Supplementary Material

Associations Between Vascular Diseases and Alzheimer's Disease or Related Dementias in a Large Cohort of Men and Women with Colorectal Cancer

Supplementary Table 1. ICD codes for cardiovascular diseases, stroke, hypertension, and diabetes*

Medical Conditions	ICD-9 codes	ICD-10 codes
Cardiovascular diseases		
Myocardial infarction	410.x, 412.x	I21.x, I22.x, I25.2
Congestive heart failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93,425.4 - 425.9, 428.x	I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5 - I42.9, I43.x, I50.x, P29.0
Peripheral-vascular-disease	093.0, 437.3, 440.x, 441.x, 443.1-443.9, 447.1, 557.1, 557.9, V43.4	I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9
Cerebrovascular disease (stroke)	362.34, 430.x - 438.x	G45.x, G46.x, H34.0, I60.x - I69.x
Hypertension		
Hypertension, uncomplicated	401.x	I10.x
Hypertension, complicated	402.x - 405.x	I11.x - I13.x, I15.x
Diabetes		
Diabetes without chronic complication	250.0 - 250.3, 250.8, 250.9	E10.0, E10.1, E10.6, E10.8, E10.9, E11.0, E11.1, E11.6, E11.8, E11.9, E12.0, E12.1, E12.6, E12.8, E12.9, E13.0, E13.1, E13.6, E13.8, E13.9, E14.0, E14.1, E14.6, E14.8, E14.9
Diabetes with chronic complication	250.4 - 250.7	E10.2 - E10.5, E10.7, E11.2 - E11.5, E11.7, E12.2 - E12.5, E12.7, E13.2 - E13.5, E13.7, E14.2 - E14.5, E14.7

*Sources:

[1] National Cancer Institute. SEER-Medicare: Calculation of Comorbidity Weights. http://healthcaredelivery.cancer.gov/seermedicare/program/comorbidity.html, Accessed November 17, 2020.

[2] Gasparini A. Comorbidity scores. 2020-01-08. https://cran.microsoft.com/web/packages/comorbidity/vignettes/comorbidityscores.html, Accessed November 17, 2020.

[3] Glasheen WP, Cordier T, Gumpina R, Haugh G, Davis J, Renda A (2019) Charlson Comorbidity Index: ICD-9 Update and ICD-10 Translation. *Am Health Drug Benefits* **12**, 188-197.

Supplementary Table 2. ICD-9 and ICD-10 codes for Alzheimer's Disease and related Dementias (ADRD)

ICD-9	Description for ICD-9 codes	ICD-10	Description for ICD-10 codes
290.0	Senile dementia, uncomplicated	F03.90	Unspecified dementia without behavioral disturbance
290.1	Presenile dementia, uncomplicated	F03.90	Unspecified dementia without behavioral disturbance
290.2	Senile dementia with delusional or depressive features	F03.90	Unspecified dementia without behavioral disturbance
290.3	Senile dementia with delirium (acute confusional state)	F03.90	Unspecified dementia without behavioral disturbance
290.40	Vascular dementia	F01.50	Vascular dementia
290.41	Vascular dementia, with delirium	F01.51	Vascular dementia with behavioral disturbance
290.42	Vascular dementia, with delusions		
290.43	Vascular dementia, with depressed mood		
290.8	Other specified senile psychotic conditions	F03.90	Unspecified dementia without behavioral disturbance
290.9	Unspecified senile psychotic condition	F03.90	Unspecified dementia without behavioral disturbance
291.2	Alcohol-induced persisting dementia	F10.27	Alcohol-induced dementia
292.82	Drug-induced persisting dementia	F19.97	Other-psychoactive substance use/unspecified with psychoactive substance induced persisting dementia
294.10	Dementia in conditions classified elsewhere without behavioral disturbance	F02.80	Dementia in other diseases classified elsewhere without behavioral disturbance
294.11	Dementia in conditions classified elsewhere with behavioral disturbance	F02.81	Dementia in other diseases classified elsewhere with behavioral disturbance
294.20	Dementia, unspecified, without behavioral disturbance	F03.90	Unspecified dementia without behavioral disturbance
294.21	Dementia, unspecified, with behavioral disturbance	F03.91	Unspecified dementia with behavioral disturbance
294.8	Other persistent mental disorders due to conditions classified elsewhere	F06.0	Psychotic disorder with hallucinations due to known physiological condition
294.9	Unspecified persistent mental disorders due to conditions classified elsewhere	F06.8	Other specified mental disorders due to known physiological condition
331.0	Alzheimer's disease	G30	Alzheimer's disease
		G30.0	Alzheimer's disease with early onset
		G30.1	Alzheimer's disease with late onset
		G30.8	Other Alzheimer's disease
		G30.9	Alzheimer's disease, unspecified
331.11	Frontotemporal dementia, Pick's disease	G31.01	Frontotemporal dementia, Pick's disease
331.19	Other frontotemporal dementia	G31.09	Other frontotemporal dementia
331.2	Senile degeneration of brain	G31.1	Senile degeneration of brain, not elsewhere classified
331.7	Cerebral degeneration in dis. classified elsewhere	G94	Other disorders of brain in dis. classified elsewhere
331.82	Dementia with Lewy bodies	G31.83	Dementia with Lewy bodies
331.83	Mild cognitive impairment, so stated	G31.84	Mild cognitive impairment, so stated
331.89	Other cerebral degeneration	G31.89	Other specified degenerative dis. of nervous system
331.9	Cerebral degeneration, unspecified	G31.9	Degenerative disease of nervous system, unspecified
797	Senility without mention of psychosis	R41.81	Age-related cognitive decline

