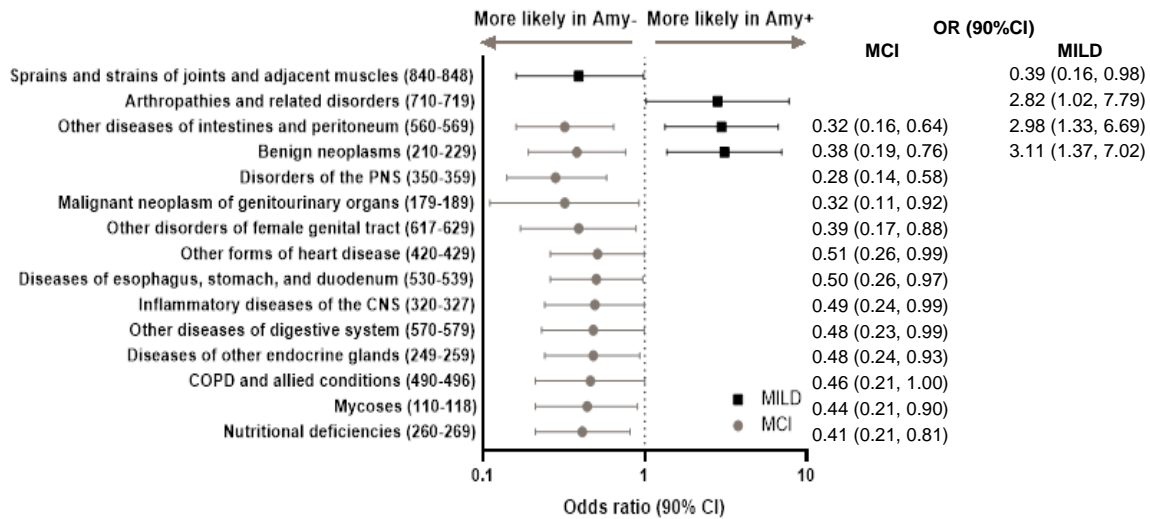


# Supplementary Material

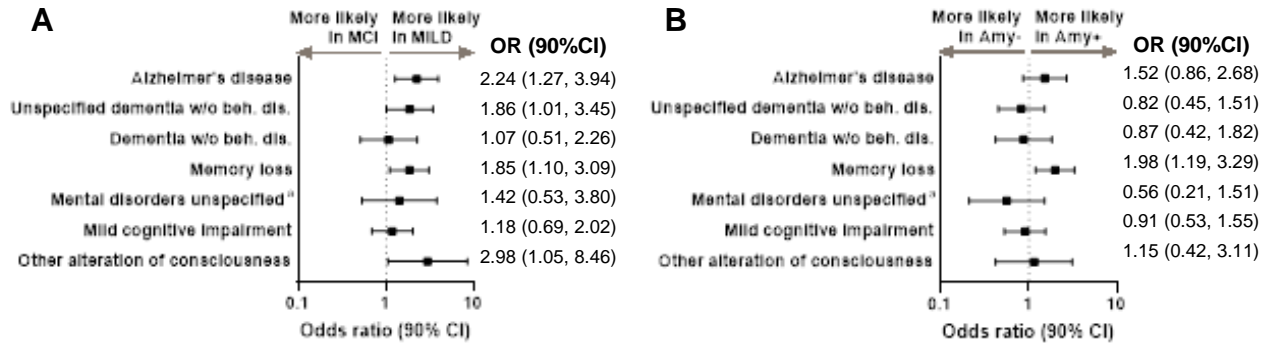
## Clinical and Economic Assessment in Early-Stage Dementia by Severity and Amyloid- $\beta$ Status: A 5-Year Retrospective Claims Study of GERAS-US Patients

**Supplementary Figure 1.** Pre-baseline comorbidities stratified by severity and amyloid- $\beta$  status.



Odds ratio with 90% CIs of comorbidities (ICD-9 codes) for Amy+ versus Amy- status in MCI and MILD cohorts. Amy-, amyloid-negative; Amy+, amyloid-positive; CI, confidence interval; CNS, central nervous system; COPD, chronic obstructive pulmonary disease; ICD-9, International Classification of Disease 9th Revision; MCI, mild cognitive impairment; MILD, mild dementia; OR, odds ratio; PNS, peripheral nervous system.

**Supplementary Figure 2.** Diagnosis with AD and cognitive impairment components in MILD versus MCI and amyloid-positive versus amyloid-negative cohorts before baseline visit.



Odds ratio with 90% CIs are represented for diagnosis of AD and specific cognitive impairment components by (A) severity, and (B) amyloid- $\beta$  status. AD, Alzheimer's disease; Amy-, amyloid-negative; Amy+, amyloid-positive; beh. dis., behavioral disturbances; CI, confidence interval; MCI, mild cognitive impairment; MILD, mild dementia; OR, odds ratio; w/o, without.

Note: The components listed above represent the ICD diagnoses observed in the Medicare data.

