Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods. Transition Probabilities (TPs)

To calculate the realistic transition probabilities between health states in our model,[1] we used the rates of myopia progression from randomized controlled trials and were categorized as slow, intermediate, or rapid progression, defined as <0.5 D, 0.5 to 0.99 D, and ≥1.0 D, respectively.[2–4]

Given two health states i and j, let $\gamma_{i,j}$ represent the optimum rate of progression from i to j. Similarly, let $\pi_{i,j}(t)$ represent the calculated TP from i to j over a period t. Let G represent the matrix of optimum rates of progression between health states; with elements $\gamma_{i,j}$, and $P(t)$ represent a matrix of corresponding transition probabilities with elements $\pi_{i,j}(t)$. The relationship between $P(t)$ and G is shown in equation 1.[5]

$$P(t) = \exp(tG) = \sum_{n=0}^{\infty} \frac{t^n}{n!} G^n \qquad \text{Equation 1}$$

The sum of transition rates from state λ_i is given in equation 2, the solution to equation 1 in our context, i.e., a three-state model with forward transitions only, is given in equation 3

$$\lambda_i = \sum_{j \neq i} \gamma_{i,j} \qquad \text{Equation 2}$$

$$P(t) = \begin{pmatrix} \pi_{1,1}(t) & \pi_{1,2}(t) & \pi_{1,3}(t) \\ \pi_{2,1}(t) & \pi_{2,2}(t) & \pi_{2,3}(t) \\ \pi_{3,1}(t) & \pi_{3,2}(t) & \pi_{3,3}(t) \end{pmatrix} = \begin{pmatrix} e^{-\lambda_1 t} & \frac{\gamma_{1,2}(e^{-\lambda_2 t} - e^{-\lambda_1 t})}{\lambda_1 - \lambda_2} & (1 - \pi_{1,1}(t) - \pi_{1,2}(t)) \\ 0 & e^{-\lambda_2 t} & (1 - \pi_{2,1}(t) - \pi_{2,2}(t)) \\ 0 & 0 & 1 \end{pmatrix} \qquad \text{Equation 3}$$

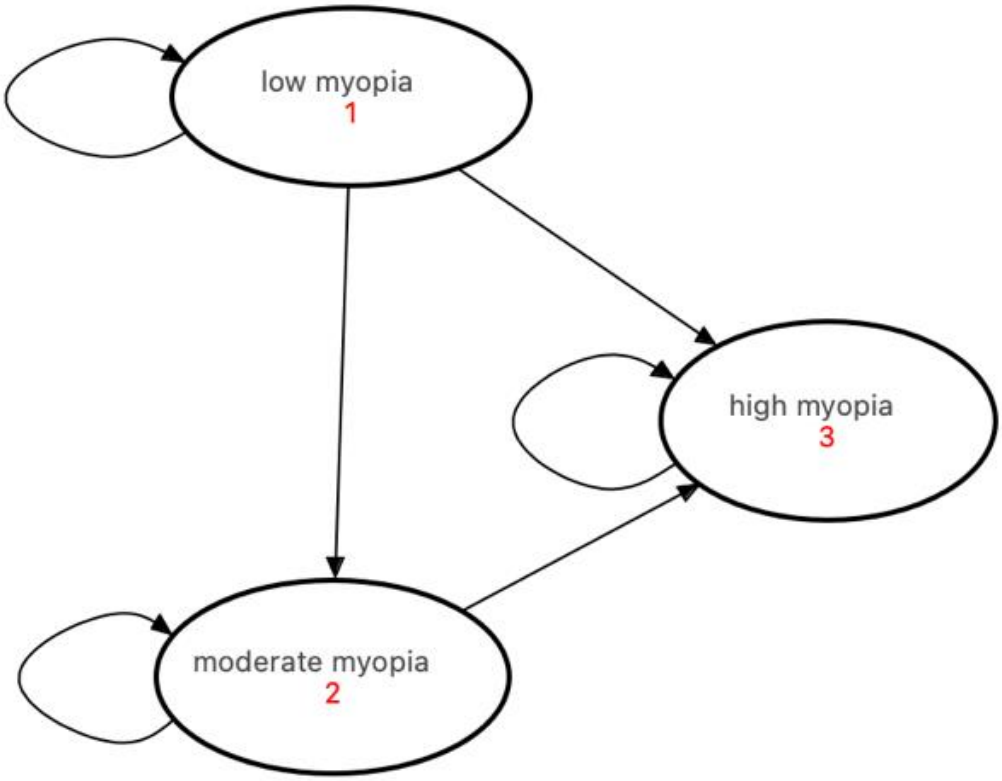
eTable. Sources and Characteristics of Studies for Transition Probabilities

