

Benefits and risks of colorectal cancer screening in elderly patients

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Methods

- Age-specific life-expectancy and the risk for colorectal cancer (CRC) from the vital statistics
- Calculation of the number needed to screen (NNS) to prevent one CRC-related death and the number needed to encounter one screening-related harm (NNH)
- Comparison of CRC screening using fecal occult blood test (FOBT), flexible sigmoidoscopy (FS), and colonoscopy (COLON)

Assumptions

- FOBT, FS, and colonoscopy reduce CRC mortality by 18%, 40%, and 75%, respectively.
- The risk of colonoscopy-related complication was is 0.3%, and the risk of death is 0.01%.

AGE-GROUP	MALES	
	Life expectancy (years)	Risk of CRC death (%)
50-54	36	4.1
	28.5	2.3
	19.6	1.0
70-74	18	3.8
	12.4	2.1
	6.7	0.9
75-79	14.2	3.6
	9.3	1.9
	4.9	0.9
80-84	10.8	3.2
	6.7	1.8
	3.3	0.8
85-89	7.9	2.7
	4.7	1.6
	2.2	0.8
90-94	5.8	2.0
	3.2	1.1
	1.5	0.5

Age-specific CRC risk in men

AGE-GROUP	FEMALES	
	Life expectancy (years)	Risk of CRC death (%)
50-54	40	3.8
	33	2.2
	24.5	1.0
70-74	21.3	3.5
	15.7	2.0
	9.5	0.9
75-79	17	3.3
	11.9	2.0
	6.8	0.9
80-84	13	3.0
	8.6	1.8
	4.6	0.8
85-89	9.6	2.5
	5.9	1.6
	2.9	0.8
90-94	6.8	1.8
	3.9	1.0
	1.5	0.4

Age-specific CRC risk in women

AGE-GROUP	MALES			
	Life expectancy (years)	NNS FOBT	NNS FS	NNS COLON
50-54	36	138	62	33
	28.5	255	115	61
	19.6	629	283	151
70-74	18	177	80	42
	12.4	380	171	91
	6.7	1877	845	450
75-79	14.2	207	93	50
	9.3	525	236	126
	4.9	-	-	-
80-84	10.8	277	125	66
	6.7	945	425	227
	3.3	-	-	-
85-89	7.9	554	249	133
	4.7	-	-	-
	2.2	-	-	-
90-94	5.8	2008	903	482
	3.2	-	-	-
	1.5	-	-	-

Number needed to screen by screening type

AGE-GROUP	FEMALES			
	Life expectancy (years)	NNS FOBT	NNS FS	NNS COLON
50-55	40	147	66	35
	33	263	119	63
	24.5	577	260	139
70-75	21.3	178	80	43
	15.7	340	153	82
	9.5	1046	471	251
75-80	17	204	92	49
	11.9	408	183	98
	6.8	1797	808	431
80-85	13	262	118	63
	8.6	581	262	140
	4.6	-	-	-
85-90	9.6	455	205	109
	5.9	2326	1047	558
	2.9	-	-	-
90-95	6.8	1163	523	279
	3.9	-	-	-
	1.5	-	-	-

Number needed to screen by screening type

AGE-GROUP	MALES			
	Life expectancy (years)	COLONOSCOPIES		
		FOBT	FS	COLON
50-54	36	0.9	2.8	4.9
	28.5	0.9	2.2	3.6
	19.6	0.7	1.6	2.3
70-74	18	0.7	1.6	2.3
	12.4	0.5	1.3	1.3
	6.7	0.2	1.0	1.0
75-79	14.2	0.6	1.3	1.3
	9.3	0.4	1.0	1.0
	4.9	0.0	0.0	0.0
80-84	10.8	0.4	1.3	1.3
	6.7	0.2	1.0	1.0
	3.3	0.0	0.0	0.0
85-89	7.9	0.2	1.0	1.0
	4.7	0.0	0.0	0.0
	2.2	0.0	0.0	0.0
90-94	5.8	0.1	1.0	1.0
	3.2	0.0	0.0	0.0
	1.5	0.0	0.0	0.0

Number of colonoscopies per subject by screening type

AGE-GROUP	FEMALES			
	Life expectancy (years)	COLONOSCOPIES		
		FOBT	FS	COLON
50-54	40	1.0	3.1	5.2
	33	0.9	2.5	3.9
	24.5	0.8	1.9	2.6
70-74	21.3	0.8	1.9	2.6
	15.7	0.6	1.6	2.3
	9.5	0.4	1.0	1.0
75-79	17	0.7	1.6	2.3
	11.9	0.5	1.3	1.3
	6.8	0.2	1.0	1.0
80-84	13	0.6	1.3	1.3
	8.6	0.3	1.0	1.0
	4.6	0.0	0.0	0.0
85-89	9.6	0.4	1.0	1.0
	5.9	0.1	1.0	1.0
	2.9	0.0	0.0	0.0
90-94	6.8	0.2	1.0	1.0
	3.9	0.0	0.0	0.0
	1.5	0.0	0.0	0.0

Number of colonoscopies per subject by screening type

AGE-GROUP	MALES			
	Life expectancy (years)	NNH	NNH	NNH
		FOBT	FS	COLON
50-54	36	352	119	68
	28.5	375	152	93
	19.6	447	208	145
70-74	18	462	208	145
	12.4	643	256	256
	6.7	1996	333	333
75-79	14.2	556	256	256
	9.3	909	333	333
	4.9	-	-	-
80-84	10.8	790	256	256
	6.7	1996	333	333
	3.3	-	-	-
85-89	7.9	1390	333	333
	4.7	-	-	-
	2.2	-	-	-
90-94	5.8	3817	333	333
	3.2	-	-	-
	1.5	-	-	-

Number
needed to
encounter one
screening-
related harm

AGE-GROUP	FEMALES			
	Life expectancy (years)	NNH	NNH	NNH
		FOBT	FS	COLON
50-54	40	346	108	64
	33	359	133	85
	24.5	397	175	128
70-74	21.3	423	175	128
	15.7	526	208	145
	9.5	909	333	333
75-79	17	480	208	145
	11.9	705	256	256
	6.8	1996	333	333
80-84	13	595	256	256
	8.6	1089	333	333
	4.6	-	-	-
85-89	9.6	909	333	333
	5.9	3817	333	333
	2.9	-	-	-
90-94	6.8	1996	333	333
	3.9	-	-	-
	1.5	-	-	-

Number
needed to
encounter one
screening-
related harm

Conclusions

- The benefits of CRC screening vary in elderly patients depending on life expectancy and comorbidity.
- Short life expectancy or severe comorbidity render CRC screening ineffective.
- The potential for harm from CRC screening alone is not a sufficiently strong argument to weigh against screening of elderly patients.