

Supplementary Material

Risk of Developing Alzheimer’s Disease and Related Dementias in Association with Cardiovascular Disease, Stroke, Hypertension, and Diabetes in a Large Cohort of Women with Breast Cancer and with up to 26 Years of Follow-Up

Supplementary Table 1. ICD-9 and ICD-10 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] Alessandro Gasparini. Comorbidity scores. 2020-01-08. <https://cran.microsoft.com/web/packages/comorbidity/vignettes/comorbiditiescores.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 dependence with 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

1) Alzheimer's disease (AD)

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

2) Vascular dementia

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		

3) Dementia with Lewy bodies

331.82	Dementia with Lewy bodies	G31.83	Dementia with Lewy bodies
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4) Frontotemporal degeneration and dementias;

331.11	Frontotemporal dementia, Pick's disease	G31.01	Frontotemporal dementia, Pick's disease
331.19	Other frontotemporal dementia	G31.09	Other frontotemporal dementia

5) Mild cognitive impairment;

331.83	Mild cognitive impairment, so stated	G31.84	Mild cognitive impairment, so stated
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6) All other dementias unspecified or all other dementias that were not specified above in categories 1-5 (see their codes in the Table).

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
290.8	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 dependence with 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
331.2	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
331.89	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

Outcomes ADRD Grouping:

- 1) Alzheimer's disease (AD)
- 2) Vascular dementia (Vascular)
- 3) Dementia with Lewy bodies (Lewy)
- 4) Frontotemporal degeneration and dementias (FTD)
- 5) Mild cognitive impairment (MCI)
- 6) Other dementias, not mentioned in categories 1-5
- 7) Total (any ADRD or any of the above 1-6)

Supplementary Table 3. Cumulative incidence of ADRD as primary diagnosis by a history of CVD, stroke, hypertension, and diabetes in women with breast cancer with up to 26 years of follow-up from 1991 to 2016

Characteristics	Cumulative incidence of ADRD (%)						
	AD	Vascular	Lewy	FTD	MCI	Others	Total
Cardiovascular disease							
No	7.05	3.58	0.27	0.13	1.13	16.52	30.44
Yes	7.29	7.22	0.22	0.05	0.80	20.18	54.21
Stroke							
No	7.08	3.5	0.27	0.13	1.07	16.58	30.44
Yes	6.92	8.51	0.27	0.10	1.42	19.45	54.17
Hypertension							
No	7.70	3.22	0.30	0.15	1.09	16.79	27.53
Yes	6.72	4.22	0.25	0.11	1.11	16.86	34.97
Diabetes							
No	7.44	3.59	0.28	0.13	1.14	17.02	30.48
Yes	5.85	4.77	0.23	0.09	0.99	16.24	38.14
Age (y)							
65-69	3.17	1.55	0.19	0.13	0.87	8.97	14.65
70-74	6.04	2.85	0.30	0.15	1.16	14.51	24.52
75-79	8.90	4.67	0.36	0.16	1.31	20.33	37.73
80-84	10.97	6.95	0.32	0.09	1.32	24.14	55.21
85 or older	9.89	9.55	0.19	0.05	0.91	24.06	79.47
Race/ethnicity							
Whites	7.11	3.72	0.28	0.13	1.14	16.97	31.79
Blacks	7.17	5.81	0.22	0.07	0.86	17.44	39.36
Asians/Pacific Islanders	4.58	2.49	0.23	0.13	0.79	11.08	22.71
Others	9.86	3.86	0.26	0.09	0.96	20.49	31.16
Marital status							
Married	6.14	2.65	0.29	0.13	1.14	14.23	24.38
Unmarried	7.88	4.97	0.25	0.12	1.08	19.09	39.26
Unknown	6.75	4.19	0.26	0.14	1.06	16.35	36.33
AJCC Tumor stage							
0 or I	7.39	3.41	0.31	0.13	1.33	16.86	28.8
II	7.57	4.39	0.26	0.15	1.03	18.24	34.28
III	4.90	3.92	0.22	0.07	0.55	14.15	37.57
IV	2.12	3.7	0.03	0.02	0.21	8.71	47.17
Unknown/Missing	8.61	5.55	0.21	0.09	0.79	20.33	47.45
Tumor size (cm)							
<1	7.04	3.19	0.31	0.13	1.42	16.14	27
1-<2	7.86	3.67	0.30	0.14	1.25	17.99	30.33
2-<3	7.32	4.12	0.26	0.13	1.05	17.66	33.64
3-<4	6.84	4.43	0.24	0.11	0.76	17.04	38.51
≥4	5.54	4.68	0.21	0.08	0.70	14.61	39.26
Missing	6.07	4.19	0.19	0.10	0.82	15.62	37.58
Tumor grade							