Supplementary Table 3. Cumulative incidence of dementias (ADRD) as primary diagnosis by vascular diseases in patients with colorectal cancer.

Characteristics	Cumulative incidence (%) of dementias						
	AD	Vascular	DLB	FTD	MCI	Others	Total ADRD
Cardiovascular disease							
No	4.88	1.93	0.19	0.08	0.59	13.62	15.94
Yes	4.28	2.45	0.15	0.04	0.50	14.83	17.44
Stroke							
No	4.59	1.68	0.18	0.07	0.56	12.79	14.93
Yes	5.78	3.63	0.21	0.09	0.62	18.70	22.17
Hypertension							
No	4.26	1.59	0.19	0.08	0.62	11.84	13.90
Yes	5.25	2.37	0.18	0.08	0.53	15.46	18.07
Diabetes							
No	4.80	1.91	0.19	0.08	0.61	13.38	15.68
Yes	4.78	2.35	0.17	0.07	0.45	15.17	17.76
Age (y)							
65-69	2.53	1.12	0.17	0.07	0.50	8.37	9.73
70-74	4.19	1.74	0.22	0.08	0.67	11.94	13.94
75-79	5.64	2.33	0.23	0.09	0.64	15.31	17.91
80-84	6.43	2.62	0.22	0.08	0.57	17.32	20.39
85 or older	5.35	2.32	0.07	0.06	0.47	16.66	19.57
Gender							
Men	3.89	1.70	0.23	0.07	0.55	12.30	14.41
Women	5.57	2.27	0.14	0.08	0.59	15.08	17.67
Race/ethnicity							
NH-Whites	4.95	2.04	0.20	0.08	0.61	14.18	16.57
NH-Blacks	4.53	2.43	0.11	0.05	0.41	13.32	15.72
NH-Asians/P. Islanders	3.72	1.47	0.11	0.06	0.46	10.88	13.18
Hispanics	4.17	1.52	0.17	0.06	0.41	11.87	14.13
Others	3.74	1.74	0.23	0.10	0.69	12.72	14.69
Unknown/missing	4.43	1.86	0.16	0.05	0.55	13.95	15.59
Marital status							
Married	4.53	1.72	0.23	0.09	0.64	12.47	14.67
Unmarried	5.06	2.31	0.14	0.06	0.50	15.11	17.67
Unknown	4.77	1.95	0.19	0.09	0.61	14.34	16.51
Tumor stage							
Local	6.56	2.61	0.27	0.12	0.83	17.16	20.21
Regional	4.92	2.10	0.20	0.07	0.53	14.51	16.88
Distant	0.87	0.47	0.02	0.01	0.15	5.27	6.06
Unknown/Missing	3.44	1.94	0.04	0.09	0.26	11.75	14.04
Tumor grade							
Well-differentiated	6.03	2.57	0.23	0.12	0.72	16.24	19.17
Moderately-differentiated	5.17	2.10	0.21	0.08	0.59	14.57	17.04
Poorly-differentiated	3.97	1.74	0.14	0.05	0.50	11.96	13.95
Unknown/Missing	3.59	1.69	0.13	0.07	0.51	11.60	13.67
Tumor site							
Colon	4.97	2.11	0.20	0.08	0.60	14.26	16.70
Rectal	4.27	1.72	0.15	0.07	0.49	12.43	14.56
Chemotherapy							
No	5.16	2.19	0.19	0.08	0.60	14.55	17.09
Yes	3.30	1.29	0.17	0.06	0.47	10.74	12.37
Radiotherapy							
No	4.88	2.05	0.19	0.08	0.59	13.99	16.39
Yes	3.39	1.35	0.13	0.06	0.38	10.73	12.51

