

Development and Validation of the Communities Geriatric Mild Cognitive Impairment Risk Calculator (CGMCI-Risk)

Supplementary Materials

Table S1: Definition of candidate variables.

Table S2: The cohort characteristics of the derivation set and temporal validation set.

Table S3: Multivariate logistic regression analysis of variables associated.

Table S4: Points of CGMCI-Risk parameters.

Table S1: Definition of candidate variables.

Candidate variables	Coding	Measure explanation
Demographic characteristics		
Age		Age in chronological years.
Sex	1 = Male; 2 = Female	Self-report
Educational level	1= Illiteracy; 2 = Primary school; 3 = Middle school or above	Self-report
Ethnic group	1 = Han; 2 = Non-han	Self-report
Category of residence	1 = City; 2 = Town; 3 = Rural	Self-report
Marital status	1 = Cohabitation; 2 = Single	"Single" include separated, divorced, widowed and never married.
Cohabitant status	1 = With family; 2 = Solitude	Self-report
Health status and lifestyle		
BMI	1 = Normal; 2 = Abnormal	18.5kg/m ² ≤ BMI < 24kg/m ² was defined as "Normal"; BMI < 18.5kg/m ² or BMI ≥ 24kg/m ² was defined as "Abnormal".
Medical expenses		Outpatient and inpatient expenses last year.
Baseline CMMSE score	0 = Non-MCI 1 = MCI	Cognitive functioning was assessed using the Chinese Mini-Mental State Examination (CMMSE), which consists of 24 items assessing general cognitive ability, reactivity, attention and calculation, recall, and language comprehension and coordination. Each correct response earns one point, while incorrect responses receive zero points. Question 6, "Count the number of food groups in one minute," has a maximum score of seven, making the total score range from 0 to 30. The CMMSE score below 24 was considered as MCI.
Sleep duration		Self-report
Chronic diseases		Hypertension, diabetes, heart disease, stroke, cerebrovascular disease, and respiratory disease, meeting one definition as "Yes".
BADL	1 = Intact; 2 = Impaired	Eating, bathing, dressing, toileting, indoor activities, and bowel and bladder control, did not require assistance was defined as "Intact".
IADL		Alone around the neighborhood, shopping, cooking, laundry, alone continuous walking 1 kilometer, raised about 5 kilograms, squat down stand up 3 consecutive, alone in a public transport. No difficulty is defined as "Intact".
PPT		Rising from a chair, picking up a book on the floor, and turning around on their own, did not require assistance and was defined as "Intact".
Masticatory function		Teeth ≥20 or with dentures were defined as "Intact".
Vision		No need for eyeglasses is defined as "Intact".

Candidate variables	Coding	Measure explanation
Hearing		No need for hearing aids is defined as "Intact".
Eat fresh fruits	1 = Usually; 2 = Sometimes; 3 = Never	Almost every day is defined as "usually"; Rarely or never is defined as "Never"; The remaining options were defined as "Sometimes". Animal protein includes fish, meat, eggs, and dairy products. Plant protein includes bean products and nuts. House work such as cooking, taking care of children, etc.
Eat fresh vegetables		
Eat animal protein		
Eat plant protein		
Drink tea		
House work		
Field work		
Garden work		
Raise domestic animals or pets		
Read newspapers or books		
TV watching or radio listening		
Play cards or mahjong		
Social activities		
Smoke	1 = Yes; 2 = No	Self-report
Alcohol use	1 = Yes; 2 = No	Self-report
Exercise	1 = Yes; 2 = No	It refers to purposeful fitness activities, such as walking, playing ball, running, qigong, etc.
Mental health		
Resilience score		The resilience score was assessed with five questions. Problems included being able to see things positively, feeling scared or anxious, feeling lonely, being able to make personal decisions and feeling useless as you age. Each question is scored on a scale of 1 (always) to 5 (never), and questions 1 and 4 were reverse coded in this study, with total scores ranging from 5 to 25, with higher scores indicating better psychological resilience.
Life satisfaction	1 = Good; 2 = So so; 3 = Bad	Self-report
Health satisfaction		
Sleep satisfaction		
Financial satisfaction	1 = Rich; 2 = So so; 3 = Poor	Self-report
Community and family support		
Child support		Money received from children in the last year.
Community services	1 = Yes; 2 = No	Community services included daily care, medical treatment and medicine delivery, spiritual comfort, chatting and recreation, daily shopping, organizing social and recreational activities, upholding rights, providing health knowledge, and dealing with family and neighborhood disputes, meeting one definition as "Yes".