Well-differentiated	7.48	3.54	0.28	0.13	1.39	17.30	30.38
Moderately-differentiated	6.99	3.77	0.28	0.14	1.12	16.53	30.83
Poorly-differentiated	6.42	3.77	0.27	0.12	0.96	15.86	32.45
Unknown/Missing	8.03	4.51	0.23	0.10	0.90	19.18	37.46
Hormone receptor status							
Positive	6.86	3.67	0.28	0.13	1.15	16.37	30.82
Negative	6.08	3.46	0.26	0.10	0.93	15.09	31.59
Unknown	9.37	4.99	0.24	0.13	0.99	21.59	38.81
Chemotherapy							
No	7.46	4.1	0.28	0.12	1.12	17.38	33.5
Yes	5.20	2.53	0.23	0.15	1.03	14.22	24.9
Radiotherapy							
No	7.80	4.82	0.26	0.10	0.95	18.61	39.53
Yes	6.33	2.99	0.28	0.14	1.27	15.05	25.75
Comorbidity Scores							
0	7.52	3.68	0.29	0.13	1.12	17.10	30.4
1	5.70	4.18	0.23	0.10	1.13	15.88	36.86
≥2	4.96	5.9	0.17	0.09	0.81	16.33	51.54
SEER Areas							
Connecticut	9.94	9.45	0.37	0.19	1.31	23.74	40.2
Detroit	11.49	6.36	0.25	0.16	0.85	24.96	41.8
Hawaii	7.93	4.9	0.27	0.03	1.24	16.60	28.6
Iowa	7.18	2.72	0.29	0.05	0.72	19.91	30.8
New Mexico	6.52	2.98	0.25	0.12	0.76	18.65	31.09
Seattle	6.28	2.8	0.21	0.11	0.80	13.39	23.86
Utah	5.44	2.18	0.17	0.03	0.74	14.11	24.73
Georgia	5.84	2.76	0.25	0.12	1.03	13.44	30.32
Kentucky	7.09	3.4	0.30	0.13	0.64	17.66	35.64
Louisiana	5.97	2.55	0.20	0.09	0.74	12.80	29.07
New Jersey	6.93	4.37	0.27	0.14	1.27	16.41	34.82
California	6.24	2.73	0.28	0.13	1.42	15.13	29.4
Total	7.07	3.81	0.27	0.12	1.11	16.84	31.92

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

Supplementary Table 4. Incidence density of ADRD as primary diagnosis by a history of CVD, stroke, hypertension, and diabetes in women with breast cancer with up to 26 years of follow-up from 1991 to 2016

Characteristics	Incidence density of ADRD (number of ADRD cases per 1,000 person-years)						
	AD	Vascular	Lewy	FTD	MCI	Others	Total
Cardiovascular disease							
No	11.02	0.02	0.43	0.20	1.77	25.83	29.79
Yes	16.53	0.03	0.49	0.12	1.81	45.75	52.25
Stroke							
No	11.05	0.02	0.42	0.20	1.68	25.85	29.79
Yes	16.13	0.03	0.63	0.23	3.30	45.32	52.20
Hypertension							
No	10.73	0.04	0.42	0.21	1.52	23.40	26.98
Yes	11.80	0.01	0.45	0.19	1.96	29.61	34.10
Diabetes							
No	11.30	0.03	0.43	0.20	1.73	25.85	29.84
Yes	11.62	0.01	0.46	0.19	1.96	32.28	36.98
Age (y)							
65-69	4.38	0.01	0.26	0.17	1.20	12.40	14.31
70-74	8.69	0.01	0.42	0.22	1.67	20.89	24.04
75-79	14.06	0.02	0.57	0.25	2.07	32.13	36.87
80-84	21.23	0.06	0.62	0.18	2.56	46.72	53.92
85 or older	27.46	0.07	0.52	0.14	2.52	66.82	77.25
Race/ethnicity							
Whites	11.31	0.03	0.44	0.21	1.82	26.97	31.07
Blacks	13.83	0.02	0.42	0.13	1.67	33.65	38.20
Asians/Pacific Islanders	7.63	0.00	0.38	0.22	1.31	18.46	22.20
Others	12.62	0.00	0.34	0.11	1.23	26.23	30.54
Marital status							
Married	8.87	0.01	0.42	0.19	1.64	20.55	23.87
Unmarried	13.80	0.04	0.45	0.20	1.89	33.42	38.30
Unknown	12.67	0.03	0.49	0.26	1.99	30.71	35.37
AJCC Tumor stage							
0 or I	10.70	0.02	0.45	0.19	1.92	24.39	28.20
II	12.07	0.03	0.41	0.23	1.64	29.09	33.40
III	11.04	0.03	0.50	0.15	1.24	31.91	36.48
IV	9.81	0.08	0.15	0.08	0.99	40.23	45.84
Unknown/Missing	17.05	0.02	0.42	0.18	1.56	40.26	46.35
Tumor size (cm)							
<1	9.95	0.02	0.44	0.19	2.00	22.79	26.45
1-<2	11.29	0.02	0.43	0.20	1.79	25.82	29.66
2-<3	11.88	0.03	0.42	0.20	1.70	28.67	32.82
3-<4	13.09	0.05	0.46	0.22	1.46	32.62	37.73
≥4	12.47	0.03	0.47	0.19	1.57	32.92	38.13

Missing	12.35	0.02	0.38	0.20	1.67	31.78	36.56
Tumor grade							
Well-differentiated	11.15	0.01	0.42	0.19	2.07	25.78	29.73
Moderately-differentiated	11.03	0.03	0.44	0.21	1.76	26.06	30.11
Poorly-differentiated	11.14	0.02	0.46	0.20	1.66	27.53	31.69
Unknown/Missing	13.36	0.04	0.38	0.16	1.50	31.94	36.52
Hormone receptor status							
Positive	10.93	0.02	0.44	0.20	1.84	26.06	30.09
Negative	10.80	0.01	0.45	0.17	1.65	26.80	30.96
Unknown	14.45	0.05	0.37	0.20	1.53	33.29	37.90
Chemotherapy							
No	12.16	0.03	0.45	0.19	1.83	28.35	32.71
Yes	7.82	0.02	0.35	0.22	1.55	21.37	24.38
Radiotherapy							
No	14.08	0.04	0.47	0.19	1.71	33.60	38.52
Yes	9.15	0.01	0.40	0.21	1.83	21.76	25.23
Comorbidity Scores							
0	11.33	0.03	0.43	0.20	1.68	25.77	29.72
1	11.24	0.01	0.45	0.20	2.22	31.31	36.00
≥2	13.16	0.03	0.44	0.23	2.16	43.35	49.51
SEER Areas							
Connecticut	14.61	0.13	0.54	0.27	1.92	34.89	38.62
Detroit	16.84	0.02	0.37	0.23	1.25	36.59	40.84
Hawaii	10.93	0.00	0.37	0.04	1.71	22.89	27.62
Iowa	10.03	0.00	0.41	0.06	1.01	27.82	30.28
New Mexico	9.73	0.00	0.37	0.17	1.13	27.81	30.57
Seattle	9.18	0.00	0.31	0.15	1.17	19.57	23.27
Utah	8.07	0.04	0.25	0.04	1.09	20.94	24.18
Georgia	10.91	0.01	0.47	0.22	1.93	25.14	29.67
Kentucky	12.55	0.00	0.53	0.23	1.14	31.26	35.04
Louisiana	10.99	0.00	0.36	0.17	1.36	23.55	28.53
New Jersey	12.26	0.00	0.48	0.25	2.24	29.03	33.87
California	10.06	0.03	0.45	0.21	2.29	24.39	28.82
Total	11.36	0.02	0.43	0.20	1.78	27.06	31.18