Comorbidity Scores

0	4.99	1.95	0.20	0.08	0.60	13.25	15.57
1	4.62	2.06	0.17	0.08	0.52	14.27	16.72
≥2	4.18	2.23	0.15	0.05	0.56	15.55	17.96
SEER Areas							
Connecticut	6.84	5.11	0.32	0.19	0.76	18.82	22.33
Detroit	8.22	3.72	0.19	0.07	0.49	20.41	23.56
Hawaii	4.59	2.80	0.30	0.06	0.70	12.47	14.87
Iowa	4.67	1.50	0.18	0.02	0.41	14.73	16.35
New Mexico	3.41	1.54	0.12	0.06	0.40	12.95	14.49
Seattle	3.34	1.28	0.11	0.03	0.22	8.97	10.84
Utah	3.45	0.97	0.04	0.10	0.22	11.25	13.18
Georgia	3.38	1.02	0.14	0.06	0.46	10.12	12.03
Kentucky	4.93	1.24	0.19	0.05	0.36	15.10	16.98
Louisiana	3.02	1.04	0.11	0.09	0.41	9.30	10.98
New Jersey	5.50	2.65	0.23	0.09	0.80	15.50	18.54
California	4.18	1.41	0.18	0.08	0.70	12.31	14.62
Total	4.79	2.01	0.19	0.08	0.57	13.80	16.16

ADRD, Alzheimer's disease and related dementias; AD, Alzheimer's disease; Vascular, vascular dementia; DLB, dementia with Lewy bodies; FTD, frontotemporal degeneration and dementias; MCI, mild cognitive impairment; others, other dementias; total, any of above ADRD.

Supplementary Table 4. Hazard ratio of dementias as primary diagnosis by vascular disease in patients with colorectal cancer