Author	Study area	Sample size	Follow-up (years)	Age (years)	Intervention	Baseline SE (D)	Baseline AL (mm)	Change in SE (D/year)	Change in AL (mm/year)
Yam et al, 2018[2]	Hong Kong	438	1	4-12	Atropine 0.05%	-3.98 (1.69)	24.85 (0.90)	-0.27 (0.61)	0.20 (0.25)
					Placebo	-3.85 (1.95)	24.82 (0.97)	-0.81 (0.53)	0.41 (0.22)
Yam et al, 2018[2]	Hong Kong	438	1	4-12	Atropine 0.01%	-3.77 (1.85)	24.70 (0.99)	-0.59 (0.61)	0.36 (0.29)
					Placebo	-3.85 (1.95)	24.82 (0.97)	-0.81 (0.53)	0.41 (0.22)
Fulk et al, 2000[6]	United States	82	2.5	6-12.9	Bifocal	-2.12 (1.16)	24.02 (0.78)	0.40 (0.35)	NA
					SVL	-2.52 (1.40)	24.10 (0.71)	0.50 (0.33)	NA
Lam et al, 2020[7]	Hong Kong	183	2	8-13	DIMS	-2.97 (0.97)	24.70 (0.82)	-0.17 (0.05)	0.11 (0.02)
					SVL	-2.76 (0.96)	24.60 (0.83)	-0.55 (0.04)	0.32 (0.02)
Bao et al, 2022[8]	China	170	2	8-13	HAL	-2.70 (0.14)	24.76 (0.09)	-0.27 (0.06)	0.13 (0.02)
					SAL	-2.31 (0.13)	24.43 (0.10)	-0.48 (0.05)	0.25 (0.02)
					SVL	-2.46 (0.12)	24.77 (0.09)	-0.81 (0.06)	0.36 (0.02)
Gwiazda and Chandler, 2011[9]	United States	118	3	8- <12	PAL	-1.50 (0.45)	NA	-0.29 (0.39)	NA
					SVL	-1.45 (0.47)	NA	-0.42 (0.37)	NA
Katz et al, 2003[10]	Singapore	428	2	6-12	RGP	-2.84 (0.83)	24.39 (0.79)	-0.65 (0.55)	0.35 (0.41)
					SVL	-2.63 (0.85)	24.46 (0.79)	-0.63 (0.49)	0.33 (0.40)
Cho & Cheung, 2012[4]	Hong Kong	102	2	6-10	Orthokeratology	-2.05 (0.72)	24.48 (0.71)	NA	0.20 (0.15)
					SVL	-2.23 (0.84)	24.40 (0.84)	NA	0.37 (0.16)
					SVL	-1.75 0.94	24.00 (0.86)	-0.44 (0.28)	0.24 (0.11)
Chamberlain et al, 2019[11]	Multicenter	144	3	8-12	MiSight Lenses	-2.02 (0.77)	24.42 (0.66)	-0.18 (0.39)	0.09 (0.13)
					Proclear (control)	-2.19 (0.81)	24.46 (0.70)	-0.58 (0.41)	0.24 (0.15)
Sankaridurg et al, 2019[12]	China	508	3	7-13	SHCL I (+2.50)	-2.38 (0.82)	24.70 (0.80)	-0.50 (0.35)	0.21 (0.17)
					SHCL II (+1.50)	-2.39 (0.79)	24.50 (0.70)	-0.53 (0.43)	0.24 (0.17)
					CL III (EDOF – +1.70D)	-2.41 (0.82)	24.50 (0.70)	-0.47 (0.39)	0.22 (0.16)
					CL IV (EDOF – +2.50D)	-2.44 (0.73)	24.60 (0.80)	-0.50 (0.34)	0.22 (0.14)
					Single vision SHCL (control)	-2.29 (0.75)	24.70 (0.80)	-0.66 (0.33)	0.33 (0.14)
					SVL	-1.93 (0.74)	24.28 (0.83)	-1.30 (0.44)	0.72 (0.21)
Wu et al, 2018[3]	Taiwan	693	1	6-7	Outdoor activity	-0.36 (1.14)	22.78 (0.77)	-0.57 (0.40)	0.45 (0.28)
					Control	-0.30 (0.99)	22.81 (0.76)	-0.79 (0.38)	0.60 (0.19)

Jiang et al,2022[13]	China	264	1	8-13	Repeated low-level red-light (RLRL)	-2.49 (0.92)	24.54 (0.67)	-0.20 (95% CI, -0.29 to -0.11)	0.13 (95% CI, 0.09-0.17)
					SVL	-2.67 (1.06)	24.62 (0.86)	-0.79 (95% CI, -0.88 to -0.69)	0.38 (95% CI, 0.34-0.42)

SVL; single vision lenses, SCL; soft contact lens, RGP; rigid gas permeable, PAL; progressive addition lens, DIMS; defocus incorporated multiple segment spectacle, HAL; SAL; SHCL; EDOF; enhanced depth of focus; PALs, progressive addition spectacle lenses; RGPs, rigid gas-permeable contact lenses