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

Supplementary Table 5. Hazard ratio (95% CI) of developing ADRD as primary diagnosis by a history of CVD, stroke, hypertension, and diabetes in women with breast cancer with up to 26 years of follow-up from 1991 to 2016

Characteristics	Hazard ratio (95% CI)** of developing ADRD by CVD, stroke, hypertension, and diabetes						
	AD	Vascular	Lewy	FTD	MCI	Others	Total
Cardiovascular disease							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.14 (1.08,1.20)	1.78 (1.59,2.00)	1.04 (0.77,1.41)	0.57 (0.31,1.06)	0.86 (0.73,1.00)	1.26 (1.21,1.30)	1.26 (1.23,1.30)
Stroke							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.26 (1.19,1.33)	1.39 (1.21,1.60)	1.49 (1.13,1.96)	1.32 (0.84,2.07)	1.79 (1.59,2.03)	1.4 (1.36,1.45)	1.42 (1.38,1.46)
Hypertension							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.94 (0.91,0.97)	0.77 (0.71,0.83)	1.00 (0.85,1.19)	0.96 (0.75,1.22)	1.18 (1.09,1.29)	1.03 (1.01,1.05)	1.03 (1.00,1.05)
Diabetes							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.06 (1.02,1.10)	1.02 (0.92,1.13)	1.17 (0.96,1.43)	1.02 (0.75,1.39)	1.13 (1.02,1.24)	1.18 (1.15,1.21)	1.18 (1.15,1.20)
Age (y)							
65-69	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
70-74	1.96 (1.86,2.07)	1.76 (1.57,1.99)	1.60 (1.27,2.01)	1.25 (0.92,1.68)	1.36 (1.21,1.51)	1.66 (1.61,1.72)	1.66 (1.61,1.71)
75-79	3.21 (3.05,3.38)	2.79 (2.47,3.13)	2.15 (1.71,2.71)	1.45 (1.06,1.98)	1.68 (1.5,1.88)	2.56 (2.47,2.64)	2.57 (2.49,2.65)
80-84	4.98 (4.71,5.26)	3.92 (3.45,4.46)	2.46 (1.89,3.20)	1.08 (0.71,1.63)	2.14 (1.88,2.42)	3.7 (3.58,3.83)	3.76 (3.64,3.88)
85 or older	6.48 (6.09,6.88)	4.69 (4.04,5.43)	2.31 (1.65,3.24)	0.96 (0.54,1.70)	2.33 (2.00,2.72)	5.04 (4.85,5.23)	5.12 (4.94,5.30)
Race/ethnicity							
Whites	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Blacks	1.18 (1.11,1.25)	1.53 (1.34,1.75)	0.98 (0.71,1.35)	0.57 (0.32,1.01)	0.93 (0.79,1.09)	1.16 (1.12,1.21)	1.15 (1.12,1.19)
Asians/Pacific Islanders	0.74 (0.67,0.82)	0.64 (0.49,0.83)	0.84 (0.53,1.34)	1.30 (0.73,2.32)	0.58 (0.46,0.74)	0.73 (0.69,0.78)	0.74 (0.70,0.79)
Others	1.10 (1.00,1.21)	1.06 (0.84,1.32)	0.68 (0.38,1.23)	0.53 (0.19,1.42)	0.55 (0.4,0.74)	0.97 (0.9,1.03)	0.97 (0.91,1.03)
Marital status							
Married	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Unmarried	1.12 (1.09,1.16)	1.35 (1.25,1.46)	0.93 (0.79,1.10)	1.12 (0.89,1.43)	1.02 (0.94,1.10)	1.19 (1.17,1.22)	1.18 (1.16,1.20)
Unknown	1.06 (0.99,1.15)	1.15 (0.95,1.39)	1.15 (0.79,1.67)	1.46 (0.87,2.44)	1.26 (1.05,1.51)	1.12 (1.07,1.17)	1.11 (1.07,1.16)
AJCC Tumor stage							
0 or I	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
II	1.06 (1.02,1.11)	1.42 (1.27,1.58)	0.86 (0.67,1.09)	1.20 (0.85,1.68)	0.85 (0.76,0.96)	1.11 (1.07,1.14)	1.11 (1.08,1.14)
III	1.10 (1.02,1.19)	1.26 (1.02,1.56)	1.19 (0.81,1.77)	0.81 (0.42,1.59)	0.65 (0.51,0.82)	1.27 (1.21,1.33)	1.25 (1.19,1.30)
IV	1.04 (0.91,1.18)	1.30 (0.93,1.80)	0.47 (0.17,1.28)	0.51 (0.12,2.11)	0.61 (0.41,0.91)	1.57 (1.47,1.68)	1.51 (1.42,1.60)
Unknown/Missing	1.39 (1.28,1.51)	1.36 (1.1,1.69)	0.94 (0.58,1.52)	0.8 (0.38,1.67)	0.75 (0.59,0.96)	1.35 (1.28,1.42)	1.35 (1.29,1.42)
Tumor size (cm)							
<1	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
1-<2	1.09 (1.05,1.14)	1.18 (1.06,1.30)	0.95 (0.78,1.16)	1.04 (0.77,1.41)	0.88 (0.80,0.97)	1.08 (1.05,1.11)	1.07 (1.05,1.10)
2-<3	1.06 (1.00,1.12)	1.05 (0.91,1.20)	1.02 (0.77,1.37)	0.98 (0.64,1.51)	0.94 (0.81,1.08)	1.05 (1.01,1.09)	1.04 (1.01,1.08)
3-<4	1.13 (1.05,1.22)	0.99 (0.83,1.19)	1.19 (0.81,1.75)	1.07 (0.61,1.89)	0.85 (0.69,1.05)	1.11 (1.06,1.17)	1.11 (1.06,1.16)
≥4	1.12 (1.05,1.20)	0.93 (0.79,1.11)	1.22 (0.86,1.72)	1.13 (0.67,1.91)	0.99 (0.83,1.18)	1.11 (1.06,1.16)	1.11 (1.07,1.16)
Missing	0.89 (0.82,0.97)	0.78 (0.63,0.98)	0.99 (0.63,1.54)	1.34 (0.72,2.49)	1.08 (0.88,1.33)	0.96 (0.92,1.02)	0.96 (0.92,1.01)

