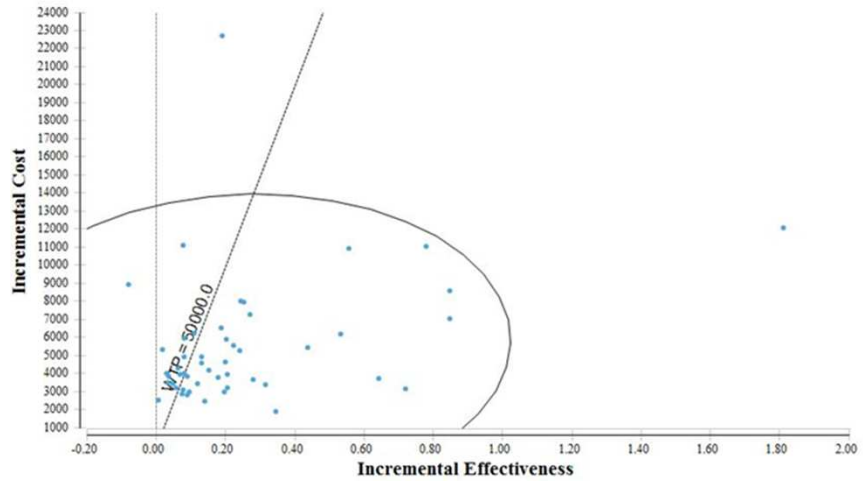
Supplemental Figures

Supplemental Figure 1

A. Probabilistic Sensitivity Analysis Summary: Biennial Stool DNA Testing with Diagnostic White Light Colonoscopy Versus No Surveillance (Natural History)

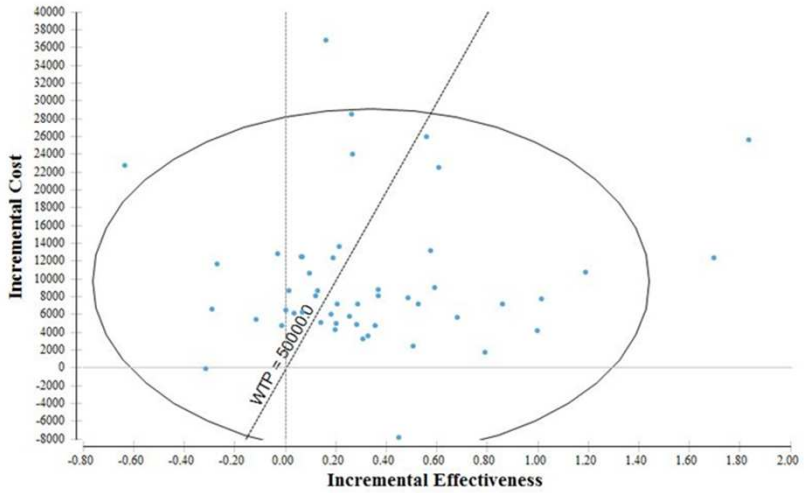
C



Component	Quadrant	Overall % (n=100)	Interpretation
C-1	Q-IV	3%	Screening strategy is less costly and more effective than no surveillance. Screening strategy recommended because it absolutely dominates no surveillance.
C-2	Q-I	63%	Screening strategy is more costly and more effective than no surveillance. Screening strategy recommended because its ICER does not exceed WTP.
C-3	Q-III	0%	Screening strategy is less costly and less effective than no surveillance. Screening strategy recommended because its ICER does not exceed WTP.
C-4	Q-I	28%	Screening strategy is more costly and more effective than no surveillance. Screening strategy not recommended because its ICER exceeds WTP.
C-5	Q-III	1%	Screening strategy is less costly and less effective than no surveillance. Screening strategy not recommended because its ICER exceeds WTP.
C-6	Q-II	5%	Screening strategy is more costly and less effective than no surveillance. Screening strategy not recommended because it is absolutely dominated by no surveillance.

Supplemental Figure 1

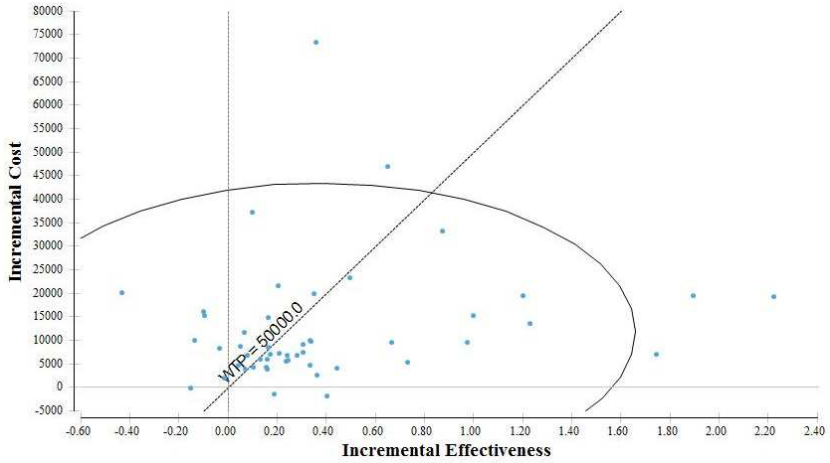
B. Probabilistic Sensitivity Analysis Summary: Biennial Chromoendoscopy Versus No Surveillance (Natural History)