Abbreviations: BMI, Body Mass Index; CMMSE, Chinese Mini-Mental State Examination; BADL, Basic Activity of Daily Living; IADL, Instrumental Activity of Daily Living; PPT, Physical Performance Test.

Table S2: The cohort characteristics of the derivation set and temporal validation set.

Variables		Derivation set (n = 6058)				Temporal validation set (n = 4488)			
		Overall n=6058	Non-M CI n=5071	MCI n=987	p	Overall n=4488	Non-M CI n=3853	MCI n=635	p
Demographic characteristics									
Age		79.00 (71.00, 87.00)	77.00 (70.00, 85.00)	88.00 (81.00, 93.00)	<0.001	79.00 (73.00, 87.00)	78.00 (72.00, 85.00)	89.00 (81.50, 95.00)	<0.001
Sex	Male	3095 (51.1)	2741 (54.1)	354 (35.9)	<0.001	2283 (50.9)	2076 (53.9)	207 (32.6)	<0.001
	Female	2963 (48.9)	2330 (45.9)	633 (64.1)		2205 (49.1)	1777 (46.1)	428 (67.4)	
	Illiteracy	2961 (48.9)	2248 (44.3)	713 (72.2)	<0.001	2175 (48.5)	1729 (44.9)	446 (70.2)	<0.001
Educational level	Primary school	2216 (36.6)	1993 (39.3)	223 (22.6)		1668 (37.2)	1519 (39.4)	149 (23.5)	
	Middle school or above	881 (14.5)	830 (16.4)	51 (5.2)		645 (14.4)	605 (15.7)	40 (6.3)	
Ethnic group	Han	5642 (93.1)	4734 (93.4)	908 (92.0)	0.140	4242 (94.5)	3649 (94.7)	593 (93.4)	0.208
	Non-han	416 (6.9)	337 (6.6)	79 (8.0)		246 (5.5)	204 (5.3)	42 (6.6)	
Category of residence	City	1106 (18.3)	950 (18.7)	156 (15.8)	0.001	688 (15.3)	595 (15.4)	93 (14.6)	0.839
	Town	1243 (20.5)	1069 (21.1)	174 (17.6)		1423 (31.7)	1217 (31.6)	206 (32.4)	
	Rural	3709 (61.2)	3052 (60.2)	657 (66.6)		2377 (53.0)	2041 (53.0)	336 (52.9)	
Marital status	Cohabitation	2995 (49.4)	2720 (53.6)	275 (27.9)	<0.001	2233 (49.8)	2055 (53.3)	178 (28.0)	<0.001
	Single	3063 (50.6)	2351 (46.4)	712 (72.1)		2255 (50.2)	1798 (46.7)	457 (72.0)	
Cohabitant status	With family	5055 (83.4)	4250 (83.8)	805 (81.6)	0.090	3648 (81.3)	3143 (81.6)	505 (79.5)	0.242
	Solitude	1003 (16.6)	821 (16.2)	182 (18.4)		840 (18.7)	710 (18.4)	130 (20.5)	
Health status and lifestyle									
BMI	Normal	3436(57.3)	2938(57.9)	531(53.8)	0.018	2506(55.8)	2173(56.4)	333(52.4)	0.069
	Abnormal	2589(42.7)	2133(42.1)	456(46.2)		1982(44.2)	1680(43.6)	302(47.2)	
Medical expenses		300.00 (88.50, 1000.00)	300.00 (80.00, 1000.00)	300.00 (100.00, 1000.00)	0.303	500.00 (37.00, 2000.00)	500.00 (40.00, 2000.00)	400.00 (20.00, 2000.00)	0.299