Tumor grade							
Well-differentiated	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Moderately-differentiated	0.97 (0.93,1.00)	1.09 (0.99,1.21)	1.08 (0.88,1.32)	1.13 (0.84,1.53)	0.89 (0.81,0.98)	0.96 (0.94,0.99)	0.97 (0.95,0.99)
Poorly-differentiated	1.00 (0.96,1.05)	1.11 (0.99,1.25)	1.17 (0.92,1.48)	1.10 (0.77,1.57)	0.89 (0.80,1.00)	1.01 (0.98,1.04)	1.02 (0.99,1.04)
Unknown/Missing	1.01 (0.95,1.06)	1.23 (1.09,1.39)	0.92 (0.68,1.24)	0.81 (0.51,1.28)	0.79 (0.69,0.92)	1.03 (0.99,1.06)	1.03 (1.00,1.06)
Hormone receptor status							
Positive	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Negative	1.05 (1.00,1.10)	0.90 (0.79,1.03)	1.04 (0.81,1.34)	0.83 (0.56,1.23)	0.96 (0.84,1.10)	1.05 (1.01,1.08)	1.04 (1.01,1.08)
Unknown	1.11 (1.06,1.16)	1.53 (1.39,1.68)	0.75 (0.58,0.96)	0.92 (0.64,1.31)	0.79 (0.69,0.89)	1.11 (1.08,1.14)	1.10 (1.07,1.13)
Chemotherapy							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.86 (0.82,0.91)	0.84 (0.75,0.94)	0.86 (0.67,1.09)	1.13 (0.82,1.55)	1.13 (1.01,1.27)	0.95 (0.92,0.98)	0.94 (0.91,0.96)
Radiotherapy							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.81 (0.79,0.84)	0.79 (0.73,0.85)	0.87 (0.74,1.02)	1.04 (0.82,1.32)	1.10 (1.02,1.19)	0.82 (0.81,0.84)	0.83 (0.81,0.84)
Comorbidity Scores							
0	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
1	1.00 (0.96,1.05)	0.95 (0.85,1.06)	1.11 (0.9,1.37)	1.12 (0.82,1.54)	1.31 (1.19,1.45)	1.16 (1.13,1.19)	1.15 (1.12,1.17)
≥2	1.08 (0.99,1.19)	1.10 (0.87,1.39)	1.07 (0.65,1.75)	1.48 (0.75,2.92)	1.19 (0.95,1.48)	1.38 (1.31,1.45)	1.37 (1.31,1.44)
SEER Areas							
Connecticut	1.32 (1.25,1.39)	3.21 (2.88,3.57)	1.06 (0.80,1.40)	1.19 (0.80,1.77)	0.75 (0.65,0.86)	1.37 (1.32,1.41)	1.31 (1.27,1.36)
Detroit	1.54 (1.46,1.62)	2.32 (2.07,2.60)	0.73 (0.53,1.00)	1.03 (0.68,1.56)	0.48 (0.41,0.57)	1.40 (1.36,1.45)	1.34 (1.30,1.38)
Hawaii	1.30 (1.14,1.48)	2.35 (1.78,3.09)	0.84 (0.41,1.70)	0.16 (0.02,1.21)	0.97 (0.70,1.35)	1.18 (1.08,1.30)	1.23 (1.14,1.34)
Iowa	0.88 (0.83,0.94)	1.11 (0.96,1.29)	0.78 (0.57,1.06)	0.28 (0.14,0.58)	0.40 (0.34,0.49)	1.07 (1.03,1.11)	0.98 (0.94,1.01)
New Mexico	0.95 (0.86,1.06)	1.29 (1.03,1.62)	0.81 (0.48,1.36)	0.78 (0.36,1.68)	0.50 (0.37,0.67)	1.19 (1.12,1.26)	1.09 (1.03,1.16)
Seattle	0.92 (0.86,0.99)	1.08 (0.92,1.28)	0.64 (0.44,0.91)	0.68 (0.41,1.15)	0.49 (0.41,0.59)	0.82 (0.79,0.86)	0.83 (0.80,0.87)
Utah	0.82 (0.74,0.91)	1.00 (0.78,1.28)	0.53 (0.29,0.97)	0.20 (0.05,0.81)	0.47 (0.36,0.63)	0.9 (0.84,0.96)	0.87 (0.82,0.93)
Georgia	1.17 (1.10,1.25)	0.69 (0.56,0.85)	1.12 (0.83,1.51)	1.18 (0.77,1.83)	0.84 (0.73,0.97)	1.05 (1.00,1.09)	1.04 (1.00,1.08)
Kentucky	1.32 (1.23,1.41)	0.70 (0.55,0.89)	1.19 (0.86,1.65)	1.10 (0.67,1.80)	0.48 (0.39,0.59)	1.31 (1.26,1.37)	1.23 (1.18,1.28)
Louisiana	1.11 (1.03,1.20)	0.53 (0.41,0.70)	0.84 (0.56,1.27)	0.89 (0.49,1.63)	0.59 (0.48,0.73)	0.90 (0.85,0.94)	0.92 (0.88,0.96)
New Jersey	1.22 (1.16,1.28)	0.99 (0.86,1.15)	1.06 (0.82,1.36)	1.24 (0.87,1.77)	0.91 (0.81,1.03)	1.12 (1.09,1.16)	1.12 (1.08,1.15)
California	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)