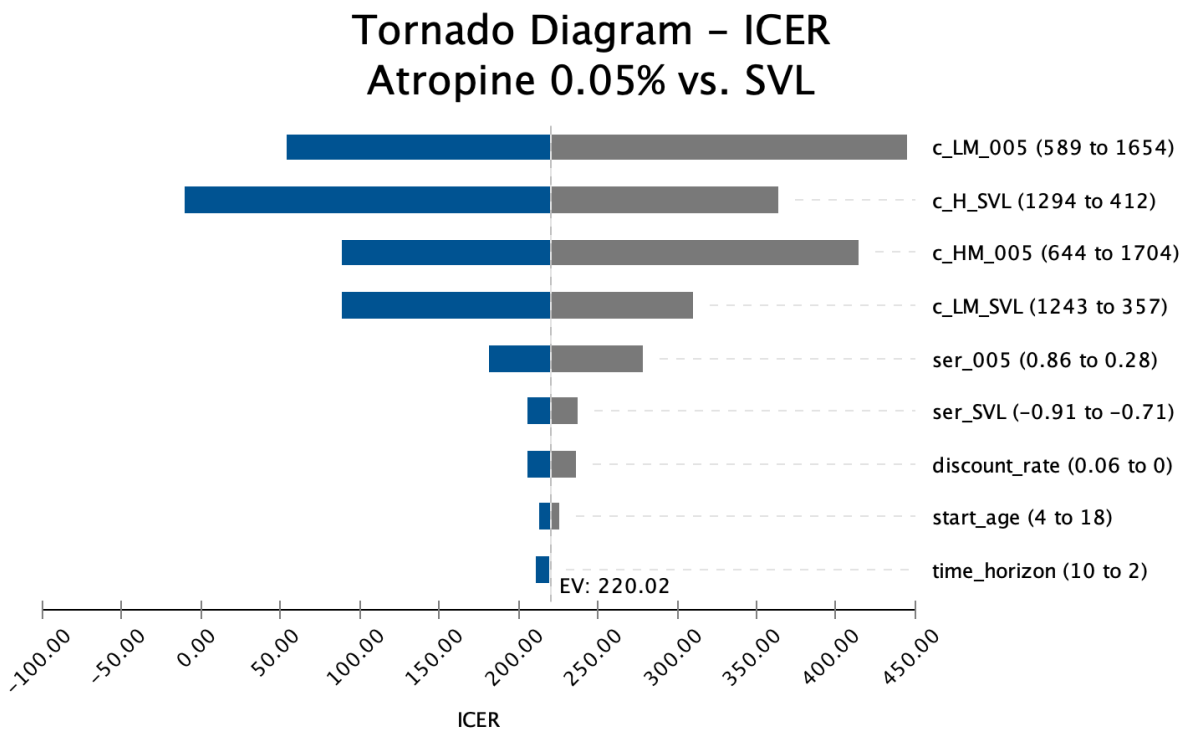
eFigure 1. Markov Model



Markov model showing myopia states (ovals) and possible transitions (arrows). Numbers 1, 2, & 3 represent low, moderate, and high myopia respectively. Looped arrows represent remaining in the same myopic state.

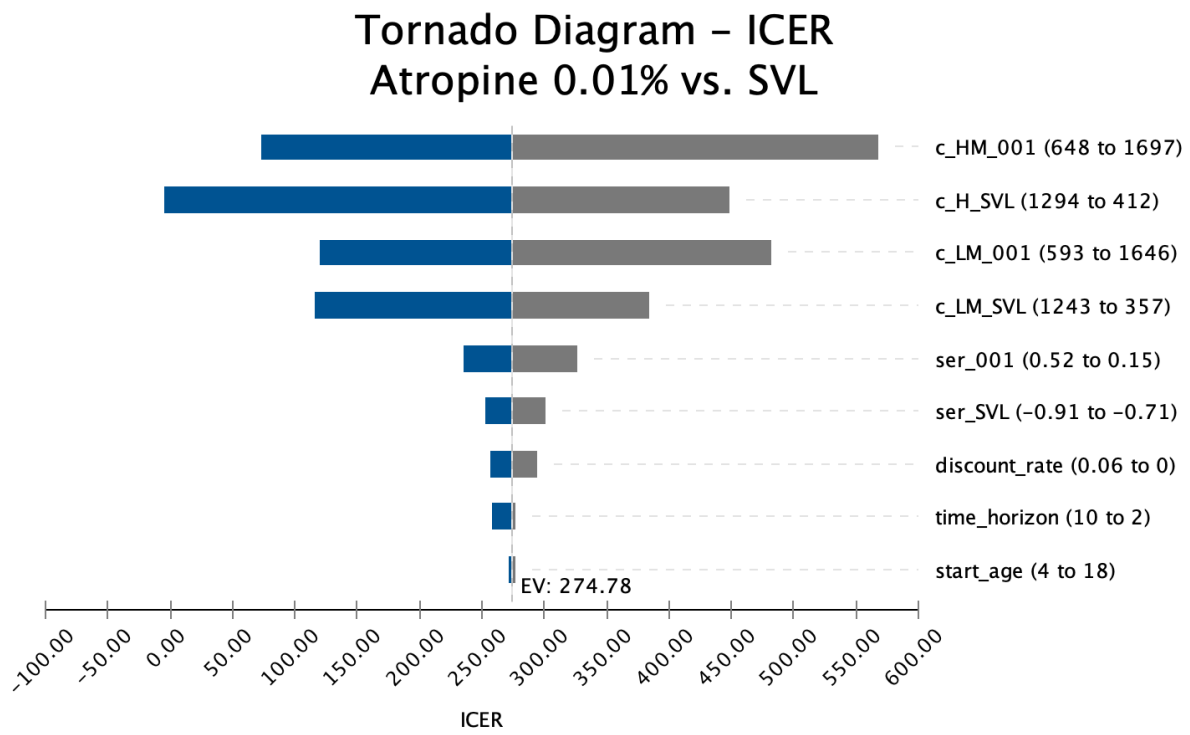
eFigure 2. Deterministic Sensitivity Analysis (Tornado Plots)

a.



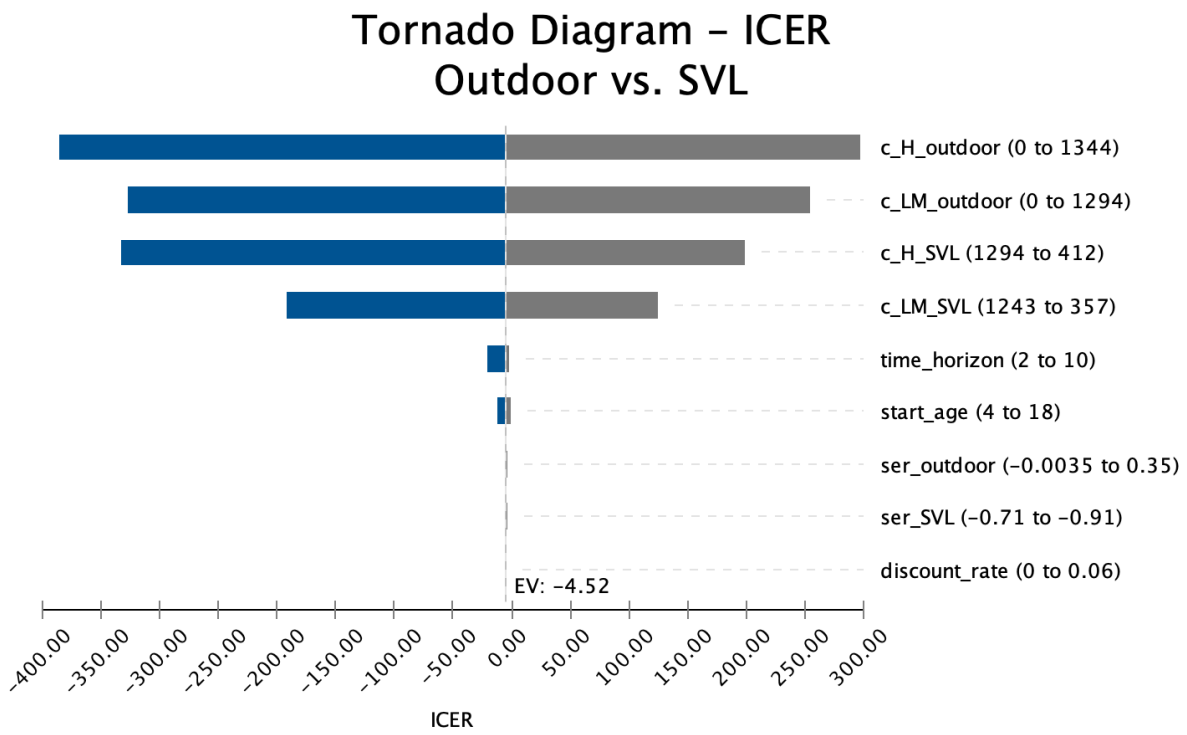
c_LM_005 = cost of atropine 0.05% for low to moderate myopia
c_HM_005 = cost of atropine 0.05% for high myopia
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_005 = spherical equivalent refraction of atropine 0.05%
ser_SVL = spherical equivalent refraction of single vision lenses