Characteristics	Hazard ratio (95% confidence intervals)* of developing dementias by vascular diseases						
	AD	Vascular	DLB	FTD	MCI	Others	Total
Cardiovascular disease							
Yes versus No	1.03 (0.98,1.10)	1.27 (1.17,1.38)	0.96 (0.70,1.32)	0.56 (0.31,1.02)	1.09 (0.92,1.30)	1.14 (1.10,1.18)	1.14 (1.11,1.18)
Stroke							
Yes versus No	1.42 (1.35,1.49)	2.30 (2.15,2.46)	1.55 (1.19,2.02)	1.68 (1.14,2.49)	1.33 (1.15,1.55)	1.62 (1.58,1.67)	1.66 (1.62,1.70)
Hypertension							
Yes versus No	1.02 (0.97,1.06)	1.12 (1.05,1.20)	0.80 (0.65,0.99)	0.93 (0.67,1.29)	0.78 (0.69,0.88)	1.09 (1.06,1.11)	1.08 (1.06,1.11)
Diabetes							
Yes versus No	1.15 (1.10,1.21)	1.25 (1.16,1.34)	1.14 (0.88,1.47)	1.08 (0.73,1.61)	0.92 (0.79,1.07)	1.23 (1.19,1.26)	1.23 (1.20,1.26)
Age (y)							
65-69	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
70-74	1.77 (1.64,1.91)	1.53 (1.37,1.72)	1.39 (1.03,1.88)	1.17 (0.72,1.91)	1.43 (1.20,1.71)	1.51 (1.45,1.58)	1.52 (1.46,1.58)
75-79	2.72 (2.53,2.93)	2.20 (1.97,2.46)	1.77 (1.31,2.40)	1.60 (0.99,2.58)	1.55 (1.30,1.86)	2.18 (2.09,2.27)	2.20 (2.12,2.28)
80-84	3.95 (3.67,4.25)	2.90 (2.59,3.25)	2.27 (1.64,3.15)	1.84 (1.10,3.09)	1.75 (1.44,2.12)	3.01 (2.88,3.14)	3.05 (2.94,3.17)
85 or older	4.89 (4.52,5.30)	3.48 (3.09,3.92)	1.33 (0.84,2.10)	2.30 (1.29,4.09)	2.11 (1.70,2.61)	3.95 (3.77,4.12)	3.98 (3.82,4.15)
Gender							
Women versus Men	1.13 (1.08,1.18)	0.99 (0.92,1.05)	0.56 (0.45,0.70)	1.00 (0.72,1.39)	1.00 (0.89,1.13)	0.98 (0.96,1.01)	0.99 (0.97,1.01)
Race/ethnicity							
NH-Whites	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
NH-Blacks	1.12 (1.04,1.21)	1.39 (1.25,1.55)	0.78 (0.49,1.24)	0.75 (0.37,1.50)	0.84 (0.66,1.07)	1.12 (1.07,1.17)	1.13 (1.09,1.18)
NH-Asians/P. Islanders	0.85 (0.76,0.96)	0.83 (0.69,1)	0.46 (0.24,0.88)	0.79 (0.33,1.89)	0.60 (0.44,0.82)	0.86 (0.80,0.92)	0.89 (0.83,0.94)
Hispanics	1.14 (1.04,1.26)	0.99 (0.85,1.16)	1.02 (0.64,1.61)	0.79 (0.36,1.72)	0.67 (0.50,0.89)	1.01 (0.96,1.07)	1.03 (0.98,1.08)
Others	0.77 (0.63,0.93)	0.82 (0.62,1.09)	0.81 (0.36,1.82)	1.09 (0.33,3.60)	0.84 (0.54,1.32)	0.92 (0.83,1.02)	0.91 (0.82,1.00)
Unknown/missing	0.77 (0.62,0.96)	0.78 (0.56,1.10)	0.69 (0.22,2.17)	0.45 (0.06,3.28)	0.66 (0.35,1.23)	0.85 (0.75,0.96)	0.81 (0.72,0.91)
Marital status							
Married	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Unmarried	1.07 (1.02,1.12)	1.29 (1.20,1.38)	0.91 (0.73,1.15)	0.75 (0.53,1.08)	0.91 (0.80,1.03)	1.23 (1.20,1.26)	1.22 (1.19,1.25)
Unknown	1.04 (0.94,1.14)	1.08 (0.93,1.25)	1.09 (0.68,1.76)	1.04 (0.52,2.10)	1.11 (0.85,1.45)	1.16 (1.10,1.23)	1.13 (1.08,1.19)
Tumor stage							
Local	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Regional	0.96 (0.92,1.00)	1.04 (0.97,1.11)	0.90 (0.72,1.13)	0.74 (0.51,1.08)	0.78 (0.68,0.89)	1.04 (1.01,1.07)	1.03 (1.00,1.05)
Distant	0.66 (0.59,0.74)	0.78 (0.66,0.91)	0.37 (0.17,0.79)	0.24 (0.06,0.99)	0.75 (0.57,1.00)	0.99 (0.94,1.04)	0.95 (0.91,1.00)
Unknown/Missing	0.64 (0.58,0.72)	0.98 (0.85,1.14)	0.16 (0.06,0.43)	0.92 (0.45,1.87)	0.31 (0.21,0.46)	0.82 (0.78,0.88)	0.84 (0.79,0.88)
Tumor grade							
Well-differentiated	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Moderately-differentiated	1.02 (0.95,1.09)	1.00 (0.90,1.11)	1.11 (0.79,1.54)	0.85 (0.54,1.36)	1.02 (0.84,1.24)	1.01 (0.97,1.05)	1.00 (0.97,1.04)
Poorly-differentiated	1.00 (0.92,1.08)	1.05 (0.93,1.18)	1.02 (0.67,1.55)	0.74 (0.40,1.38)	1.13 (0.90,1.42)	1.00 (0.95,1.04)	0.99 (0.95,1.04)
Unknown/Missing	0.98 (0.90,1.07)	1.02 (0.89,1.15)	1.00 (0.65,1.56)	0.94 (0.52,1.70)	1.20 (0.95,1.52)	1.05 (1.00,1.10)	1.05 (1.00,1.10)
Tumor site							
Rectal versus Colon	0.99 (0.94,1.04)	0.97 (0.90,1.05)	0.77 (0.59,1.00)	0.86 (0.58,1.27)	0.87 (0.75,1.00)	0.98 (0.95,1.01)	0.98 (0.95,1.00)

