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Table S1. Model Inputs and Parameter Values

Variable	Baseline value	One-way sensitivity analysis range		Distribution	Reference
		Min	Max		
Probabilities					
Annual incidence of EAC in SSBE	0.0006	0.0001	0.0010	Beta	17
Annual incidence of EAC in NDBE	0.0021	0.0012	0.0029	Beta	6
Annual incidence of EAC in LGD	0.0116	0.0057	0.0175	Beta	6
Annual incidence of EAC in HGD	0.1416	0.1243	0.1589	Beta	6
Dysplasia recurrence after EET in LGD	0.0600	0.0400	0.1000	Beta	18
EAC recurrence after EET in LGD	0.0050	0.0020	0.0100	Beta	19
Dysplasia recurrence after EET in HGD	0.0500	0.0300	0.1000	Beta	18
EAC recurrence after EET in HGD	0.0100	0.0050	0.0200	Beta	19
Adherence rates					
Endoscopy	0.78	0.50	1.00	Beta	20
AI-assisted endoscopy	0.78	0.50	1.00	Beta	20
Sponge test	0.75	0.50	1.00	Beta	20
Breath test	0.95	0.50	1.00	Beta	Assumption
miRNA test	0.95	0.50	1.00	Beta	Assumption

EET	0.90	0.50	1.00	Beta	Assumption
Sensitivity					
Endoscopy	0.75	0.70	0.80	Beta	9
AI-assisted endoscopy	0.93	0.88	1.00	Beta	12
Sponge test	0.81	0.76	0.85	Beta	13
Breath test	0.91	0.84	0.95	Beta	14
miRNA test	0.96	0.90	0.98	Beta	15
Specificity					
Endoscopy	0.70	0.60	0.80	Beta	9
AI-assisted endoscopy	0.78	0.53	0.94	Beta	12
Sponge test	0.90	0.82	0.93	Beta	13
Breath test	0.74	0.69	0.79	Beta	14
miRNA test	0.95	0.87	0.98	Beta	15
Stage distribution for non-screen-detected EACs	Localized: 0.24, Regional: 0.34, Distant: 0.42	—	—	Dirichlet	SEER Stat
Stage distribution for screen-detected EACs	Localized: 0.60, Regional: 0.30, Distant: 0.10	—	—	Dirichlet	SEER Stat
Stage-specific 5-year survival rates for EAC	Localized: 0.468, Regional: 0.233, Distant: 0.043	—	—	Beta	SEER Stat
Discount rate	0.03	0.02	0.05	Fixed	16

Costs (US\$)					
Endoscopy	2,500	1,250	5,000	Gamma	21
AI-assisted endoscopy	3,000	1,500	6,000	Gamma	Assumption
Sponge test	400	200	1,600	Gamma	22
Breath test	200	100	800	Gamma	14
miRNA test	300	150	1,200	Gamma	Assumption
Localized EAC treatment	50,000	25,000	200,000	Gamma	23
Regional EAC treatment	100,000	50,000	400,000	Gamma	23
Distant EAC treatment	150,000	75,000	600,000	Gamma	23
EET	7,000	3,500	14,000	Gamma	24
Health state utilities					
SSBE	0.93	0.88	0.96	Beta	25
NDBE	0.93	0.88	0.96	Beta	25
LGD	0.88	0.82	0.92	Beta	25
HGD	0.82	0.75	0.88	Beta	25
Localized EAC	0.75	0.70	0.80	Beta	25
Regional EAC	0.65	0.60	0.70	Beta	25
Distant EAC	0.55	0.45	0.60	Beta	25
Post-treatment state in EET year: LGD	0.83	0.77	0.87	Beta	25
Post-treatment state in EET year: HGD	0.77	0.70	0.83	Beta	25
Post-treatment state: NDBE	0.93	0.88	0.96	Beta	25
Post-treatment state: LGD	0.88	0.82	0.92	Beta	25

Post-treatment state: HGD	0.82	0.75	0.88	Beta	25
Death	0	N/A	N/A	-	-

AI, artificial intelligence; EAC, esophageal adenocarcinoma; EET, endoscopic eradication therapy; NDBE, non-dysplastic Barrett's esophagus; LGD, low-grade dysplasia; HGD, high-grade dysplasia; SSBE, short-segment Barrett's esophagus; miRNA, microRNA; N/A, not applicable.