Variables		Derivation set (n = 6058)				Temporal validation set (n = 4488)			
		Overall n=6058	Non-M CI n=5071	MCI n=987	p	Overall n=4488	Non-M CI n=3853	MCI n=635	p
Baseline		29.00	29.00	28.00	<0.	29.00	29.00	27.00	<0.
CMMSE score		(27.00, 30.00)	(27.00, 30.00)	(26.00, 29.00)	00 1	(27.00, 30.00)	(27.00, 30.00)	(26.00, 29.00)	00 1
Sleep duration		8.00	8.00	8.00	<0.	8.00	8.00	8.00	0.0
		(6.00, 9.00)	(6.00, 9.00)	(6.50, 10.00)	00 1	(6.00, 9.00)	(6.00, 9.00)	(6.00, 10.00)	05
Chronic diseases	Yes	2348	1991	357	0.0	3401	2928	473	0.4
		(38.8)	(39.3)	(36.2)	74	(75.8)	(76.0)	(74.5)	41
	No	3710	3080	630		1087	925	162	
		(61.2)	(60.7)	(63.8)		(24.2)	(24.0)	(25.5)	
BADL	Intact	5767	4883	884	<0.	3954	3465	489	<0.
		(95.2)	(96.3)	(89.6)	00 1	(88.1)	(89.9)	(77.0)	00 1
	Impaired	291 (4.8)	188 (3.7)	103 (10.4)		534 (11.9)	388 (10.1)	146 (23.0)	
IADL	Intact	3453	3149	304	<0.	2366	2203	163	<0.
		(57.0)	(62.1)	(30.8)	00 1	(52.7)	(57.2)	(25.7)	00 1
	Impaired	2605	1922	683		2122	1650	472	
		(43.0)	(37.9)	(69.2)		(47.3)	(42.8)	(74.3)	
PPT	Intact	4623	4037	586	<0.	3307	2985	322	<0.
		(76.3)	(79.6)	(59.4)	00 1	(73.7)	(77.5)	(50.7)	00 1
	Impaired	1435	1034	401		1181	868	313	
		(23.7)	(20.4)	(40.6)		(26.3)	(22.5)	(49.3)	
Vision	Intact	4792	4132	660	<0.	3373	2990	383	<0.
		(79.1)	(81.5)	(66.9)	00 1	(75.2)	(77.6)	(60.3)	00 1
	Impaired	1266	939	327		1115	863	252	
		(20.9)	(18.5)	(33.1)		(24.8)	(22.4)	(39.7)	
Hearing	Intact	5372	4613	759	<0.	1461	1134	327	<0.
		(88.7)	(91.0)	(76.9)	00 1	(32.6)	(29.4)	(51.5)	00 1
	Impaired	686	458 (9.0)	228 (23.1)		3027	2719	308	
		(11.3)				(67.4)	(70.6)	(48.5)	
Masticatory function	Intact	3493	3135	358	<0.	2825	2525	300	<0.
		(57.7)	(61.8)	(36.3)	00 1	(62.9)	(65.5)	(47.2)	00 1
	Impaired	2565	1936	629		1663	1328	335	
		(42.3)	(38.2)	(63.7)		(37.1)	(34.5)	(52.8)	
Eat fresh fruits	Usually	2603	2256	347	<0.	1773	1569	204	<0.
		(43.0)	(44.5)	(35.2)	00 1	(39.5)	(40.7)	(32.1)	00 1
	Sometimes	2244	1825	419		1626	1374	252	
		(37.0)	(36.0)	(42.5)		(36.2)	(35.7)	(39.7)	
	Never	1211	990	221		1089	910	179	
		(20.0)	(19.5)	(22.4)		(24.3)	(23.6)	(28.2)	