Chemotherapy							
Yes versus No	0.83 (0.78,0.89)	0.76 (0.69,0.84)	1.11 (0.83,1.47)	1.12 (0.70,1.79)	1.02 (0.86,1.20)	0.88 (0.85,0.91)	0.87 (0.84,0.90)
Radiotherapy							
Yes versus No	0.95 (0.85,1.05)	0.89 (0.76,1.05)	0.91 (0.53,1.57)	0.95 (0.42,2.16)	0.89 (0.65,1.22)	0.97 (0.91,1.03)	0.97 (0.92,1.02)
Comorbidity Scores							
0	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
1	1.00 (0.95,1.04)	1.07 (1.00,1.14)	1.00 (0.79,1.26)	1.26 (0.90,1.77)	0.99 (0.87,1.13)	1.13 (1.10,1.16)	1.12 (1.10,1.15)
≥2	1.12 (1.04,1.20)	1.27 (1.15,1.40)	1.18 (0.81,1.70)	1.09 (0.59,2.00)	1.43 (1.18,1.74)	1.42 (1.37,1.48)	1.39 (1.34,1.44)
SEER Areas							
Connecticut	1.52 (1.41,1.63)	3.52 (3.20,3.88)	1.44 (1.04,2.01)	2.29 (1.44,3.64)	0.90 (0.74,1.10)	1.46 (1.39,1.52)	1.46 (1.41,1.52)
Detroit	1.86 (1.73,1.98)	2.26 (2.03,2.52)	0.87 (0.59,1.30)	0.84 (0.44,1.60)	0.59 (0.47,0.75)	1.54 (1.48,1.61)	1.50 (1.45,1.56)
Hawaii	1.26 (1.06,1.51)	2.44 (1.92,3.09)	1.77 (0.87,3.63)	0.77 (0.17,3.39)	1.05 (0.67,1.65)	1.15 (1.04,1.28)	1.15 (1.05,1.27)
Iowa	0.99 (0.92,1.07)	1.05 (0.91,1.20)	0.73 (0.49,1.08)	0.18 (0.06,0.59)	0.45 (0.35,0.58)	1.12 (1.07,1.18)	1.05 (1.00,1.09)
New Mexico	0.88 (0.76,1.03)	1.33 (1.06,1.68)	0.55 (0.24,1.25)	0.77 (0.24,2.51)	0.57 (0.37,0.88)	1.18 (1.09,1.28)	1.11 (1.03,1.19)
Seattle	0.80 (0.72,0.89)	1.00 (0.84,1.18)	0.51 (0.29,0.91)	0.43 (0.15,1.20)	0.27 (0.18,0.41)	0.72 (0.68,0.77)	0.74 (0.69,0.78)
Utah	0.84 (0.72,0.98)	0.80 (0.60,1.08)	0.18 (0.05,0.74)	1.26 (0.50,3.19)	0.27 (0.15,0.50)	0.97 (0.89,1.06)	0.96 (0.88,1.04)
Georgia	1.06 (0.96,1.16)	0.90 (0.76,1.07)	0.91 (0.56,1.45)	1.13 (0.56,2.26)	0.76 (0.59,0.99)	0.98 (0.93,1.04)	0.98 (0.93,1.03)
Kentucky	1.47 (1.35,1.60)	1.07 (0.91,1.27)	1.13 (0.73,1.73)	0.74 (0.33,1.67)	0.54 (0.41,0.73)	1.47 (1.40,1.54)	1.39 (1.32,1.45)
Louisiana	0.87 (0.78,0.98)	0.82 (0.68,1.00)	0.64 (0.35,1.17)	1.42 (0.70,2.85)	0.63 (0.47,0.86)	0.82 (0.77,0.88)	0.82 (0.77,0.87)
New Jersey	1.41 (1.32,1.50)	1.89 (1.71,2.09)	1.27 (0.93,1.75)	1.29 (0.78,2.12)	1.17 (0.99,1.38)	1.26 (1.21,1.31)	1.28 (1.24,1.33)
California	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)

***Hazard ratios adjusted for age, gender, race/ethnicity, marital status, tumor stage, tumor grade, tumor site, comorbidity score, chemotherapy, radiation therapy, year of diagnosis, and SEER areas.

Supplementary Table 5. Hazard ratio of dementias by a history of vascular disease, considering death as competing risk