Table S2. Base-case results in the SSBE cohort

Strategy	Cost (US\$)	Incremental Cost (US\$)	Effectiveness (QALY)	Incremental Effectiveness (QALY)	ICER (US\$/QALY)	NMB (US\$)
No surveillance	3,053	Ref	18.1703	Ref	Ref	1,813,980
Sponge test every 10 years	9,055	6,002	18.1717	0.0014	4,290,967	1,808,118
Endoscopy every 10 years	8,824	-231	18.1721	0.0004	dominant	1,808,389
Breath test every 10 years	11,854	3,030	18.1723	0.0002	15,570,821	1,805,379
miRNA test every 10 years	11,003	-851	18.1724	0.0001	dominant	1,806,240
AI-assisted endoscopy every 10 years	9,977	-1,026	18.1726	0.0001	dominant	1,807,279
Sponge test every 5 years	12,952	2,975	18.1727	0.0002	17,083,609	1,804,322
Sponge test every 4 years	14,907	1,956	18.1732	0.0005	3,866,729	1,802,417
Endoscopy every 5 years	12,569	-2,338	18.1734	0.0002	dominant	1,804,772
Breath test every 5 years	17,567	4,998	18.1738	0.0003	14,962,947	1,799,808
miRNA test every 5 years	16,163	-1,404	18.1739	0.0002	dominant	1,801,231
Endoscopy every 4 years	14,449	-1,714	18.1741	0.0001	dominant	1,802,957
Sponge test every 3 years	18,171	3,722	18.1741	0.0000	191,584,215	1,799,238
AI-assisted endoscopy every 5 years	14,470	-3,701	18.1742	0.0001	dominant	1,802,945
Breath test every 4 years	20,434	5,964	18.1745	0.0003	19,007,806	1,797,013

miRNA test every 4 years	18,753	-1,681	18.1747	0.0002	dominant	1,798,717
AI-assisted endoscopy every 4 years	16,725	-2,028	18.1750	0.0003	dominant	1,800,771
Endoscopy every 3 years	17,586	861	18.1752	0.0002	4,555,323	1,799,929
Breath test every 3 years	25,220	7,634	18.1757	0.0005	14,627,844	1,792,347
Sponge test every 2 years	24,709	-511	18.1758	0.0001	dominant	1,792,869
miRNA test every 3 years	23,075	-1,634	18.1760	0.0002	dominant	1,794,521
AI-assisted endoscopy every 3 years	20,489	-2,586	18.1763	0.0003	dominant	1,797,142
Endoscopy every 2 years	23,871	3,382	18.1773	0.0010	3,326,322	1,793,862
Breath test every 2 years	34,807	10,936	18.1781	0.0008	14,441,621	1,783,002
miRNA test every 2 years	31,734	-3,073	18.1785	0.0004	dominant	1,786,117
AI-assisted endoscopy every 2 years	28,029	-3,705	18.1790	0.0005	dominant	1,789,872
Annual sponge test	44,327	16,298	18.1809	0.0019	8,762,766	1,773,760
Annual endoscopy	42,727	-1,599	18.1839	0.0030	dominant	1,775,658
Annual breath test	63,572	20,844	18.1853	0.0015	14,234,732	1,754,960
Annual miRNA test	57,715	-5,857	18.1861	0.0008	dominant	1,760,899
Annual AI-assisted endoscopy	50,651	-7,063	18.1871	0.0010	dominant	1,768,058

“Dominant” was defined as an intervention that is both more effective and less costly than the comparator.

Table S3. Base-case results in the NDBE cohort

Strategy	Cost (US\$)	Incremental Cost (US\$)	Effectiveness (QALY)	Incremental Effectiveness (QALY)	ICER (US\$/QALY)	NMB (US\$)
No surveillance	10,472	Ref	17.9005	Ref	Ref	1,779,581
Sponge test every 10 years	16,328	5,856	17.9054	0.0048	1,210,048	1,774,209
Endoscopy every 10 years	16,081	-247	17.9067	0.0014	dominant	1,774,594
Breath test every 10 years	19,061	2,980	17.9074	0.0007	4,427,352	1,771,681
miRNA test every 10 years	18,216	-845	17.9078	0.0004	dominant	1,772,564
AI-assisted endoscopy every 10 years	17,198	-1,019	17.9082	0.0004	dominant	1,773,626
Sponge test every 5 years	20,089	2,891	17.9088	0.0006	4,970,099	1,770,793
Sponge test every 4 years	21,978	1,888	17.9106	0.0017	1,085,300	1,769,078
Endoscopy every 5 years	19,680	-2,298	17.9112	0.0006	dominant	1,771,438
Breath test every 5 years	24,578	4,899	17.9123	0.0012	4,250,268	1,766,654
miRNA test every 5 years	23,188	-1,390	17.9130	0.0006	dominant	1,768,109
Endoscopy every 4 years	21,486	-1,702	17.9134	0.0004	dominant	1,769,855
Sponge test every 3 years	25,129	3,643	17.9135	0.0001	60,789,023	1,766,217
AI-assisted endoscopy every 5 years	21,512	-3,617	17.9137	0.0003	dominant	1,769,860
Breath test every 4 years	27,348	5,836	17.9148	0.0011	5,427,821	1,764,132