Component	Quadrant	Overall % (n=100)	Interpretation
C-1	Q-IV	11%	Screening strategy is less costly and more effective than no surveillance. Screening strategy recommended because it absolutely dominates no surveillance.
C-2	Q-I	55%	Screening strategy is more costly and more effective than no surveillance. Screening strategy recommended because its ICER does not exceed WTP.
C-3	Q-III	0%	Screening strategy is less costly and less effective than no surveillance. Screening strategy recommended because its ICER does not exceed WTP.
C-4	Q-I	20%	Screening strategy is more costly and more effective than no surveillance. Screening strategy not recommended because its ICER exceeds WTP.
C-5	Q-III	1%	Screening strategy is less costly and less effective than no surveillance. Screening strategy not recommended because its ICER exceeds WTP.
C-6	Q-II	13%	Screening strategy is more costly and less effective than no surveillance. Screening strategy not recommended because it is absolutely dominated by no surveillance.

Supplemental Figure 1

C. Probabilistic Sensitivity Analysis Summary: Biennial White Light Colonoscopy Versus No Surveillance (Natural History)

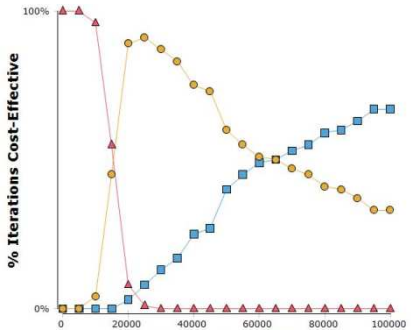


Component	Quadrant	Overall % (n=100)	Interpretation
C-1	Q-IV	11%	Screening strategy is less costly and more effective than no surveillance. Screening strategy recommended because it absolutely dominates no surveillance.
C-2	Q-I	44%	Screening strategy is more costly and more effective than no surveillance. Screening strategy recommended because its ICER does not exceed WTP.
C-3	Q-III	1%	Screening strategy is less costly and less effective than no surveillance. Screening strategy recommended because its ICER does not exceed WTP.
C-4	Q-I	32%	Screening strategy is more costly and more effective than no surveillance. Screening strategy not recommended because its ICER exceeds WTP.
C-5	Q-III	1%	Screening strategy is less costly and less effective than no surveillance. Screening strategy not recommended because its ICER exceeds WTP.
C-6	Q-II	11%	Screening strategy is more costly and less effective than no surveillance. Screening strategy not recommended because it is absolutely dominated by no surveillance.

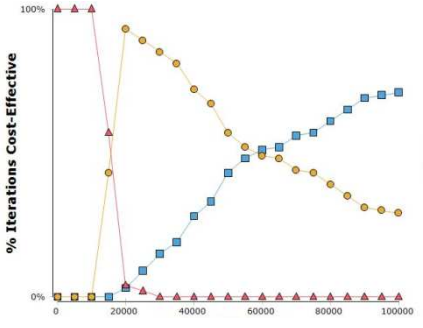
Supplemental Figure 2

Sampling of CRC incidence rate with additional clusters of two or four probability-based variables

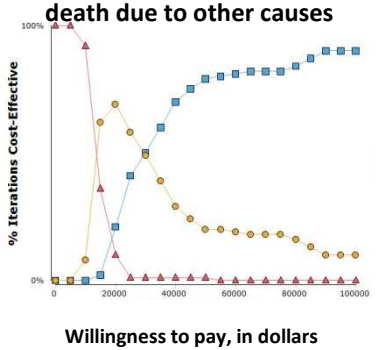
i. By probabilities of local and regional CRC mortality, and transition probabilities of local CRC to regional and regional to distant CRC.



