Would not impact access for CMV R+ patients, as D+ organs would be reallocated to them



Transplantation

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