miRNA test every 4 years	25,685	-1,664	17.9156	0.0008	dominant	1,765,874
AI-assisted endoscopy every 4 years	23,679	-2,006	17.9165	0.0009	dominant	1,767,971
Endoscopy every 3 years	24,502	823	17.9171	0.0006	1,280,576	1,767,212
Breath test every 3 years	31,972	7,470	17.9189	0.0018	4,152,384	1,759,922
Sponge test every 2 years	31,443	-528	17.9193	0.0004	dominant	1,760,486
miRNA test every 3 years	29,851	-1,592	17.9200	0.0007	dominant	1,762,144
AI-assisted endoscopy every 3 years	27,294	-2,557	17.9211	0.0012	dominant	1,764,818
Endoscopy every 2 years	30,543	3,249	17.9246	0.0035	930,494	1,761,919
Breath test every 2 years	41,234	10,691	17.9272	0.0026	4,097,781	1,751,489
miRNA test every 2 years	38,198	-3,036	17.9287	0.0015	dominant	1,754,672
AI-assisted endoscopy every 2 years	34,537	-3,661	17.9304	0.0017	dominant	1,758,503
Annual sponge test	50,390	15,853	17.9368	0.0064	dominant	1,743,288
Annual endoscopy	48,670	-1,720	17.9471	0.0103	dominant	1,746,038
Annual breath test	69,026	20,356	17.9521	0.0050	4,037,150	1,726,186
Annual miRNA test	63,243	-5,783	17.9550	0.0028	dominant	1,732,252
Annual AI-assisted endoscopy	56,271	-6,972	17.9582	0.0033	dominant	1,739,554

Table S4. Base-case results in the LGD cohort

Strategy	Cost (US\$)	Incremental Cost (US\$)	Effectiveness (QALY)	Incremental Effectiveness (QALY)	ICER (US\$/QALY)	NMB (US\$)
No surveillance	51,169	Ref	15.5039	Ref	Ref	1,499,217
Sponge test every 10 years	56,196	5,027	15.5278	0.0239	210,083	1,496,583
Endoscopy every 10 years	55,858	-338	15.5346	0.0068	dominant	1,497,601
Breath test every 10 years	58,559	2,701	15.5379	0.0033	811,519	1,495,233
miRNA test every 10 years	57,748	-811	15.5398	0.0019	dominant	1,496,231
AI-assisted endoscopy every 10 years	56,772	-976	15.5420	0.0022	dominant	1,497,424
Sponge test every 5 years	59,203	2,431	15.5442	0.0022	1,081,678	1,495,218
Sponge test every 4 years	60,716	1,513	15.5525	0.0083	182,104	1,494,536
Endoscopy every 5 years	58,641	-2,075	15.5557	0.0031	dominant	1,496,926
Breath test every 5 years	62,983	4,342	15.5613	0.0056	773,789	1,493,145
miRNA test every 5 years	61,672	-1,311	15.5644	0.0032	dominant	1,494,772
Endoscopy every 4 years	60,041	-1,631	15.5663	0.0019	dominant	1,496,593
Sponge test every 3 years	63,243	3,202	15.5664	0.0001	41,863,092	1,493,398
AI-assisted endoscopy every 5 years	60,093	-3,150	15.5681	0.0017	dominant	1,496,717
Breath test every 4 years	65,209	5,116	15.5731	0.0050	1,022,548	1,492,101