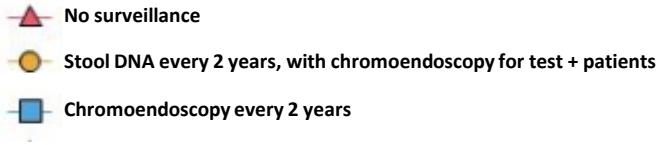
ii. By probability of a given CRC stage in screening-based modalities



iii. By probabilities of chromoendoscopy accuracy for dysplasia and probability of death due to other causes



iv. By probabilities of colorectal cancer in patients with high-grade dysplasia and stool DNA accuracy for dysplasia



Supplemental Table 1: Additional transition probabilities, utilities and model variables

Variable	Base case	Range	Monte Carlo distribution (base case, 95% CI)	References
Ulcerative Colitis				
Annual rate of UC flare requiring colectomy	0.0023	0.0016-0.0075	Beta (0.0023; 0.0015)	1,2
Probability of death due to other causes in UC	0.0013	0.0001-0.003	Beta (0.0013; SD 0.0007)	3
Colonoscopy test characteristic				
WLE sensitivity for dysplasia	0.695	0.00-1.00	Beta (0.695, SD 0.100)	4-7
WLE specificity for dysplasia	0.9	0.00-1.00	Beta (0.90, SD 0.15)	4, 7, 8
WLE or chromoendoscopy sensitivity for CRC	0.9	0.80-1.00	Beta (0.9; SD 0.05)	4, 6, 9
WLE or chromoendoscopy specificity for CRC	0.999	0.90-1.00	Beta (0.999; SD 0.025)	1, 4
Chromoendoscopy sensitivity for	0.833	0.36-1.00	Beta (0.833, SD 0.159)	7, 10

dysplasia in UC				
Chromoendoscopy specificity for dysplasia in UC	0.913	0.44-1.00	Beta (0.913, SD 0.141)	8, 10
Dysplasia				
Probability of LGD if dysplasia on surveillance colonoscopy	0.75	0.61-0.80	Beta (0.75; SD 0.048)	7, 11
Probability of HGD if dysplasia on surveillance colonoscopy	0.25	0.20-0.38	Beta (0.25; SD 0.045)	7, 11
Proportion proceeding to colectomy if LGD	0.60	0-1.00	Beta (0.60; SD 0.25)	12
Probability of synchronous CRC if LGD	0.19	0.04-0.46	Beta (0.19, SD 0.105)	13, 14
Probability of developing CRC given LGD	0.14	0.090-0.314	0.090-0.314 Beta (0.140; SD 0.056)	14
Probability of synchronous CRC if HGD	0.53	0.42-0.67	Beta (0.53, 0.06)	13, 15

Probability of dysplasia in chronic UC	0.0036	0.0008-0.015	Beta (0.0036, SD 0.004)	16
Cancer progression (annual transition proportion)				
From local CRC to regional CRC	0.20	0.10-0.30	Beta (0.20; SD 0.05)	17
From regional CRC to distant CRC	0.40	0.20-0.60	Beta (0.40; SD 0.10)	17
Cancer mortality				
Local cancer (Dukes A/B, stage 1-2)	0.0211	0.0158-0.0263	Beta (0.0211; SD 0.0026)	18
Regional cancer (Dukes C, stage 3)	0.0699	0.0524-0.0874	Beta (0.0699; SD 0.0088)	18
Distant cancer (Dukes D, stage 4)	0.3467	0.2600-0.4334	Beta (0.3467; SD 0.0434)	18
Adverse events				
Mortality from emergent colectomy	0.024	0.018-0.16	Beta (0.024; SD 0.036)	19
Mortality from elective colectomy	0.006	0.0035-0.066	Beta (0.006; SD 0.016)	1, 19
Mortality from colectomy for CRC	0.042	0.039-0.057	Beta (0.042; SD 0.005)	20

Morbidity from emergent colectomy	0.421	0.316-0.526	Beta (0.421; SD 0.053)	19
Morbidity from elective colectomy	0.346	0.260-0.433	Beta (0.346; SD 0.043)	19
Morbidity from colectomy for CRC	0.384	0.278-0.405	Beta (0.384; SD 0.032)	21
Mortality from surveillance colonoscopy	0.00007	0.00006-0.0003	Beta (0.00007; SD 0.00006)	21
Morbid adverse event from surveillance colonoscopy	0.005	0.001-0.009	Beta (0.005; SD 0.002)	21
Perforation from surveillance colonoscopy	0.0001	0.00003-0.003	Beta (0.0001; SD 0.0007)	21
Utilities				
Chronic UC, with or without dysplasia	0.94	0.85-1.0	Triangular (0.94, 0.85, 1.0)	22, 23
Post-IPAA	0.9	0.84-0.94	Triangular (0.90, 0.84, 0.94)	21
Local cancer	0.74	0.69-0.78	Triangular	24

(Dukes A/B, stage 1-2)			(0.74, 0.69, 0.78)	
Regional cancer (Dukes C, stage 3)	0.59	0.54-0.69	Triangular (0.59, 0.54, 0.69)	24
Distant cancer (Dukes D, stage 4)	0.25	0.20-0.31	Triangular (0.25, 0.20, 0.31)	24
Severe UC flare resulting in colectomy	0.42 (1 mo)	0.10-0.70	Triangular (0.42, 0.10, 0.70)	21, 23
Surgery (IPAA or other type of colectomy)	0.61 (1 mo)	0.32-0.84	Triangular (0.61, 0.32, 0.84)	23
Colonoscopy adverse events	0.031 (1 mo)	0.001-0.125	Triangular (0.031, 0.001, 0.125)	1
Postoperative adverse events	0.55 (1 mo)	0.30-0.70	Triangular (0.55, 0.30, 0.70)	23
Other variables				
Discount rate	3%			25, 26
Cycle length	1 y	0-10 y		
Willingness to pay threshold	$50,000/QALY			27