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

*Hazard ratios were adjusted for cardiovascular disease, stroke, hypertension, diabetes, age, race/ethnicity, marital status, tumor stage, tumor size, tumor grade, hormone receptor status, chemotherapy, radiotherapy, comorbidity scores, and SEER areas.

Supplementary Table 6. The 10-year and 26-year cumulative incidence of ADRD by a history of CVD, stroke, hypertension, and diabetes in women with breast cancer with up to 26 years of follow-up from 1991 to 2016

The 10-year and 26-year cumulative incidence (row %) of AD and ADRD						
Characteristics	10-year incidence of AD	10-year incidence of ADRD including MCI	10-year incidence of ADRD excluding MCI	26-year incidence of AD	26-year incidence of ADRD including MCI	26-year incidence of ADRD excluding MCI
Cardiovascular disease						
No	9.52	27.28	26.84	11.59	31.32	30.84
Yes	12.56	39.03	38.71	13.60	40.75	40.43
Stroke						
No	9.54	27.21	26.79	11.67	31.34	30.89
Yes	12.28	39.43	38.83	12.83	40.24	39.64
Hypertension						
No	9.29	24.67	24.32	12.25	30.47	30.05
Yes	10.06	30.32	29.84	11.50	33.06	32.58
Diabetes						
No	9.80	27.30	26.90	12.10	31.77	31.32
Yes	9.76	31.63	31.11	10.69	33.38	32.86
Age (y)						
65-69	3.20	13.54	13.17	5.02	17.67	17.24
70-74	6.72	21.86	21.41	9.42	26.97	26.46
75-79	11.85	32.62	32.10	14.32	37.21	36.66
80-84	17.00	42.93	42.47	18.63	45.50	45.05
85 or older	18.25	48.85	48.52	18.73	49.69	49.37
Race/ethnicity						
Whites	9.79	28.26	27.83	11.79	32.17	31.70
Blacks	10.99	31.21	30.73	12.54	33.65	33.16
Asians/Pacific Islanders	6.40	21.84	21.44	8.02	25.14	24.70
Others	11.90	32.22	31.98	15.66	39.30	39.06
Marital status						
Married	7.50	22.34	21.90	9.76	26.87	26.39
Unmarried	11.68	33.27	32.85	13.48	36.64	36.18
Unknown	10.27	29.20	28.76	11.75	31.75	31.31
AJCC Tumor stage						
0 or I	9.58	26.88	26.38	11.87	31.34	30.80

II	10.84	30.80	30.41	12.85	34.68	34.26
III	8.67	28.68	28.35	9.35	30.11	29.75
IV	4.13	20.81	20.59	4.32	21.10	20.88
Unknown/Missing	13.12	36.21	35.94	15.21	39.91	39.61
Tumor size (cm)						
<1	8.88	25.34	24.83	11.26	30.06	29.49
1-<2	10.10	28.37	27.88	12.61	33.16	32.64
2-<3	10.41	30.01	29.63	12.32	33.73	33.32
3-<4	10.71	31.42	31.07	12.11	34.13	33.78
≥4	9.26	28.87	28.48	10.08	30.44	30.04
Missing	9.53	28.31	28.05	10.90	30.89	30.60
Tumor grade						
Well-differentiated	10.03	28.16	27.65	12.14	32.22	31.68
Moderately-differentiated	9.84	28.07	27.62	11.71	31.71	31.23
Poorly-differentiated	9.09	27.68	27.28	10.69	30.91	30.48
Unknown/Missing	10.75	30.73	30.41	13.68	36.12	35.75
Hormone receptor status						
Positive	9.57	27.75	27.29	11.42	31.36	30.87
Negative	8.47	26.17	25.75	10.12	29.28	28.84
Unknown	12.56	34.03	33.76	15.69	40.01	39.67
Chemotherapy						
No	10.50	29.40	28.96	12.48	33.20	32.73
Yes	6.36	23.08	22.66	8.36	27.05	26.60
Radiotherapy						
No	11.68	32.75	32.35	13.42	36.05	35.64
Yes	7.87	23.82	23.35	10.10	28.18	27.67
Comorbidity Scores						
0	9.99	27.59	27.18	12.29	32.04	31.59
1	9.10	29.93	29.42	10.12	31.90	31.38
≥2	9.17	34.45	33.94	9.55	35.10	34.59
SEER Areas						
Connecticut	11.32	31.63	31.30	14.83	38.18	37.76
Detroit	13.50	34.12	33.81	17.78	41.16	40.79
Hawaii	8.79	26.84	26.34	12.70	34.18	33.65
Iowa	8.90	27.24	26.95	11.97	34.13	33.80
New Mexico	8.49	28.13	27.82	11.12	33.63	33.32

Seattle	8.46	24.39	23.90	9.63	26.63	26.11
Utah	7.49	24.73	24.47	9.61	29.65	29.37
Georgia	9.63	25.93	25.50	10.20	26.85	26.43
Kentucky	10.90	31.50	31.33	12.18	33.47	33.29
Louisiana	10.56	28.40	27.95	10.64	28.53	28.11
New Jersey	10.58	28.61	28.15	11.75	31.04	30.54
California	8.76	27.54	26.97	10.81	31.62	31.02
Total	9.79	28.31	27.88	11.77	32.14	31.68