Characteristics	Hazard ratio (95% confidence intervals)* of dementias by vascular diseases						
	AD	Vascular	DLB	FTD	MCI	Others	Total
Cardiovascular disease							
Yes versus No	1.26 (1.24,1.28)	1.28 (1.26,1.30)	1.28 (1.26,1.30)	1.28 (1.26,1.30)	1.28 (1.26,1.30)	1.24 (1.22,1.26)	1.24 (1.22,1.25)
Stroke							
Yes versus No	1.23 (1.21,1.24)	1.25 (1.23,1.26)	1.21 (1.19,1.23)	1.20 (1.19,1.22)	1.21 (1.19,1.23)	1.33 (1.31,1.35)	1.34 (1.32,1.36)
Hypertension							
Yes versus No	0.94 (0.93,0.95)	0.93 (0.92,0.94)	0.92 (0.90,0.93)	0.92 (0.90,0.93)	0.91 (0.90,0.93)	0.98 (0.97,0.99)	0.98 (0.97,0.99)
Diabetes							
Yes versus No	1.20 (1.18,1.22)	1.22 (1.20,1.23)	1.21 (1.20,1.23)	1.21 (1.20,1.23)	1.21 (1.19,1.23)	1.21 (1.19,1.23)	1.21 (1.19,1.22)
Age (y)							
65-69	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
70-74	1.24 (1.22,1.27)	1.21 (1.19,1.24)	1.20 (1.18,1.23)	1.20 (1.18,1.23)	1.21 (1.18,1.23)	1.28 (1.25,1.30)	1.28 (1.26,1.30)
75-79	1.56 (1.53,1.59)	1.50 (1.47,1.53)	1.47 (1.44,1.50)	1.47 (1.44,1.50)	1.47 (1.44,1.50)	1.63 (1.60,1.66)	1.63 (1.60,1.66)
80-84	2.04 (2.00,2.08)	1.94 (1.90,1.97)	1.90 (1.87,1.94)	1.90 (1.87,1.94)	1.90 (1.87,1.94)	2.16 (2.12,2.20)	2.16 (2.12,2.19)
85 or older	2.89 (2.83,2.95)	2.77 (2.72,2.83)	2.75 (2.70,2.81)	2.76 (2.70,2.82)	2.75 (2.70,2.81)	3.04 (2.98,3.10)	3.03 (2.98,3.09)
Gender							
Women versus Men	0.87 (0.86,0.88)	0.84 (0.83,0.86)	0.83 (0.82,0.84)	0.83 (0.82,0.84)	0.84 (0.83,0.85)	0.89 (0.88,0.90)	0.89 (0.88,0.90)
Race/ethnicity							
NH-Whites	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
NH-Blacks	1.15 (1.13,1.18)	1.17 (1.14,1.19)	1.15 (1.13,1.17)	1.15 (1.13,1.18)	1.15 (1.12,1.17)	1.16 (1.14,1.18)	1.16 (1.14,1.18)
NH-Asians/P. Islanders	0.86 (0.83,0.89)	0.85 (0.82,0.87)	0.84 (0.81,0.87)	0.84 (0.81,0.87)	0.83 (0.81,0.86)	0.90 (0.87,0.92)	0.90 (0.88,0.93)
Hispanics	1.04 (1.01,1.07)	1.02 (0.99,1.05)	1.02 (0.99,1.05)	1.02 (0.99,1.05)	1.01 (0.99,1.04)	1.03 (1.01,1.06)	1.04 (1.01,1.06)
Others	0.99 (0.94,1.04)	0.99 (0.95,1.04)	1.01 (0.96,1.06)	1.01 (0.96,1.06)	1.00 (0.96,1.06)	0.96 (0.92,1.01)	0.97 (0.92,1.01)
unknown/missing	0.77 (0.72,0.82)	0.75 (0.70,0.80)	0.74 (0.69,0.80)	0.74 (0.69,0.80)	0.74 (0.69,0.79)	0.77 (0.72,0.81)	0.78 (0.73,0.83)
Marital status							
Married	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Unmarried	1.21 (1.20,1.23)	1.23 (1.22,1.25)	1.23 (1.21,1.24)	1.23 (1.21,1.24)	1.22 (1.20,1.24)	1.22 (1.21,1.24)	1.22 (1.21,1.24)
Unknown	1.08 (1.05,1.11)	1.09 (1.06,1.12)	1.09 (1.06,1.12)	1.09 (1.06,1.12)	1.09 (1.06,1.12)	1.11 (1.08,1.14)	1.10 (1.07,1.13)
Tumor stage							
Local	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Regional	1.57 (1.55,1.59)	1.64 (1.61,1.66)	1.68 (1.66,1.71)	1.69 (1.66,1.72)	1.66 (1.63,1.69)	1.44 (1.42,1.45)	1.42 (1.40,1.44)
Distant	6.33 (6.23,6.44)	6.86 (6.75,6.97)	7.28 (7.16,7.40)	7.34 (7.22,7.47)	7.12 (7.00,7.24)	4.78 (4.71,4.86)	4.64 (4.57,4.71)
Unknown/Missing	2.24 (2.18,2.29)	2.47 (2.41,2.53)	2.59 (2.53,2.66)	2.63 (2.56,2.69)	2.53 (2.46,2.59)	1.82 (1.78,1.87)	1.80 (1.76,1.84)
Tumor grade							
Well-differentiated	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Moderately-differentiated	1.07 (1.05,1.09)	1.08 (1.06,1.11)	1.08 (1.06,1.11)	1.08 (1.06,1.11)	1.08 (1.06,1.11)	1.05 (1.03,1.07)	1.05 (1.03,1.07)
Poorly-differentiated	1.35 (1.32,1.39)	1.39 (1.35,1.42)	1.40 (1.37,1.44)	1.40 (1.37,1.44)	1.40 (1.36,1.44)	1.27 (1.25,1.3)	1.27 (1.25,1.30)
Unknown/Missing	1.52 (1.48,1.56)	1.56 (1.52,1.60)	1.59 (1.55,1.63)	1.59 (1.55,1.63)	1.58 (1.54,1.63)	1.40 (1.37,1.44)	1.40 (1.36,1.43)
Tumor site							
Rectal versus Colon	1.09 (1.08,1.11)	1.10 (1.08,1.12)	1.11 (1.09,1.12)	1.11 (1.09,1.12)	1.10 (1.09,1.12)	1.07 (1.06,1.09)	1.07 (1.05,1.08)