b.



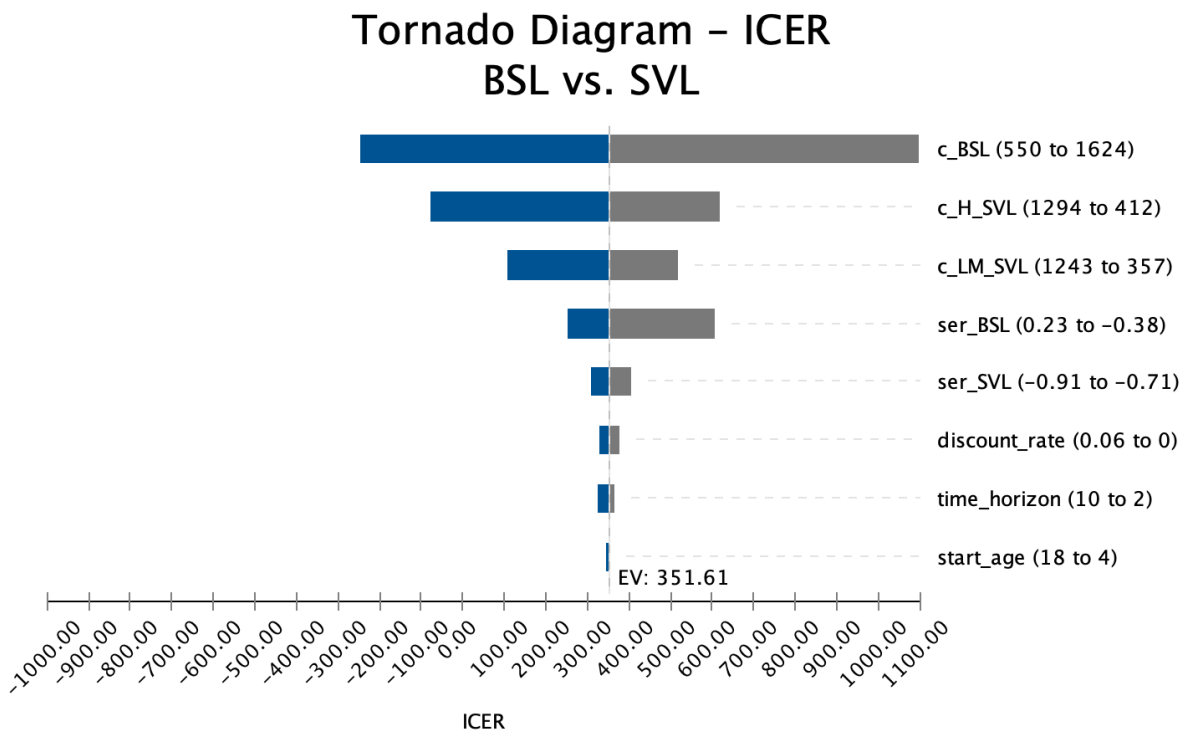
c_LM_001 = cost of atropine 0.01% for low to moderate myopia
c_HM_001 = cost of atropine 0.01% for high myopia
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_001 = spherical equivalent refraction of atropine 0.01%
ser_SVL = spherical equivalent refraction of single vision lenses

c.



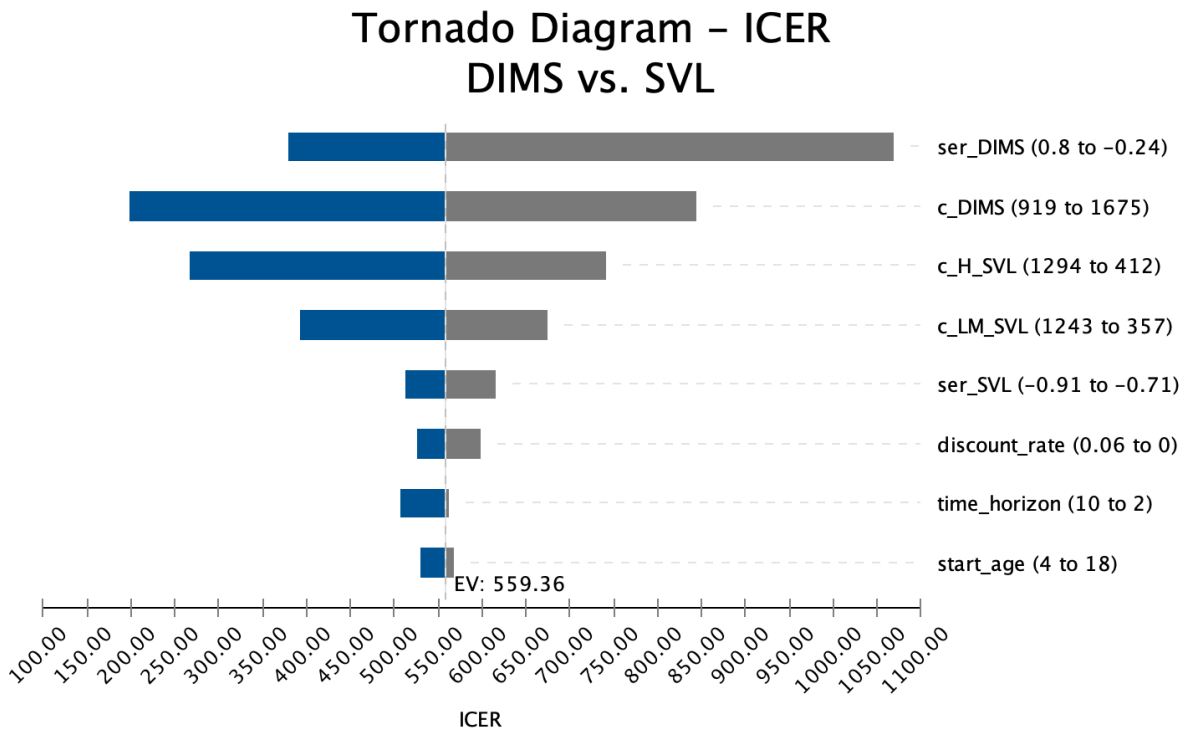
c_LM_outdoor = cost of outdoor activity for low to moderate myopia
c_H_outdoor= cost of outdoor activity for high myopia
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_outdoor = spherical equivalent refraction of outdoor activity
ser_SVL = spherical equivalent refraction of single vision lenses