**Supplementary Table. 1** List of ICD-9 codes used for Alzheimer’s disease and cognitive impairment diagnosis.

<b>ICD-9 code</b>	<b>ICD-9 DESCRIPTION</b>
2900	Senile dementia, uncomplicated
29010	Presenile dementia, uncomplicated
29011	Presenile dementia with delirium
29013	Presenile dementia with depressive features
29021	Senile dementia with depressive features
2903	Senile dementia with delirium
29040	Vascular dementia, uncomplicated
29041	Vascular dementia, with delirium
29042	Vascular dementia, with delusions
29043	Vascular dementia, with depressed mood
29410	Dementia in conditions classified elsewhere without behavioral disturbance
29411	Dementia in conditions classified elsewhere with behavioral disturbance
29420	Dementia, unspecified, without behavioral disturbance
29421	Dementia, unspecified, with behavioral disturbance
2949	Unspecified persistent mental disorders due to conditions classified elsewhere
31081	Pseudobulbar affect
31089	Other specified nonpsychotic mental disorders following organic brain damage
3310	Alzheimer’s disease
33111	Pick’s disease
33119	Other frontotemporal dementia
3312	Senile degeneration of brain
3317	Cerebral degeneration in diseases classified elsewhere
33182	Dementia with Lewy bodies
33183	Mild cognitive impairment, so stated
33189	Other cerebral degeneration
3319	Cerebral degeneration, unspecified
34830	Encephalopathy, unspecified
4380	Late effects of cerebrovascular disease, cognitive deficits
78009	Other alteration of consciousness
78093	Memory loss
797	Senility without mention of psychosis

ICD-9, International Classification of Disease 9th Revision.

**Supplementary Table 2.** All-cause healthcare utilization and costs based on severity during the pre- and post-diagnosis phases.

Categories <sup>a</sup>	Pre-diagnosis phase			Post-diagnosis phase		
	MCI N = 96	MILD N = 70	P	MCI N = 60	MILD N = 55	P
<b>Utilization PPPM, mean (SD)</b>						
<b>Inpatient acute episodes</b>	0.01 (0.12)	0.01 (0.12)	0.899	0.01 (0.08)	0.02 (0.13)	<b>0.041</b>
<b>Outpatient emergency department visits</b>	0.02 (0.17)	0.04 (0.20)	<b>0.091</b>	0.02 (0.16)	0.05 (0.22)	<b>0.017</b>
<b>Outpatient clinic visits</b>	0.06 (0.29)	0.02 (0.17)	0.251	0.07 (0.28)	0.04 (0.25)	0.283
<b>Outpatient general practitioner visits</b>	0.36 (0.65)	0.46 (0.80)	<b>0.091</b>	0.48 (0.76)	0.52 (0.77)	0.508
<b>Outpatient specialist visits</b>	0.86 (1.27)	0.77 (1.33)	0.613	1.22 (1.53)	1.07 (1.27)	0.398
<b>Inpatient acute days</b>	0.05 (0.53)	0.07 (0.68)	0.624	0.03 (0.46)	0.10 (0.99)	<b>0.070</b>
<b>Skilled nursing facility days</b>	0.01 (0.40)	0.06 (1.13)	0.220	0.07 (1.16)	0.16 (1.80)	0.295
<b>All-cause costs PPPM in USD, mean (SD)</b>						
<b>Ambulance/transport</b>	\$2 (31)	\$3 (35)	0.794	\$2 (35)	\$6 (57)	<b>0.047</b>
<b>Durable medical equipment</b>	\$11 (84)	\$13 (110)	0.700	\$21 (98)	\$9 (87)	0.200
<b>Emergency department</b>	\$3 (25)	\$6 (35)	<b>0.059</b>	\$3 (26)	\$7 (43)	<b>0.019</b>
<b>Home health</b>	\$28 (304)	\$72 (541)	0.254	\$9 (157)	\$120 (681)	<b>0.014</b>
<b>Skilled nursing facility</b>	\$6 (251)	\$19 (380)	0.346	\$31 (508)	\$80 (918)	0.231
<b>Hospice</b>	\$0 (0)	\$0 (0)		\$0 (0)	\$46 (483)	0.310
<b>Inpatient acute</b>	\$129 (1420)	\$119 (1266)	0.856	\$122 (3255)	\$257 (3414)	0.314
<b>Inpatient non-acute</b>	\$0 (0)	\$0 (0)		\$29 (702)	\$45 (849)	0.619
<b>Outpatient hospital/facility</b>	\$81 (586)	\$118 (685)	0.233	\$142 (896)	\$128 (766)	0.700
<b>Professional provider (carrier) inpatient</b>	\$23 (343)	\$18 (199)	0.585	\$8 (100)	\$27 (286)	<b>0.045</b>
<b>Professional provider (carrier) non-inpatient</b>	\$160 (306)	\$162 (599)	0.848	\$216 (411)	\$295 (1772)	0.467
<b>Testing and imaging</b>	\$62 (190)	\$65 (172)	0.765	\$89 (290)	\$82 (158)	0.628
<b>Part B covered drugs</b>	\$20 (155)	\$35 (249)	0.480	\$36 (209)	\$83 (476)	0.307
<b>Other</b>	\$7 (59)	\$4 (19)	0.522	\$3 (24)	\$5 (27)	0.411
<b>Total healthcare costs</b>	\$532 (1926)	\$633 (2074)	0.416	\$712 (4115)	\$1191 (4700)	<b>0.067</b>

<sup>a</sup> Adjusted for length of fee-for-service history in each diagnosis phase. General linear model regression analyses were conducted adjusting for patient observation months.