miRNA test every 4 years	63,646	-1,563	15.5769	0.0038	dominant	1,494,045
AI-assisted endoscopy every 4 years	61,764	-1,882	15.5813	0.0044	dominant	1,496,369
Endoscopy every 3 years	62,379	615	15.5842	0.0028	216,345	1,496,038
Breath test every 3 years	68,926	6,547	15.5929	0.0087	752,586	1,490,361
Sponge test every 2 years	68,306	-620	15.5943	0.0014	dominant	1,491,119
miRNA test every 3 years	66,942	-1,364	15.5978	0.0035	dominant	1,492,834
AI-assisted endoscopy every 3 years	64,554	-2,388	15.6034	0.0057	dominant	1,495,790
Endoscopy every 2 years	67,064	2,510	15.6199	0.0165	152,304	1,494,928
Breath test every 2 years	76,374	9,310	15.6325	0.0126	740,525	1,486,875
miRNA test every 2 years	73,548	-2,826	15.6396	0.0071	dominant	1,490,408
AI-assisted endoscopy every 2 years	70,145	-3,402	15.6478	0.0082	dominant	1,494,632
Annual sponge test	83,504	13,358	15.6779	0.0302	442,987	1,484,289
Annual endoscopy	81,127	-2,377	15.7274	0.0494	dominant	1,491,609
Annual breath test	98,731	17,605	15.7516	0.0242	727,146	1,476,425
Annual miRNA test	93,376	-5,355	15.7652	0.0136	dominant	1,483,141
Annual AI-assisted endoscopy	86,929	-6,447	15.7810	0.0158	dominant	1,491,170
EET followed by annual endoscopy	64,234	-22,696	16.3790	0.5980	dominant	1,573,669

Table S5. Base-case results in the HGD cohort

Strategy	Cost (US\$)	Incremental Cost (US\$)	Effectiveness (QALY)	Incremental Effectiveness (QALY)	ICER (US\$/QALY)	NMB (US\$)
No surveillance	212,485	Ref	7.6641	Ref	Ref	553,930
Sponge test every 10 years	212,785	300	7.8359	0.1717	1,748	570,804
Endoscopy every 10 years	211,780	-1,004	7.8847	0.0488	dominant	576,685
Sponge test every 5 years	212,510	729	7.8971	0.0125	58,513	577,203
Breath test every 10 years	213,058	548	7.9085	0.0114	47,984	577,797
miRNA test every 10 years	212,338	-720	7.9220	0.0134	dominant	579,859
Sponge test every 4 years	212,360	22	7.9310	0.0090	2,416	580,739
AI-assisted endoscopy every 10 years	211,481	-879	7.9376	0.0066	dominant	582,277
Endoscopy every 5 years	211,129	-352	7.9633	0.0257	dominant	585,199
Sponge test every 3 years	212,104	975	7.9890	0.0257	37,886	586,798
Breath test every 5 years	212,706	602	7.9957	0.0067	90,362	586,862
Endoscopy every 4 years	210,774	-1,932	8.0068	0.0111	dominant	589,902
miRNA test every 5 years	211,762	988	8.0139	0.0071	138,274	589,628
AI-assisted endoscopy every 5 years	210,637	-1,125	8.0351	0.0212	dominant	592,870
Breath test every 4 years	212,515	1,878	8.0439	0.0088	213,296	591,872

miRNA test every 4 years	211,448	-1,067	8.0647	0.0209	dominant	595,026
Endoscopy every 3 years	210,168	-1,279	8.0813	0.0165	dominant	597,958
AI-assisted endoscopy every 4 years	210,177	9	8.0890	0.0077	1,152	598,721
Sponge test every 2 years	211,583	1,406	8.1075	0.0185	75,808	599,169
Breath test every 3 years	212,188	605	8.1264	0.0189	31,954	600,457
miRNA test every 3 years	210,912	-1,276	8.1519	0.0254	dominant	604,273
AI-assisted endoscopy every 3 years	209,393	-1,518	8.1814	0.0295	dominant	608,744
Endoscopy every 2 years	208,936	-457	8.2334	0.0521	dominant	614,406
Breath test every 2 years	211,522	2,586	8.2951	0.0617	41,931	617,987
miRNA test every 2 years	209,821	-1,701	8.3298	0.0347	dominant	623,155
AI-assisted endoscopy every 2 years	207,797	-2,023	8.3700	0.0403	dominant	629,207
Annual sponge test	210,001	2,204	8.4680	0.0980	22,490	636,803
Annual endoscopy	205,195	-4,807	8.6963	0.2283	dominant	664,437
Annual breath test	209,501	4,306	8.8081	0.1118	38,509	671,313
Annual miRNA test	206,509	-2,992	8.8710	0.0629	dominant	680,590
Annual AI-assisted endoscopy	202,953	-3,556	8.9440	0.0730	dominant	691,451
EET followed by annual endoscopy	115,450	-87,503	12.8171	3.8731	dominant	1,166,264