d.



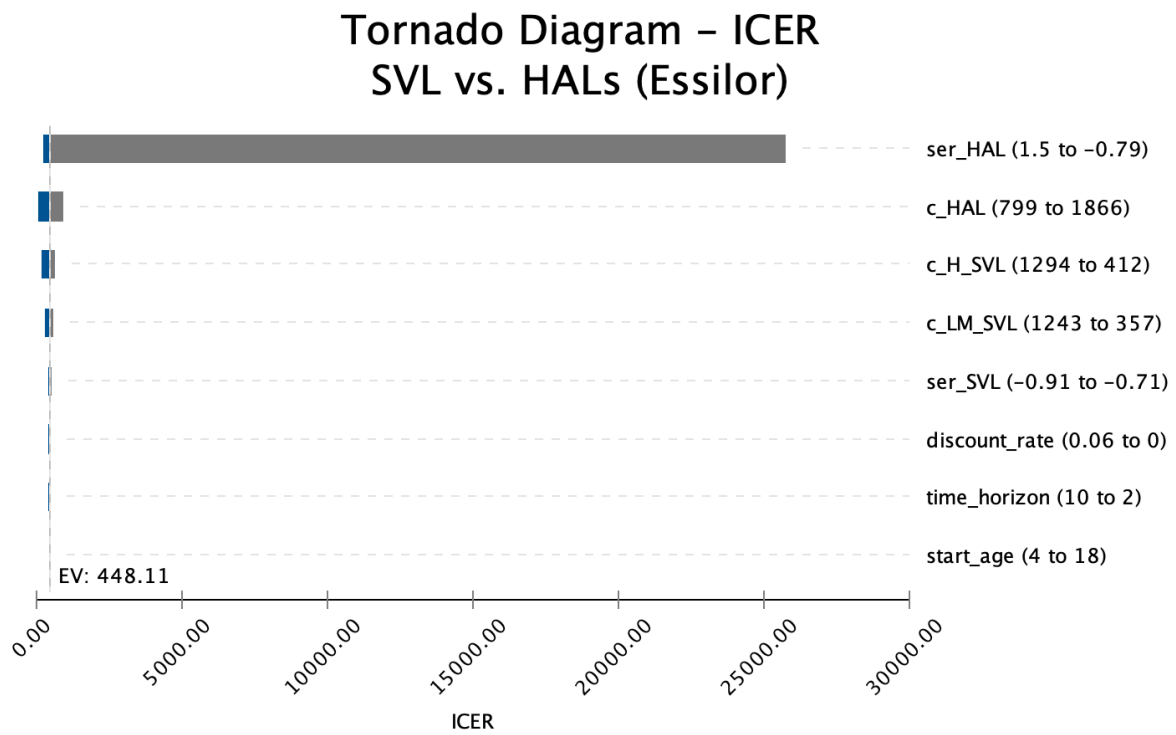
c_BSL = cost of bifocal spectacle lenses (BSL)
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_BSL = spherical equivalent refraction of BSL
ser_SVL = spherical equivalent refraction of single vision lenses

e.