Chemotherapy							
Yes versus No	0.73 (0.72,0.74)	0.72 (0.71,0.73)	0.72 (0.71,0.73)	0.72 (0.71,0.73)	0.72 (0.71,0.73)	0.76 (0.75,0.77)	0.76 (0.75,0.77)
Radiotherapy							
Yes versus No	1.27 (1.24,1.30)	1.29 (1.26,1.32)	1.30 (1.27,1.34)	1.31 (1.28,1.34)	1.30 (1.27,1.34)	1.20 (1.17,1.23)	1.19 (1.17,1.22)
Comorbidity Scores							
0	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
1	1.19 (1.17,1.20)	1.20 (1.18,1.21)	1.21 (1.19,1.22)	1.21 (1.19,1.22)	1.20 (1.19,1.22)	1.20 (1.18,1.21)	1.19 (1.18,1.21)
≥2	1.54 (1.51,1.56)	1.56 (1.53,1.59)	1.58 (1.55,1.61)	1.58 (1.55,1.61)	1.57 (1.54,1.6)	1.54 (1.51,1.56)	1.54 (1.51,1.56)

*Hazard ratios adjusted for age, gender, race/ethnicity, marital status, tumor stage, tumor grade, tumor site, comorbidity score, chemotherapy, radiation therapy, year of diagnosis, and SEER areas.

Supplementary Table 6. Cumulative-incidence of AD and ADRD after excluding dementia cases that occurred within 1 or 5 years, by history of vascular diseases

	Cumulative-incidence (%) of AD and ADRD by excluding dementia cases that occurred <1 year or <5 years after the baseline					
	Cases <1 year of baseline were excluded		Cases <5 years of baseline were excluded		All cases included after baseline	
Characteristics	**AD**	**ADRD**	**AD**	**ADRD**	**AD**	**ADRD**
Cardiovascular disease						
No	7.25	23.71	4.71	15.88	8.71	28.12
Yes	6.48	24.58	3.45	13.46	8.53	31.92
Stroke						
No	6.92	22.56	4.62	15.40	8.18	26.39
Yes	8.17	30.04	4.06	16.18	11.11	39.82
Hypertension						
No	6.19	20.90	3.94	13.62	7.53	24.88
Yes	7.93	26.31	5.02	17.14	9.66	31.88
Diabetes						
No	7.14	23.23	4.62	15.49	8.61	27.66
Yes	7.11	25.84	4.19	15.66	8.92	32.01
Age (y)						
65-69	3.94	15.31	3.11	11.70	4.28	16.76
70-74	6.25	21.19	4.68	15.91	7.02	23.66
75-79	8.49	26.38	5.84	18.38	9.90	30.41
80-84	9.41	29.29	5.48	18.03	11.76	35.89
85 or older	7.79	27.87	3.34	13.36	10.97	38.53
Gender						
Men	5.83	21.54	3.64	13.83	7.12	25.89
Women	8.25	25.80	5.27	16.98	10.02	31.06
Race/ethnicity						
NH-Whites	7.31	24.16	4.66	15.92	8.85	28.89
NH-Blacks	6.66	22.61	3.88	12.76	8.68	29.61
NH-Asians/P. Islanders	6.12	23.07	3.83	15.23	7.31	26.85
Hispanics	6.44	22.09	3.99	14.00	7.89	26.58
Others	6.33	22.72	4.72	16.72	7.08	26.49
Unknown/missing	7.17	23.30	5.03	17.18	8.59	27.02
Total	7.13	23.83	4.52	15.53	8.68	28.67

AD, Alzheimer's disease; ADRD, Alzheimer's disease and related dementias including AD; Vascular, vascular dementia; DLB, dementia with Lewy bodies; FTD, frontotemporal degeneration and dementias; MCI, mild cognitive impairment; other dementias.