Variables			Derivation set (n = 6058)				Temporal validation set (n = 4488)			
			Overall n=6058	Non-M CI n=5071	MCI n=987	p	Overall n=4488	Non-M CI n=3853	MCI n=635	p
Eat fresh vegetables	Usually	Sometimes	5609 (92.6)	4712 (92.9)	897 (90.9)	0.0 65	4128 (92.0)	3568 (92.6)	560 (88.2)	<0. 00 1
			385 (6.4)	306 (6.0)	79 (8.0)		264 (5.9)	215 (5.6)	49 (7.7)	
			64 (1.1)	53 (1.0)	11 (1.1)		96 (2.1)	70 (1.8)	26 (4.1)	
Eat animal protein	Usually	Sometimes	3415 (56.4)	2901 (57.2)	514 (52.1)	0.0 12	2559 (57.0)	2182 (56.6)	377 (59.4)	0.1 89
			2574 (42.5)	2113 (41.7)	461 (46.7)		1884 (42.0)	1635 (42.4)	249 (39.2)	
			69 (1.1)	57 (1.1)	12 (1.2)		45 (1.0)	36 (0.9)	9 (1.4)	
Eat plant protein	Usually	Sometimes	1210 (20.0)	1027 (20.3)	183 (18.5)	0.3 65	701 (15.6)	607 (15.8)	94 (14.8)	0.0 85
			4380 (72.3)	3659 (72.2)	721 (73.0)		3363 (74.9)	2897 (75.2)	466 (73.4)	
			468 (7.7)	385 (7.6)	83 (8.4)		424 (9.4)	349 (9.1)	75 (11.8)	
Drink tea	Usually	Sometimes	2200 (36.3)	1893 (37.3)	307 (31.1)	<0. 00 1	1219 (27.2)	1098 (28.5)	121 (19.1)	<0. 00 1
			933 (15.4)	799 (15.8)	134 (13.6)		747 (16.6)	645 (16.7)	102 (16.1)	
			2925 (48.3)	2379 (46.9)	546 (55.3)		2522 (56.2)	2110 (54.8)	412 (64.9)	
House work	Usually	Sometimes	3631 (59.9)	3165 (62.4)	466 (47.2)	<0. 00 1	2716 (60.5)	2424 (62.9)	292 (46.0)	<0. 00 1
			959 (15.8)	794 (15.7)	165 (16.7)		563 (12.5)	482 (12.5)	81 (12.8)	
			1468 (24.2)	1112 (21.9)	356 (36.1)		1209 (26.9)	947 (24.6)	262 (41.3)	
Field work	Usually	Sometimes	3244 (53.5)	2819 (55.6)	425 (43.1)	<0. 00 1	2400 (53.5)	2144 (55.6)	256 (40.3)	<0. 00 1
			1312 (21.7)	1079 (21.3)	233 (23.6)		806 (18.0)	678 (17.6)	128 (20.2)	
			1502 (24.8)	1173 (23.1)	329 (33.3)		1282 (28.6)	1031 (26.8)	251 (39.5)	
Garden work	Usually	Sometimes	768 (12.7)	719 (14.2)	49 (5.0)	<0. 00 1	859 (19.1)	786 (20.4)	73 (11.5)	<0. 00 1
			406 (6.7)	370 (7.3)	36 (3.6)		314 (7.0)	280 (7.3)	34 (5.4)	
			4884 (80.6)	3982 (78.5)	902 (91.4)		3315 (73.9)	2787 (72.3)	528 (83.1)	
Read newspapers or	Usually		834 (13.8)	786 (15.5)	48 (4.9)	<0. 00	651 (14.5)	608 (15.8)	43 (6.8)	<0. 00