ADRD, Alzheimer's disease and related dementias; AD, Alzheimer's disease; MCI, mild cognitive impairment

Supplementary Table 7. The 10-year and 26-year hazard ratio (95% CI) of developing ADRD by a history of CVD, stroke, hypertension, and diabetes in women with breast cancer with up to 26 years of follow-up from 1991 to 2016

Hazard ratio (95% CI)* of developing AD and ADRD by CVD, stroke, hypertension and diabetes						
Characteristics	10-year risk of AD	10-year risk of ADRD including MCI	10-year risk of ADRD excluding MCI	26-year risk of AD	26-year risk of ADRD including MCI	26-year risk of ADRD excluding MCI
Cardiovascular disease						
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.21 (1.16,1.26)	1.31 (1.28,1.34)	1.32 (1.29,1.35)	1.21 (1.16,1.26)	1.30 (1.27,1.33)	1.31 (1.28,1.34)
Stroke						
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.32 (1.26,1.37)	1.51 (1.47,1.54)	1.50 (1.47,1.54)	1.32 (1.27,1.37)	1.50 (1.47,1.54)	1.50 (1.46,1.53)
Hypertension						
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.93 (0.91,0.96)	1.07 (1.05,1.09)	1.07 (1.05,1.08)	0.96 (0.93,0.98)	1.08 (1.06,1.09)	1.07 (1.06,1.09)
Diabetes						
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.14 (1.11,1.18)	1.26 (1.24,1.28)	1.26 (1.24,1.28)	1.15 (1.11,1.18)	1.26 (1.24,1.29)	1.26 (1.24,1.28)
Age (y)						
65-69	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
70-74	2.07 (1.97,2.18)	1.63 (1.59,1.67)	1.64 (1.60,1.69)	1.94 (1.86,2.02)	1.61 (1.57,1.64)	1.61 (1.58,1.65)
75-79	3.74 (3.56,3.93)	2.57 (2.50,2.64)	2.60 (2.53,2.67)	3.26 (3.13,3.40)	2.49 (2.43,2.55)	2.52 (2.46,2.58)
80-84	5.99 (5.70,6.30)	3.86 (3.76,3.96)	3.92 (3.82,4.03)	5.29 (5.07,5.52)	3.75 (3.65,3.84)	3.80 (3.71,3.90)
85 or older	8.32 (7.89,8.78)	5.63 (5.48,5.80)	5.74 (5.58,5.91)	7.42 (7.08,7.78)	5.50 (5.35,5.65)	5.60 (5.45,5.75)
Race/ethnicity						
Whites	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Blacks	1.20 (1.15,1.26)	1.16 (1.13,1.20)	1.17 (1.13,1.20)	1.21 (1.16,1.27)	1.16 (1.13,1.19)	1.16 (1.13,1.19)
Asians/Pacific Islanders	0.78 (0.72,0.85)	0.84 (0.8,0.88)	0.84 (0.80,0.88)	0.77 (0.71,0.83)	0.83 (0.79,0.86)	0.83 (0.79,0.87)
Others	1.11 (1.02,1.21)	1.01 (0.96,1.07)	1.02 (0.97,1.08)	1.05 (0.97,1.13)	0.97 (0.93,1.02)	0.99 (0.94,1.03)
Marital status						
Married	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Unmarried	1.17 (1.14,1.20)	1.22 (1.20,1.24)	1.22 (1.20,1.24)	1.16 (1.13,1.19)	1.20 (1.18,1.22)	1.20 (1.19,1.22)
Unknown	1.11 (1.04,1.18)	1.15 (1.10,1.19)	1.14 (1.10,1.19)	1.12 (1.06,1.19)	1.14 (1.10,1.18)	1.14 (1.10,1.18)
AJCC Tumor stage						
0 or I	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
II	1.13 (1.09,1.18)	1.14 (1.11,1.16)	1.14 (1.11,1.17)	1.11 (1.07,1.15)	1.11 (1.09,1.13)	1.12 (1.09,1.14)