Supplementary Table 7. Adjusted hazard ratio of AD and ADRD after excluding dementia cases that occurred within 1 or 5 years, by history of vascular diseases

| | Adjusted hazard ratio (95% CI)* of AD and ADRD by excluding dementia cases that occurred <1 year or <5 years after the baseline | | | | | |
| | Cases <1 year of baseline were excluded | | Cases <5 years of baseline were excluded | | All cases included after baseline | |
Characteristics	AD	ADRD	AD	ADRD	AD	ADRD
Cardiovascular disease						
Yes versus No	1.12 (1.07-1.18)	1.15 (1.13-1.18)	1.11 (1.04-1.19)	1.10 (1.06-1.14)	1.12 (1.07-1.16)	1.17 (1.14-1.20)
Stroke						
Yes versus No	1.38 (1.33-1.44)	1.57 (1.53-1.60)	1.22 (1.15-1.29)	1.42 (1.38-1.47)	1.47 (1.42-1.52)	1.65 (1.62-1.68)
Hypertension						
Yes versus No	1.04 (1.01-1.08)	1.05 (1.03-1.07)	1.06 (1.02-1.11)	1.09 (1.06-1.11)	1.04 (1.01-1.08)	1.07 (1.05-1.09)
Diabetes						
Yes versus No	1.17 (1.13-1.22)	1.26 (1.24-1.29)	1.16 (1.10-1.22)	1.23 (1.20-1.27)	1.18 (1.13-1.22)	1.26 (1.24-1.29)
Age (y)						
65-69	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
70-74	1.72 (1.62-1.82)	1.50 (1.46-1.55)	1.68 (1.57-1.80)	1.52 (1.47-1.58)	1.75 (1.65-1.85)	1.51 (1.47-1.56)
75-79	2.75 (2.59-2.91)	2.17 (2.11-2.24)	2.62 (2.45-2.80)	2.14 (2.07-2.22)	2.83 (2.68-2.99)	2.20 (2.13-2.26)
80-84	4.07 (3.84-4.32)	3.09 (2.99-3.19)	3.72 (3.46-4.00)	2.94 (2.83-3.05)	4.26 (4.03-4.51)	3.17 (3.08-3.27)
85 or older	5.51 (5.17-5.88)	4.30 (4.16-4.44)	4.56 (4.20-4.95)	3.68 (3.53-3.84)	5.85 (5.51-6.20)	4.58 (4.44-4.72)
Gender						
Women versus Men	1.09 (1.05-1.13)	0.97 (0.95-0.99)	1.11 (1.06-1.16)	1.01 (0.99-1.03)	1.08 (1.05-1.12)	0.95 (0.94-0.97)
Race/ethnicity						
NH-Whites	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
NH-Blacks	1.17 (1.10-1.25)	1.17 (1.13-1.21)	1.12 (1.04-1.22)	1.07 (1.02-1.12)	1.20 (1.13-1.27)	1.22 (1.18-1.25)
NH-Asians/P. Islanders	0.91 (0.83-1.00)	0.98 (0.94-1.03)	0.86 (0.77-0.97)	0.95 (0.89-1.00)	0.91 (0.84-0.99)	0.97 (0.93-1.01)
Hispanics	1.15 (1.06-1.24)	1.05 (1.01-1.09)	1.10 (1.00-1.21)	1.01 (0.95-1.06)	1.16 (1.08-1.24)	1.06 (1.02-1.10)
Others	0.82 (0.71-0.95)	0.88 (0.81-0.95)	0.83 (0.70-0.99)	0.87 (0.79-0.95)	0.80 (0.69-0.91)	0.88 (0.82-0.95)
Unknown/missing	0.82 (0.69-0.98)	0.81 (0.74-0.89)	0.87 (0.71-1.07)	0.88 (0.78-0.98)	0.82 (0.70-0.96)	0.79 (0.72-0.86)

AD, Alzheimer's disease; ADRD, Alzheimer's disease and related dementias including AD; Vascular, vascular dementia; DLB, dementia with Lewy bodies; FTD, frontotemporal degeneration and dementias; MCI, mild cognitive impairment; and other dementias.

*Hazard ratios adjusted for the following variables: age (categorical by 5-year interval), gender, race/ethnicity, marital status, tumor stage, tumor grade, tumor site, comorbidity score, chemotherapy, radiation therapy, year of diagnosis, and SEER areas.