Variables		Derivation set (n = 6058)				Temporal validation set (n = 4488)			
		Overall n=6058	Non-M CI n=5071	MCI n=987	p	Overall n=4488	Non-M CI n=3853	MCI n=635	p
books					1				1
Raise domestic animals or pets	Sometimes	715 (11.8)	652 (12.9)	63 (6.4)		534 (11.9)	495 (12.8)	39 (6.1)	
	Never	4509 (74.4)	3633 (71.6)	876 (88.8)		3303 (73.6)	2750 (71.4)	553 (87.1)	
	Usually	1584 (26.1)	1383 (27.3)	201 (20.4)	<0. 00 1	1196 (26.6)	1070 (27.8)	126 (19.8)	<0. 00 1
	Sometimes	485 (8.0)	404 (8.0)	81 (8.2)		287 (6.4)	257 (6.7)	30 (4.7)	
	Never	3989 (65.8)	3284 (64.8)	705 (71.4)		3005 (67.0)	2526 (65.6)	479 (75.4)	
	Usually	517 (8.5)	464 (9.2)	53 (5.4)	<0. 00 1	384 (8.6)	357 (9.3)	27 (4.3)	<0. 00 1
Play cards or mahjong	Sometimes	847 (14.0)	764 (15.1)	83 (8.4)		558 (12.4)	501 (13.0)	57 (9.0)	
	Never	4694 (77.5)	3843 (75.8)	851 (86.2)		3546 (79.0)	2995 (77.7)	551 (86.8)	
	Usually	3936 (65.0)	3483 (68.7)	453 (45.9)	<0. 00 1	3001 (66.9)	2728 (70.8)	273 (43.0)	<0. 00 1
TV watching or radio listening	Sometimes	969 (16.0)	680 (13.4)	289 (29.3)		711 (15.8)	565 (14.7)	146 (23.0)	
	Never	1153 (19.0)	908 (17.9)	245 (24.8)		776 (17.3)	560 (14.5)	216 (34.0)	
	Usually	234 (3.9)	221 (4.4)	13 (1.3)	<0. 00 1	178 (4.0)	168 (4.4)	10 (1.6)	<0. 00 1
Social activities	Sometimes	817 (13.5)	736 (14.5)	81 (8.2)		621 (13.8)	565 (14.7)	56 (8.8)	
	Never	5007 (82.7)	4114 (81.1)	893 (90.5)		3689 (82.2)	3120 (81.0)	569 (89.6)	
	Yes	1402 (23.1)	1256 (24.8)	146 (14.8)	<0. 00 1	1000 (22.3)	905 (23.5)	95 (15.0)	<0. 00 1
Smoke	No	4656 (76.9)	3815 (75.2)	841 (85.2)		3488 (77.7)	2948 (76.5)	540 (85.0)	
Alcohol use	Yes	1290 (21.3)	1137 (22.4)	153 (15.5)	<0. 00 1	916 (20.4)	818 (21.2)	98 (15.4)	0.0 01
	No	4768 (78.7)	3934 (77.6)	834 (84.5)		3572 (79.6)	3035 (78.8)	537 (84.6)	
Exercise	Yes	2235 (36.9)	1983 (39.1)	252 (25.5)	<0. 00 1	1791 (39.9)	1598 (41.5)	193 (30.4)	<0. 00 1

Variables		Derivation set (n = 6058)				Temporal validation set (n = 4488)			
		Overall n=6058	Non-M CI n=5071	MCI n=987	<i>p</i>	Overall n=4488	Non-M CI n=3853	MCI n=635	<i>p</i>
Resilience score	No	3823	3088	735		2697	2255	442	
		(63.1)	(60.9)	(74.5)		(60.1)	(58.5)	(69.6)	
		20.00	20.00	19.00	<0.	20.00	20.00	18.00	<0.
		(17.00, 22.00)	(18.00, 22.00)	(16.00, 21.00)	00 1	(18.00, 21.00)	(18.00, 22.00)	(16.00, 21.00)	00 1
Mental health									
Life satisfaction	Good	3660	3061	599	0.2	2742	2372	370	0.0
		(60.4)	(60.4)	(60.7)	18	(61.1)	(61.6)	(58.3)	63
	So so	2052	1731	321		1525	1302	223	
		(33.9)	(34.1)	(32.5)		(34.0)	(33.8)	(35.1)	
	Bad	346 (5.7)	279 (5.5)	67 (6.8)		221 (4.9)	179 (4.6)	42 (6.6)	
Health satisfaction	Good	3360	2814	546	0.9	2162	1899	263	<0.
		(55.5)	(55.5)	(55.3)	21	(48.2)	(49.3)	(41.4)	00 1
	So so	1937	1617	320		1698	1445	253	
		(32.0)	(31.9)	(32.4)		(37.8)	(37.5)	(39.8)	
	Bad	761	640	121		628	509	119	
		(12.6)	(12.6)	(12.3)		(14.0)	(13.2)	(18.7)	
Sleep satisfaction	Good	4074	3423	651	0.1	2819	2445	374	0.0
		(67.2)	(67.5)	(66.0)	23	(62.8)	(63.5)	(58.9)	87
	So so	1365	1120	245		1095	925	170	
		(22.5)	(22.1)	(24.8)		(24.4)	(24.0)	(26.8)	
	Bad	619	528	91 (9.2)		574	483	91 (14.3)	
		(10.2)	(10.4)			(12.8)	(12.5)		
Financial satisfaction	Rich	872	752	120	0.0	848	742	106	0.0
		(14.4)	(14.8)	(12.2)	03	(18.9)	(19.3)	(16.7)	01
	So so	4241	3559	682		3040	2626	414	
		(70.0)	(70.2)	(69.1)		(67.7)	(68.2)	(65.2)	
	Poor	945	760	185		600	485	115	
		(15.6)	(15.0)	(18.7)		(13.4)	(12.6)	(18.1)	
Community and family support									
Child support		1300.00	1300.00	1500.00	0.0	1200.00	1200.00	1000.00	0.0
		(600.00, 2500.00)	(600.00, 2500.00)	(700.00, 2500.00)	04	(300.00, 2700.00)	(300.00, 2900.00)	(275.00, 2300.00)	10
		1744	1464	280	0.7	2188	1886	302	0.5
Community services	Yes	(28.8)	(28.9)	(28.4)	80	(48.8)	(48.9)	(47.6)	44
	No	4314	3607	707		2300	1967	333	
		(71.2)	(71.1)	(71.6)		(51.2)	(51.1)	(52.4)	