CI, Confidence interval; UC, ulcerative colitis; SD, standard deviation; WLE, white-light endoscopy; CRC, colorectal cancer; LGD, low-grade dysplasia; HGD, high-grade dysplasia; IPAA, ileal pouch anal anastomosis; QALY, quality-adjusted life year

Adapted from Konijeti GG, Shrime MG, Ananthakrishnan AN, Chan AT. Cost-effectiveness analysis of chromoendoscopy for colorectal cancer surveillance in patients with ulcerative colitis. Gastrointest Endosc. 2014 Mar;79(3):455-65 and used with permission.

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"Relative to Baseline" Analysis

STRATEGYNAME	COST	EFF	INCRCOST vs Baseline	INCREFF vs Baseline	ICER_vs_Baseline
No Surveillance (Natural History)	189960.26	19.65	0	0	0
sDNA testing with WLE Confirmatory q2 year	194913.88	19.92	4953.626	0.266	18643
White light endoscopy q2 year	201112.19	20.05	11151.933	0.400	27907

"Incremental" Analysis

STRATEGYNAME	COST	EFF	INCRCOST	INCREFF	ICER	NMB at WTP 0	NMB at WTP 5000	NMB at WTP 10000	NMB at WTP 15000	NMB at 18642.73	NMB at 25000	NMB at 30000	NMB at 35000	NMB at 40000	NMB at 45000	NMB at 46294	NMB at 50000	NMB at 100000
No Surveillance (Natural History)	189960.2578	19.65055763	0	0	0	-189960.26	-91707.5	6545.319	104798.1	176379.8	301303.7	399556.5	497809.3	596062	694314.8	719742.7	792567.6	1775096
sDNA testing with WLE Confirmatory q2 year	194913.8841	19.91627132	4953.626267	0.265714	18643	-194913.88	-95332.5	4248.829	103830.2	176379.8	302992.9	402574.3	502155.6	601737	701318.3	727090	800899.7	1796713
White light endoscopy q2 year	201112.1913	20.05016251	6198.30722	0.133891	46294	-201112.19	-100861	-610.566	99640.25	172677.6	300141.9	400392.7	500643.5	600894.3	701145.1	727090	801395.9	1803904

highest NMB = optimal strategy at WTP (not

Net monetary benefit (NMB) analysis (and acceptability curve) directly relates to ICER (G8 through G10)
Acceptability curves provide the additional information of quantifying how *often* a strategy has a higher NMB at a given WTF

ICERs *imply* optimal WTP thresholds
No Surv: Optimal at WTP $0 - <$18,643
sDNA: Optimal at WTP > $18,643 - < $46294
WLE: Optimal at WTP >$46,294

te the concordance with ICER thresholds)

"Relative to Baseline" Analysis

STRATEGYNAME	COST	EFF	INCRCOST vs Baseline	INCREFF vs Baseline	ICER_vs_Baseline
No Surveillance (Natural History)	189960.26	19.65	0	0	0
sDNA testing with Chromo Confirmatory q2 year	194812.43	19.95	4852.173	0.297	16362
Chromoendoscopy q2 year	200260.79	20.08	10300.532	0.432	23830

"Incremental" Analysis

STRATEGYNAME	COST	EFF	INCRCOST vs Baseline	INCREFF vs Baseline	ICER_vs_Baseline	NMB at WTP 0	NMB at WTP 5000	NMB at WTP 10000	NMB at WTP 15000	NMB at 16362	NMB at 25000	NMB at 30000	NMB at 35000	NMB at 40000	NMB at 40151	NMB at 45000	NMB at 50000	NMB at 100000	highest NMB = optimal strategy a
No Surveillance (Natural History)	189960.26	19.65	0	0	0	**-189960**	**-91707**	**6545**	**104798**	**131562**	301304	399556	497809	596062	599029	694315	792568	1775096	
sDNA testing with Chromo Confirmatory q2 year	194812.43	19.95	4852.1727	0.2965	16362	-194812	-95077	4659	104394	**131562**	**303865**	**403601**	**503336**	**603072**	**606084**	702807	802543	1799898	
Chromoendoscopy q2 year	200260.79	20.08	5448.3589	0.1357	40151	-200261	-99847	567	100981	128334	301809	402223	502637	603051	**606084**	**703465**	**803879**	**1808020**	

at WTP