III	1.26 (1.19,1.34)	1.37 (1.33,1.42)	1.39 (1.34,1.44)	1.24 (1.17,1.31)	1.35 (1.31,1.40)	1.36 (1.32,1.41)
IV	1.14 (1.03,1.25)	1.78 (1.70,1.86)	1.80 (1.72,1.89)	1.13 (1.03,1.24)	1.75 (1.67,1.83)	1.77 (1.69,1.85)
Unknown/Missing	1.44 (1.35,1.54)	1.46 (1.41,1.52)	1.47 (1.41,1.53)	1.41 (1.32,1.50)	1.41 (1.36,1.47)	1.42 (1.37,1.48)
Tumor size (cm)						
<1	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
1-<2	1.09 (1.05,1.13)	1.07 (1.05,1.09)	1.07 (1.05,1.10)	1.08 (1.05,1.12)	1.06 (1.04,1.08)	1.07 (1.04,1.09)
2-<3	1.07 (1.01,1.12)	1.05 (1.02,1.09)	1.06 (1.03,1.09)	1.06 (1.01,1.11)	1.05 (1.02,1.08)	1.05 (1.03,1.08)
3-<4	1.17 (1.10,1.25)	1.15 (1.11,1.19)	1.15 (1.11,1.19)	1.16 (1.10,1.23)	1.14 (1.11,1.18)	1.15 (1.11,1.19)
≥4	1.18 (1.11,1.25)	1.16 (1.12,1.20)	1.16 (1.12,1.20)	1.15 (1.10,1.22)	1.14 (1.11,1.18)	1.15 (1.11,1.18)
Missing	0.97 (0.91,1.03)	0.98 (0.94,1.02)	0.98 (0.95,1.02)	0.95 (0.89,1.01)	0.97 (0.93,1.01)	0.97 (0.94,1.01)
Tumor grade						
Well-differentiated	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Moderately-differentiated	0.99 (0.96,1.02)	0.98 (0.96,1.00)	0.98 (0.96,1.01)	0.99 (0.95,1.02)	0.98 (0.97,1.00)	0.99 (0.97,1.00)
Poorly-differentiated	1.01 (0.97,1.05)	1.04 (1.02,1.06)	1.04 (1.02,1.07)	1.01 (0.97,1.04)	1.04 (1.02,1.06)	1.04 (1.02,1.07)
Unknown/Missing	1.01 (0.97,1.06)	1.02 (1.00,1.05)	1.03 (1.00,1.05)	1.03 (0.99,1.08)	1.04 (1.01,1.06)	1.04 (1.01,1.06)
Hormone receptor status						
Positive	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Negative	1.05 (1.00,1.09)	1.05 (1.03,1.08)	1.05 (1.03,1.08)	1.04 (1.00,1.09)	1.04 (1.02,1.07)	1.04 (1.02,1.07)
Unknown	1.13 (1.09,1.17)	1.09 (1.07,1.12)	1.10 (1.08,1.13)	1.11 (1.07,1.15)	1.09 (1.06,1.11)	1.09 (1.07,1.12)
Chemotherapy						
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.80 (0.77,0.84)	0.92 (0.90,0.95)	0.92 (0.90,0.94)	0.83 (0.80,0.86)	0.92 (0.90,0.94)	0.92 (0.90,0.94)
Radiotherapy						
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.76 (0.74,0.78)	0.79 (0.78,0.80)	0.79 (0.78,0.80)	0.79 (0.77,0.81)	0.81 (0.80,0.82)	0.81 (0.79,0.82)
Comorbidity Scores						
0	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
1	1.03 (1.00,1.07)	1.19 (1.17,1.22)	1.19 (1.17,1.22)	1.04 (1.01,1.08)	1.20 (1.17,1.22)	1.19 (1.17,1.22)
≥2	1.13 (1.06,1.21)	1.44 (1.39,1.49)	1.44 (1.39,1.49)	1.15 (1.07,1.22)	1.45 (1.40,1.50)	1.45 (1.40,1.50)
SEER Areas						
Connecticut	1.14 (1.09,1.20)	1.04 (1.01,1.08)	1.06 (1.02,1.09)	1.14 (1.09,1.19)	1.05 (1.02,1.08)	1.06 (1.03,1.09)
Detroit	1.40 (1.34,1.47)	1.12 (1.09,1.15)	1.14 (1.10,1.17)	1.38 (1.32,1.43)	1.11 (1.08,1.14)	1.12 (1.09,1.15)
Hawaii	1.18 (1.05,1.34)	1.13 (1.05,1.21)	1.12 (1.05,1.21)	1.24 (1.12,1.37)	1.15 (1.08,1.22)	1.15 (1.08,1.23)
Iowa	0.85 (0.80,0.89)	0.85 (0.83,0.88)	0.86 (0.84,0.89)	0.85 (0.81,0.89)	0.87 (0.84,0.89)	0.88 (0.85,0.90)
New Mexico	0.95 (0.87,1.04)	1.04 (0.99,1.10)	1.06 (1.01,1.11)	0.95 (0.88,1.03)	1.04 (1.00,1.09)	1.06 (1.01,1.10)
Seattle	0.96 (0.91,1.02)	0.88 (0.85,0.92)	0.89 (0.86,0.92)	0.82 (0.78,0.87)	0.78 (0.75,0.80)	0.78 (0.75,0.81)

Utah	0.87 (0.80,0.95)	0.92 (0.88,0.97)	0.93 (0.89,0.98)	0.85 (0.78,0.92)	0.91 (0.87,0.95)	0.92 (0.88,0.97)
Georgia	1.29 (1.23,1.36)	1.04 (1.01,1.07)	1.05 (1.02,1.08)	1.17 (1.11,1.22)	0.97 (0.94,1.00)	0.98 (0.95,1.01)
Kentucky	1.34 (1.27,1.41)	1.22 (1.18,1.26)	1.24 (1.20,1.28)	1.29 (1.23,1.36)	1.18 (1.15,1.22)	1.20 (1.17,1.24)
Louisiana	1.29 (1.21,1.36)	1.04 (1.00,1.08)	1.05 (1.01,1.08)	1.11 (1.05,1.18)	0.94 (0.90,0.97)	0.94 (0.91,0.98)
New Jersey	1.22 (1.17,1.27)	0.99 (0.97,1.02)	1.00 (0.97,1.02)	1.17 (1.13,1.22)	0.98 (0.96,1.01)	0.99 (0.96,1.01)
California	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)

ADRD, Alzheimer's disease and related dementias; AD, Alzheimer's disease; MCI, mild cognitive impairment; CVD, cardiovascular diseases

*Hazard ratios were adjusted for cardiovascular disease, stroke, hypertension, diabetes, age, race/ethnicity, marital status, tumor stage, tumor size, tumor grade, hormone receptor status, chemotherapy, radiotherapy, comorbidity scores, and SEER areas.