Abbreviations: MCI, Mild Cognitive Impairment; BMI, Body Mass Index; CMMSE, Chinese Mini-Mental State Examination; BADL, Basic Activity of Daily Living; IADL, Instrumental Activity of Daily Living; PPT, Physical Performance Test.

Table S3: Multivariate logistic regression analysis of variables associated.

variables		Coefficient	SE	Z value	OR	95% CI		p
						LL	UL	
Intercept		-7.474086	0.39779	-18.78	0.00	0.00	0.00	<0.00
			9	9	1	0	1	1
Age		0.056940	0.00456	12.484	1.06	1.05	1.07	<0.00
			1		0	0	0	1
Sex	Male	Ref	Ref	Ref	Ref	NA	NA	NA
	Female	0.260831	0.08666	3.010	1.30	1.10	1.54	0.003
			1		0	0	0	
Educational level	Illiteracy	Ref	Ref	Ref	Ref	NA	NA	NA
	Primary school	-0.454130	0.09668	-4.697	0.64	0.53	0.77	<0.00
			1		0	0	0	1
	Middle school or above	-0.733703	0.16522	-4.441	0.48	0.35	0.66	<0.00
			3		0	0	0	1
	Yes	Ref	Ref	Ref	Ref	NA	NA	NA
Exercise	No	0.190398	0.08735	2.179	1.21	1.02	1.44	0.029
			9		0	0	0	
Garden work	Usually	Ref	Ref	Ref	Ref	NA	NA	NA
	Sometimes	0.276074	0.23862	1.157	1.32	0.83	2.10	0.247
			5		0	0	0	
	Never	0.600872	0.16150	3.720	1.82	1.33	2.50	<0.00
			6		0	0	0	1
	Usually	Ref	Ref	Ref	Ref	NA	NA	NA
TV watching or radio listening	Sometimes	0.243289	0.09845	2.471	1.28	1.05	1.55	0.013
			5		0	0	0	
	Never	0.254242	0.09525	2.669	1.29	1.07	1.55	0.008
			6		0	0	0	
	Intact	Ref	Ref	Ref	Ref	NA	NA	NA
IADL	Impaired	0.363276	0.08947	4.060	1.44	1.21	1.71	<0.00
			9		0	0	0	1
Hearing	Intact	Ref	Ref	Ref	Ref	NA	NA	NA
	Impaired	0.318173	0.10148	3.135	1.37	1.13	1.68	0.002
			8		0	0	0	
Masticatory function	Intact	Ref	Ref	Ref	Ref	NA	NA	NA
	Impaired	0.394562	0.08029	4.914	1.48	1.27	1.74	<0.00
			8		0	0	0	1

Abbreviations: SE, Standard Error; OR, Odds Ratio; CI, Confidence Interval; LL, Lower Limit; UL, Upper Limit; IADL, Instrumental Activity of Daily Living

Table S4: Points of CGMCI-Risk parameters.

variables	Parameter	Points
Age		1.818181818 * Trueage-109.090909091
Sex	Male	0
	Female	8.769365
Educational level	Illiteracy	25.84193
	Primary school	12.92096
	Middle school or above	0
Exercise	Yes	0
	No	6.292808
Garden work	Usually	0
	Sometimes	9.643149
	Never	19.286299
TV watching or radio listening	Usually	0
	Sometimes	4.250002
	Never	8.500005
IADL	Intact	0
	Impaired	11.78163
Hearing	Intact	0
	Impaired	10.3652
Masticatory function	Intact	0
	Impaired	12.65261

Abbreviations: IADL, Instrumental Activity of Daily Living.