Bolded p-values represent significant difference between amyloid-negative (Amy-) and amyloid-positive (Amy+) cohorts (p < 0.1).

MCI, mild cognitive impairment; MILD, mild dementia; PPPM, per patient per month; SD, standard deviation; USD, United States Dollar.

**Supplementary Table 3.** All-cause healthcare utilization and costs based on amyloid- $\beta$  status during the pre- and post-diagnosis phases.

Categories <sup>a</sup>	Pre-diagnosis phase			Post-diagnosis phase		
	Amy- N = 74	Amy+ N = 92	P	Amy- N = 51	Amy+ N = 64	P
<b>Utilization PPPM, mean (SD)</b>						
<b>Inpatient acute episodes</b>	0.01 (0.12)	0.01 (0.12)	0.928	0.02 (0.14)	0.01 (0.08)	<b>0.010</b>
<b>Outpatient emergency department visits</b>	0.03 (0.18)	0.03 (0.18)	0.677	0.04 (0.21)	0.03 (0.18)	0.309
<b>Outpatient clinic visits</b>	0.06 (0.31)	0.03 (0.20)	0.170	0.05 (0.29)	0.05 (0.25)	0.977
<b>Outpatient general practitioner visits</b>	0.43 (0.76)	0.37 (0.66)	0.306	0.55 (0.79)	0.46 (0.75)	0.262
<b>Outpatient specialist visits</b>	0.99 (1.40)	0.71 (1.20)	<b>0.036</b>	1.15 (1.38)	1.14 (1.43)	0.896
<b>Inpatient acute days</b>	0.05 (0.47)	0.07 (0.66)	0.419	0.11 (1.04)	0.03 (0.46)	<b>0.046</b>
<b>Skilled nursing facility days</b>	0.01 (0.33)	0.04 (0.95)	0.267	0.20 (1.98)	0.05 (1.03)	<b>0.081</b>
<b>All-cause costs PPPM in USD, mean (SD)</b>						
<b>Ambulance/transport</b>	\$3 (42)	\$1 (23)	0.103	\$6 (54)	\$3 (41)	0.163
<b>Durable medical equipment</b>	\$11 (54)	\$12 (115)	0.952	\$27 (113)	\$7 (75)	<b>0.022</b>
<b>Emergency department</b>	\$5 (34)	\$4 (26)	0.270	\$6 (38)	\$5 (33)	0.643
<b>Home health</b>	\$21 (321)	\$61 (460)	0.210	\$124 (693)	\$19 (252)	<b>0.022</b>
<b>Skilled nursing facility</b>	\$5 (170)	\$15 (374)	0.322	\$97 (986)	\$25 (478)	<b>0.082</b>
<b>Hospice</b>	\$0 (0)	\$0 (0)		\$53 (519)	\$0 (0)	0.239
<b>Inpatient acute</b>	\$120 (1344)	\$129 (1383)	0.866	\$283 (3637)	\$118 (3092)	0.284
<b>Inpatient non-acute</b>	\$0 (0)	\$0 (0)		\$35 (633)	\$38 (867)	0.917
<b>Outpatient hospital/facility</b>	\$101 (703)	\$89 (557)	0.681	\$178 (1157)	\$104 (478)	<b>0.042</b>
<b>Professional provider (carrier) inpatient</b>	\$19 (248)	\$23 (332)	0.694	\$27 (293)	\$9 (123)	<b>0.089</b>
<b>Professional provider (carrier) non-inpatient</b>	\$173 (319)	\$151 (505)	0.411	\$324 (1901)	\$204 (397)	0.259
<b>Testing and imaging</b>	\$69 (156)	\$59 (203)	0.397	\$91 (222)	\$82 (244)	0.595
<b>Part B covered drugs</b>	\$14 (100)	\$34 (242)	0.201	\$25 (145)	\$83 (462)	0.211
<b>Other</b>	\$5 (24)	\$7 (60)	0.651	\$5 (25)	\$4 (26)	0.814
<b>Total healthcare costs</b>	\$547 (1921)	\$584 (2025)	0.729	\$1281 (5007)	\$701 (3911)	<b>0.034</b>

<sup>a</sup> Adjusted for length of fee-for-service history in each diagnosis phase. General linear model regression analyses were conducted adjusting for patient observation months.

Bolded p-values represent significant difference between amyloid-negative and amyloid-positive cohorts (p<0.1).

Amy-, amyloid-negative cohort; Amy+, amyloid-positive cohort; PPPM, per patient per month; SD, standard deviation; USD, United States Dollar.