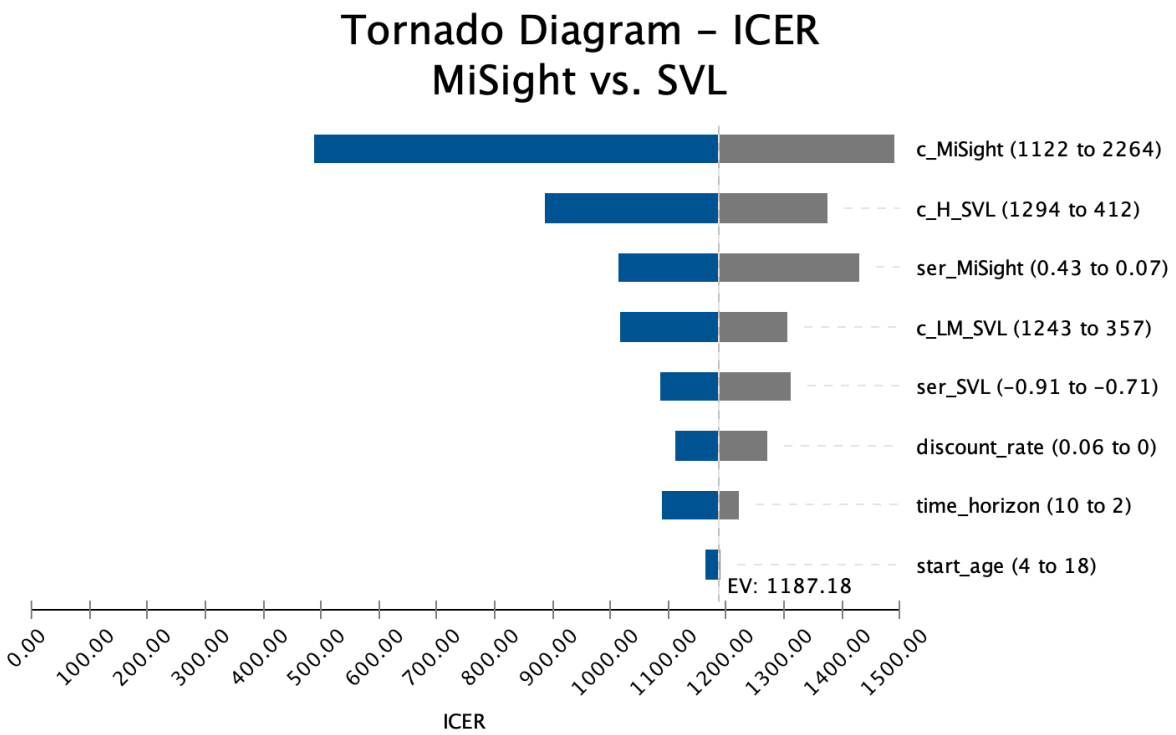
c_DIMS = cost of defocus incorporated multiple segment spectacles (DIMS)
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_DIMS = spherical equivalent refraction of DIMS
ser_SVL = spherical equivalent refraction of single vision lenses

f.



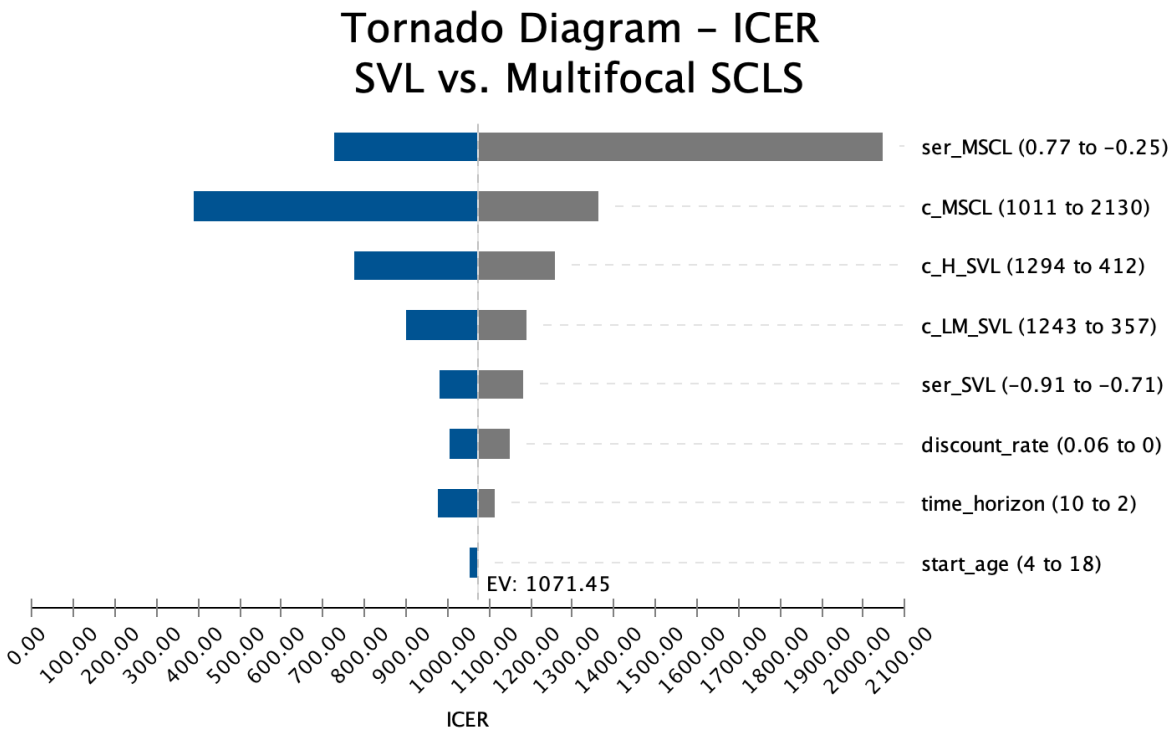
c_HAL = cost of highly aspherical lenslets (HAL)
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_HAL = spherical equivalent refraction of HAL
ser_SVL = spherical equivalent refraction of single vision lenses

g.



