

Table E1: Model Parameters

Variable	No iMRI	iMRI	Reference(s)
Probabilities			
Probability of GTR	0.49 (0.33–0.68)	0.74 (0.55–0.96)	Zhang et al (12), Roder et al (13), Napolitano et al (14), Senft et al (16), Senft et al (15), Tsugu et al (17), based on analysis by Li et al (18)
Probability of 6 month PFS	0.54 (0.39–0.62)	0.69 (0.67–0.69)	Zhang et al (12), Roder et al (13), Senft et al (16), based on analysis by Li et al (18)
Probability of OS	3 months: 0.926, 6 months: 0.86, 12 months: 0.81, 18 months: 0.66, 24 months: 0.5, 36 months: 0.16, 48 months: 0.121, 60 months: 0.098		Nuño et al (31), Chaichana et al (8), Stupp et al (6)
Probability of overall complications after resection of glioma	GTR: 0.21 (0.18–0.26), STR: 0.27 (0.21–0.34)		Yan et al (32), STR range estimated using variance of GTR range
Risk of hemorrhage in patients undergoing glioma resection	0.037 (0.011–0.037)	0.038 (0.011–0.038)	Ahmadi et al (33), Yan et al (32)
Probability a hemorrhage returns to the OR for revision surgery	0.888	0.895	Ahmadi et al (33)
Probability of new postoperative aphasia, lasting at least 3 months	0.20 (0.03, 0.348)	0.14 (0.023, 0.29)	Wu et al (34), Gupta et al (35), Meyer et al (36), Zhang et al (12)
Probability of surgical complications following evacuation of hemorrhage	0.018 (0.01–0.048)		Rusconi et al (37)
Probability of cognitive decline after RT	0.004 (0.003–0.005)		Yamamoto et al (38), from SRS data
Probability of major hematologic toxicity with TMZ	0.28 (0.10–0.33)		Minniti et al (22), Gerber et al (39), median duration of Grade 3–4 cytopenia in patients with HGG on TMZ and RT estimated as 3 months (1–13 months) per Gerber et al (39)
Transition Probabilities			
Risk of death due to natural causes	Age-Specific Mortality		CDC NVSS (23)
Risk of death within 4 weeks of surgery	0.00375		Esteves et al (40)
Risk of death due to postoperative hemorrhage in patients with HGG, age 65 or older	0.09 (0.00–0.18)		Tanaka et al (41), based on GBM data, Grossman et al (42)
Risk of disease progression from PFS on TMZ (rate of progression)	0.15910 (0.1432–0.1750)		Bernard-Arnoux et al (43)
Risk of death from cancer progression on TMZ	0.05800 (0.0522–0.0638)		
Risk of death from PFS on TMZ	0.04346 (0.0391–0.0478)		
Health Utilities			
Health utility for HGG at stable baseline	0.8872 (0.525–1.000)		Garside et al (44)
Health utility at time of surgery and for 4 weeks postoperative	0.8870 (0.845–0.929)		Rogers et al (45)
Health utility for PFS+TMZ+RT	0.7426 (0.175–0.98)		Garside et al (44)
Healthy utility for cancer progression	0.7314 (0.125–0.995)-0.02 QALY deduction per month (maximum 30 months deductions)		Garside et al (44), Kovic et al (28), minimum QALYs = 0.0
Health utility deduction for Grade 3–4 cytopenia after TMZ	–0.0898		Nafees et al (46), converted to monthly utility
Health utility for new postoperative aphasia	0.55		Latimer et al (47), converted to monthly utility
Health utility for cognitive decline following RT	0.3 (0.2–0.4)		Lester-Coll et al (48), converted to monthly utility
Costs			
Added cost per case for iMRI	N/A	\$1,852 (\$1,360–\$2,266)	Eljamel et al (11), modeled as 15%–25% of upfront and ongoing costs of iMRI

Cost of primary debulking surgery (per minute)	\$27.40 (\$15.58–\$68.87)	Eseonu et al (49), calculated as total OR expenses per minutes of surgery
Time in surgery	186 ± 145 min	255 ± 10.6 min Ahmadi et al (33)
Cost of return to OR for hematoma evacuation	\$7,588 (\$7,588–\$10,416)	Regan et al (50)
Yearly attributable cost of poststroke aphasia	\$1,703 (\$1,132–\$2,343)	Ellis et al (51), converted to monthly rate
Cost of inpatient admission [†]	\$46,798 (\$19,153–\$61,637)	Eseonu et al (49)
Cost of treatments for PFS*	\$715 (\$500–\$930) for first 24 months; \$634 (\$444–\$824) for months 25–60; \$593 (\$415–\$771) for patients surviving greater than 60 months	Qian et al (27) estimation based on Physician Fee Schedule and CMS National Health Expenditure Data
Cost of treating recurrent glioma	\$2,809 (\$1,966–\$3,652)	Qian et al (27) estimation based on Wasserfallen et al (52), range estimated as ± 30% of the base cost
Cost of RT over 3 weeks (one-time cost)	\$15,509 (\$12,660–\$18,358) for patients younger than 65 years \$9,496 (\$6,647–\$12,345) for patients 65 years and older	Based on microcosting by Qian et al (27), adjusted for 40Gy over 15 fractions, range estimated as ± 30% of the base cost
Cost of chemotherapy (TMZ)**	\$30,563 (\$27,762–\$41,146)	Federal Supply Schedule (25)***
Cost of hematologic toxicity (only in first 12 months; one-time cost)	\$13,365 (\$9,356–\$17,375)	Caggiano et al (53), Liou et al (54), Qian et al (27)

Abbreviations: iMRI = intraoperative MRI, GTR = gross-total resection, PFS = progression-free survival, OS = overall survival, STR = subtotal resection, TMZ = temozolomide, HGG = high grade glioma, RT = radiation therapy, SRS = stereotactic radiosurgery, GBM = glioblastoma multiforme.

[†] Costs for inpatient admission do not include cost of surgery. Costs include operating room, drug, radiology, laboratory, and supply expenses as well as room and board.

* Costs for PFS include baseline medical care as well as physician visits and MRIs (calculated as visit and imaging every 3 months during first 2 years, every 6 months during years 3–5, and annually thereafter, based on the schema of Qian et al (27)).

** Regimen: 75 mg/m²/day during 21d of RT, then 6 cycles (5 days each) at 200 mg/m², calculated for patient with BSA = 1.8 mg/m² similar to Perry et al (21).

*** TMZ costs were estimated as 121% of the cost listed in the Department of Veteran Affairs Federal Supply Schedule (FSS).