Supplementary Table 8. Hazard ratio (95% CI) of developing ADRD by a history of types of CVD, stroke, hypertension, and diabetes in women with breast cancer with up to 26 years of follow-up from 1991 to 2016, stratified by age

Characteristics	Hazard ratio (95% CI)* of developing ADRD by types of CVD, stroke, hypertension and diabetes						
	AD	Vascular	Lewy	FTD	MCI	Others	Total
Types of CVD							
Myocardial infarction							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.05 (0.98,1.12)	1.04 (0.91,1.19)	0.88 (0.66,1.17)	1.05 (0.62,1.76)	1.04 (0.90,1.21)	1.14 (1.10,1.18)	1.12 (1.08,1.16)
Congestive heart failure							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.18 (1.12,1.25)	1.88 (1.71,2.06)	1.08 (0.85,1.36)	0.70 (0.41,1.20)	0.77 (0.66,0.90)	1.27 (1.23,1.31)	1.28 (1.24,1.32)
Peripheral vascular disease							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.29 (1.19,1.39)	1.80 (1.58,2.05)	0.95 (0.67,1.36)	0.34 (0.11,1.07)	0.74 (0.59,0.94)	1.29 (1.23,1.35)	1.30 (1.24,1.36)
Stroke							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.32 (1.27,1.37)	1.43 (1.32,1.56)	1.54 (1.32,1.80)	1.25 (0.91,1.71)	1.79 (1.65,1.94)	1.49 (1.46,1.53)	1.51 (1.47,1.54)
Hypertension							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.96 (0.93,0.98)	0.87 (0.83,0.92)	1.06 (0.95,1.17)	1.12 (0.93,1.35)	1.25 (1.18,1.32)	1.08 (1.07,1.10)	1.08 (1.06,1.10)
Diabetes							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.15 (1.12,1.18)	1.05 (0.99,1.12)	1.22 (1.09,1.37)	1.21 (0.98,1.49)	1.28 (1.20,1.36)	1.27 (1.24,1.29)	1.27 (1.24,1.29)
Age (y)							
65-69	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
70-74	1.94 (1.86,2.02)	1.83 (1.69,1.98)	1.67 (1.45,1.92)	1.21 (0.96,1.54)	1.42 (1.32,1.54)	1.62 (1.58,1.66)	1.61 (1.57,1.64)
75-79	3.26 (3.13,3.40)	2.95 (2.73,3.19)	2.26 (1.95,2.60)	1.53 (1.20,1.95)	1.93 (1.78,2.09)	2.54 (2.48,2.60)	2.49 (2.43,2.55)
80-84	5.29 (5.07,5.52)	4.27 (3.92,4.64)	3.08 (2.64,3.60)	1.78 (1.35,2.35)	2.43 (2.23,2.65)	3.83 (3.73,3.93)	3.75 (3.66,3.84)
85 or older	7.42 (7.08,7.78)	5.39 (4.91,5.92)	2.95 (2.44,3.57)	1.56 (1.09,2.24)	2.82 (2.54,3.13)	5.63 (5.48,5.79)	5.50 (5.35,5.65)
Stratified by age							
<75 y							
Myocardial infarction							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.25 (1.10,1.43)	1.27 (1.00,1.62)	1.06 (0.65,1.73)	1.39 (0.65,3.00)	1.24 (0.96,1.59)	1.23 (1.14,1.32)	1.22 (1.14,1.31)
Congestive heart failure							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.29 (1.14,1.46)	1.80 (1.47,2.21)	1.11 (0.69,1.77)	0.66 (0.24,1.79)	0.81 (0.61,1.08)	1.52 (1.42,1.62)	1.48 (1.40,1.58)
Peripheral vascular disease							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.31 (1.11,1.56)	1.68 (1.28,2.21)	0.79 (0.37,1.67)	0.34 (0.05,2.42)	0.96 (0.66,1.40)	1.54 (1.40,1.68)	1.49 (1.36,1.63)
Stroke							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.69 (1.47,1.74)	2.10 (1.80,2.46)	1.80 (1.36,2.38)	1.68 (1.03,2.72)	1.90 (1.64,2.20)	1.73 (1.65,1.81)	1.74 (1.66,1.82)
Hypertension							

No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.14 (1.09,1.19)	1.10 (1.02,1.20)	1.04 (0.90,1.21)	1.14 (0.88,1.47)	1.20 (1.10,1.30)	1.21 (1.18,1.24)	1.20 (1.17,1.23)
Diabetes							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.24 (1.18,1.31)	1.22 (1.10,1.36)	1.27 (1.06,1.53)	0.90 (0.64,1.26)	1.29 (1.16,1.42)	1.37 (1.33,1.41)	1.37 (1.33,1.41)
>=75 y							
Myocardial infarction							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.01 (0.94,1.09)	0.98 (0.83,1.15)	0.8 (0.56,1.15)	0.85 (0.42,1.74)	0.96 (0.80,1.16)	1.13 (1.08,1.18)	1.11 (1.06,1.16)
Congestive heart failure							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.22 (1.15,1.29)	1.98 (1.78,2.19)	1.08 (0.83,1.41)	0.72 (0.38,1.37)	0.78 (0.65,0.93)	1.28 (1.24,1.33)	1.30 (1.25,1.34)
Peripheral vascular disease							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.33 (1.22,1.44)	1.87 (1.62,2.17)	1.03 (0.69,1.55)	0.35 (0.09,1.41)	0.67 (0.50,0.90)	1.25 (1.19,1.33)	1.28 (1.21,1.35)
Stroke							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.31 (1.25,1.37)	1.31 (1.18,1.45)	1.46 (1.22,1.76)	1.04 (0.69,1.58)	1.76 (1.59,1.94)	1.48 (1.44,1.52)	1.49 (1.45,1.53)
Hypertension							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	0.93 (0.90,0.96)	0.79 (0.75,0.84)	1.11 (0.97,1.26)	1.13 (0.86,1.47)	1.35 (1.24,1.46)	1.06 (1.04,1.09)	1.06 (1.04,1.08)
Diabetes							
No	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
Yes	1.06 (1.02,1.10)	0.92 (0.85,1.00)	1.17 (1.01,1.35)	1.49 (1.13,1.96)	1.25 (1.15,1.36)	1.16 (1.13,1.18)	1.16 (1.13,1.18)

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

*Hazard ratios were adjusted for types of cardiovascular disease (myocardial infarction, congestive heart failure, peripheral vascular disease), stroke, hypertension, diabetes, age, race/ethnicity, marital status, tumor stage, tumor size, tumor grade, hormone receptor status, chemotherapy, radiotherapy, comorbidity scores, and SEER areas.