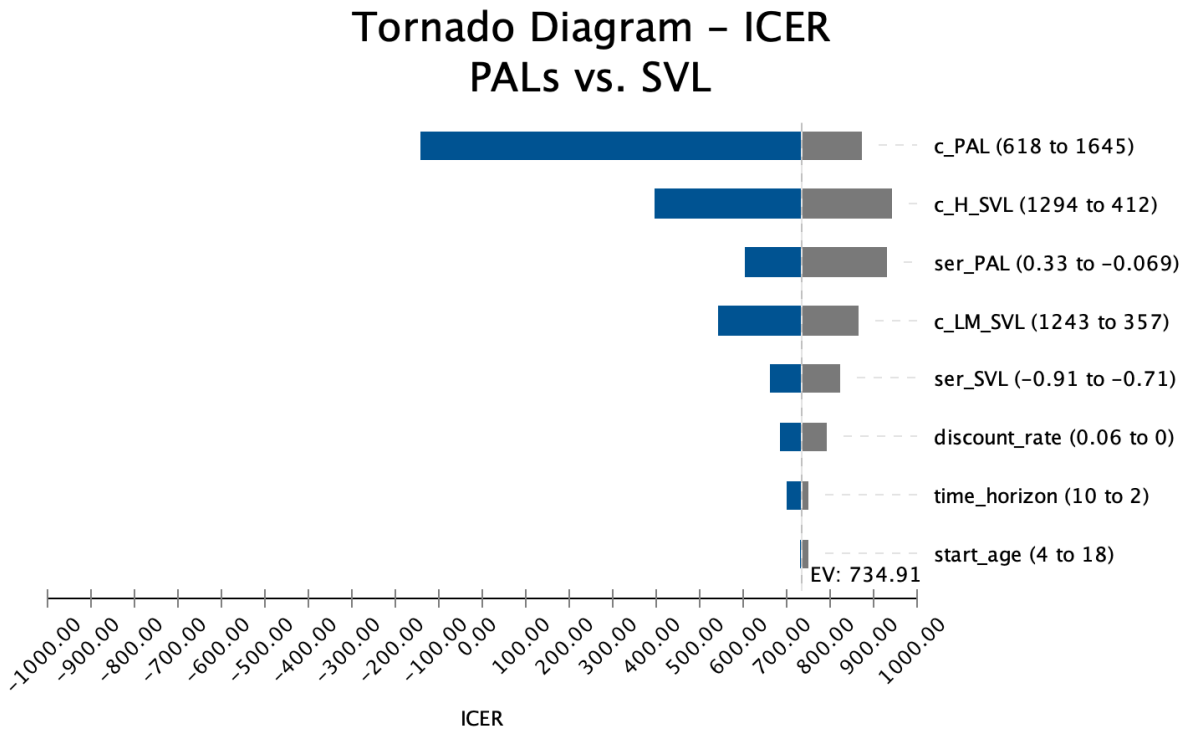
c_MiSight = cost of MiSight lenses
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_ MiSight = spherical equivalent refraction of MiSight lenses
ser_SVL = spherical equivalent refraction of single vision lenses

h.



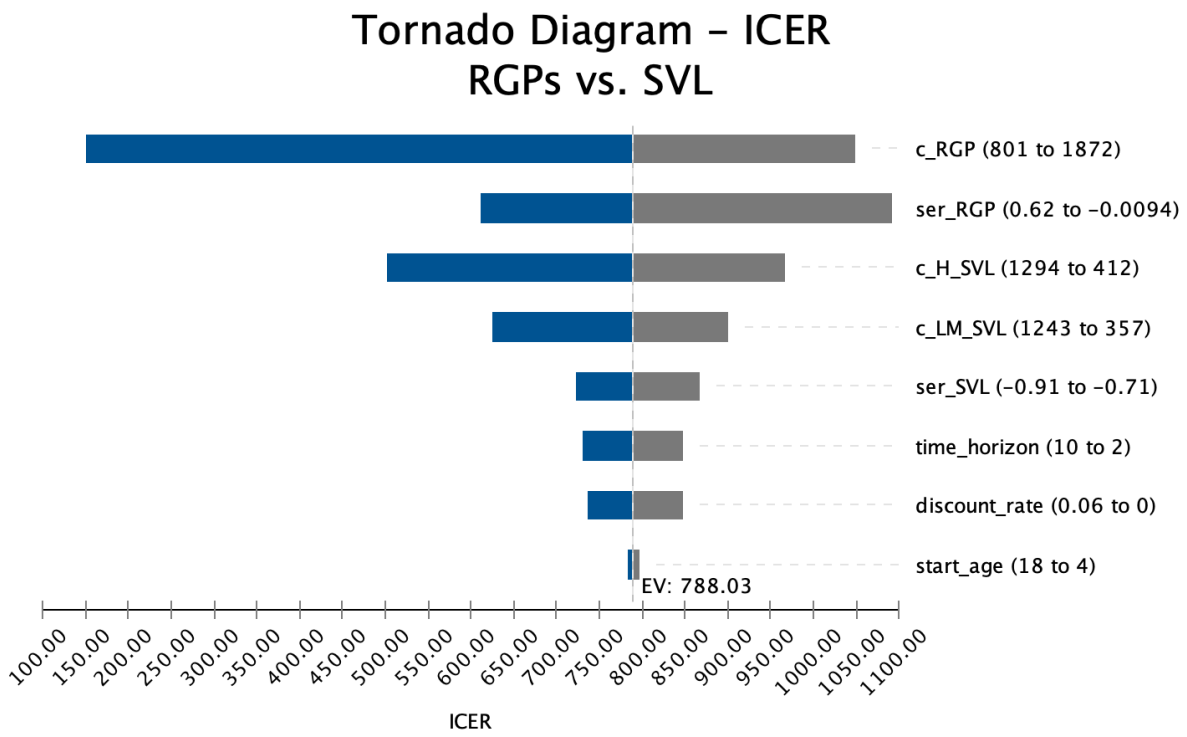
c_MSCL = cost of multifocal soft contact lenses (MSCLs)
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_ MSCL = spherical equivalent refraction of MSCLs
ser_SVL = spherical equivalent refraction of single vision lenses

i.



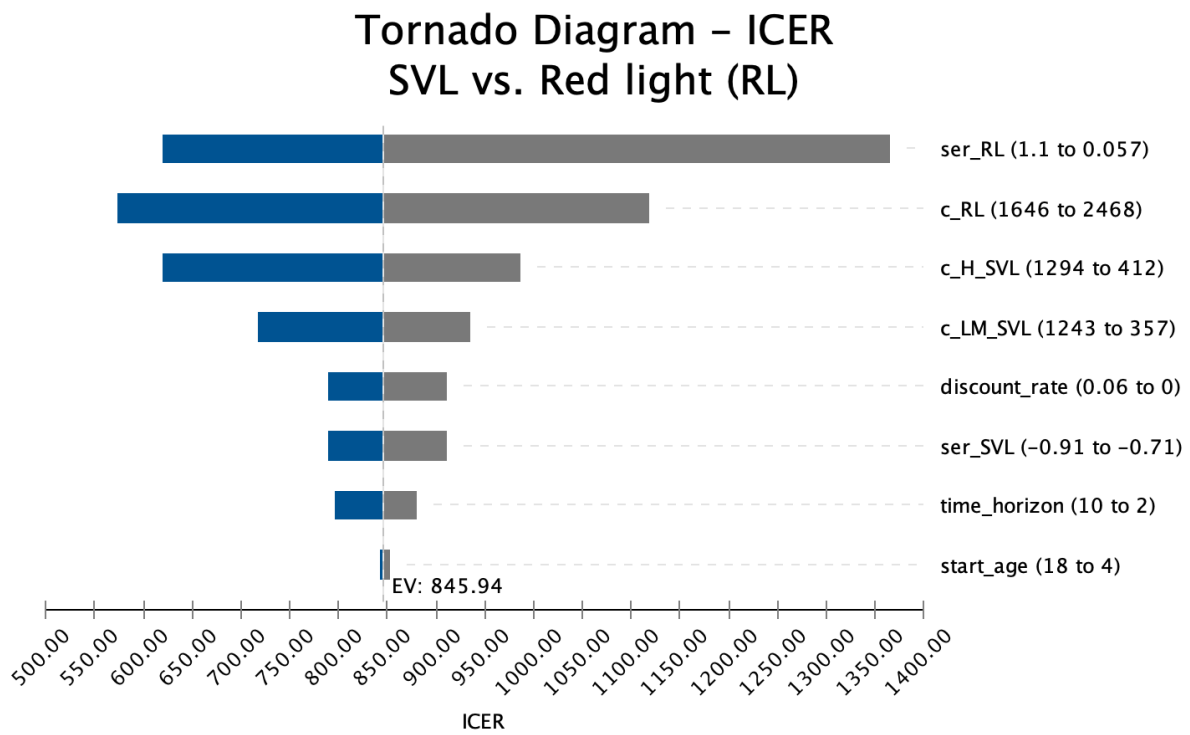
c_PAL = cost of progressive addition lenses (PALs)
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_ PAL = spherical equivalent refraction of PALs
ser_SVL = spherical equivalent refraction of single vision lenses

j.



c_RGP = cost of rigid gas permeable (RGP) contact lenses
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_ RGP = spherical equivalent refraction of RGP contact lenses
ser_SVL = spherical equivalent refraction of single vision lenses

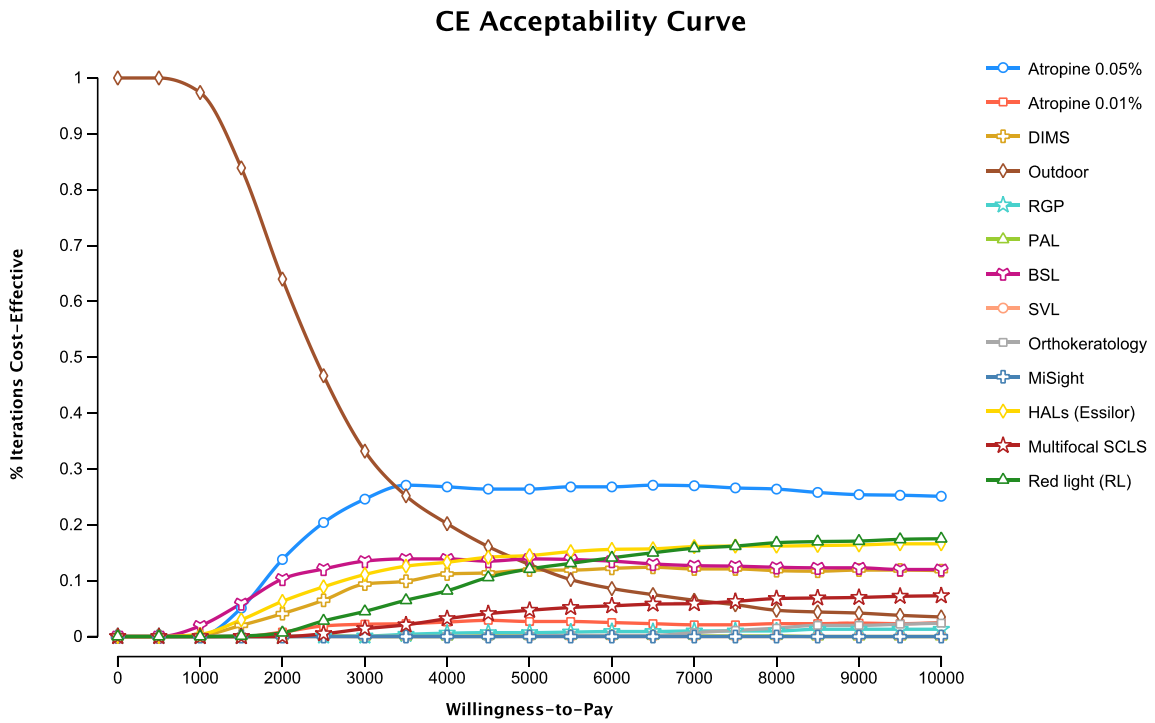
k.



c_RL = cost of red light therapy
c_ LM_SVL = cost of single vision lenses for low to moderate myopia
c_H_SVL = cost of single vision lenses for high myopia
ser_ RL = spherical equivalent refraction of red light therapy
ser_SVL = spherical equivalent refraction of single vision lenses

Tornado diagrams showing the parameters that had the greatest impact on the model**.**
The results show that our model was most sensitive to the costs of the interventions and SER. Increasing cost resulted in less cost-effectiveness.

eFigure 3. Cost-Effectiveness Acceptability Curves in Terms of Axial Length



Outdoor activity was the most likely cost-effective intervention at a lower willingness to pay threshold of between 0 to US $3000. Atropine 0.05% was mostly the likely cost-effective intervention above this threshold.

Abbreviations: SVL, single vision lenses; DIMS, defocus incorporated multiple segment spectacles; BSL, bifocal spectacle lenses; PALs, progressive addition spectacle lenses; RGPs, rigid gas-permeable contact lenses; SCLs, soft contact lenses; HALs, highly aspherical lenslets.

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