

Supplementary material

Title: The prevalence of multimorbidity and its associations with hospitalisation or death in Japan 2014-2019 - a retrospective cohort study using nationwide medical claims data in the middle-aged generation

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Supplementary eTable 1. List of diseases and their ICD-10 codes used to define diseases in medical claims data

Diseases	ICD-10 codes
AIDS/HIV	B20.x-B22.x, B24.x
Any malignancy, incl. leukemia and lymphoma	C00.x-C26.x, C30.x-C34.x, C37.x-C41.x, C45.x-C58.x, C60.x-C76.x, C81.x-C85.x, C88.3, C88.7, C88.9, C90.0, C90.1, C91.x-C93.x, C94.0-C94.3, C94.5, C94.7, C95.x, C96.x, C43.x, C88.0-C88.2, C90.2, C94.4, C97.x
Cerebrovascular disease	I69.x, G45.x, G46.x, H34.0, I60.x-I68.x
Chronic pulmonary disease	J41.x-J47.x, J60.x-J66.x, I27.8, I27.9, J40.x, J67.x, J68.4, J70.1, J70.3
Congestive heart failure	I50.x, I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5- I42.9, I43.x, P29.0
Dementia	F00.x-F02.x, F03.x, F05.1, G30.x, G31.1
Diabetes with chronic complication	E10.2-E10.4, E11.2-E11.4, E13.2-E13.4, E14.2-E14.4, E10.5, E10.7, E11.5, E11.7, E12.2-E12.5, E12.7, E13.5, E13.7, E14.5, E14.7
Diabetes without chronic complication	E10.1, E10.9, E11.1, E11.9, E13.1, E13.9, E14.1, E14.9, E10.0, E10.6, E10.8, E11.0, E11.6, E11.8, E12.0, E12.1, E12.6, E12.8, E12.9, E13.0, E13.6, E13.8, E14.0, E14.6, E14.8
Hemiplegia or paraplegia	G81.x, G82.0-G82.2, G04.1, G11.4, G80.1, G80.2, G82.3-G82.5, G83.0-G83.4, G83.9
Metastatic solid tumor	C77.x-C79.x, C80.x
Mild liver disease	K70.3, K71.7, K73.x, K74.3- K74.6, B18.x, K70.0-K70.2, K70.9, K71.3-K71.5, K74.0-K74.2, K76.0, K76.2-K76.4, K76.8, K76.9, Z94.4
Moderate or severe liver disease	K72.1, K72.9, K76.6, K76.7, I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K76.5
Myocardial infarction	I25.2, I21.x, I22.x
Peptic ulcer disease	K25.4-K25.7, K26.4-K26.7, K27.4-K27.7, K28.4-K28.7, K25.0-K25.3, K25.9, K26.0-K26.3, K26.9, K27.0-K27.3, K27.9, K28.0-K28.3, K28.9
Peripheral vascular disease	I71.x, I73.9, Z95.8, Z95.9, I70.x, I73.1, I73.8, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9

Renal disease	N18.x, I12.0, I13.1, N03.2-N03.7, N05.2-N05.7, N19.x, N25.0, Z49.0-Z49.2, Z94.0, Z99.2
Rheumatology disease	M05.x, M06.0, M32.x, M33.2, M34.x, M35.3, M06.1-M06.4, M06.8, M06.9, M31.5, M33.0, M33.1, M33.9, M35.1, M36.0

Supplementary eTable 2. Characteristics of baseline data in fiscal year 2014 and cohort data

	Baseline data in FY2014		Cohort data		P-value ^c
<i>N</i>	242,360	(100%)	181,959	(100%)	
Men	142,471	(58.8%)	111,088	(61.1%)	<0.01
Age (Mean, SD)	44.5	(12.5)	44.7	(10.6)	<0.01
20-24	18,524	(7.6%)	5,052	(2.8%)	<0.01
25-29	17,251	(7.1%)	12,675	(7.0%)	
30-34	18,093	(7.5%)	14,784	(8.1%)	
35-39	23,878	(9.9%)	20,508	(11.3%)	
40-44	39,721	(16.4%)	35,168	(19.3%)	
45-49	40,908	(16.9%)	37,124	(20.4%)	
50-54	29,466	(12.2%)	25,906	(14.2%)	
55-59	20,149	(8.3%)	13,052	(7.2%)	
60-64	21,278	(8.8%)	10,735	(5.9%)	
65-69	11,931	(4.9%)	6,246	(3.4%)	
70-71	1,161	(0.5%)	709	(0.4%)	
AIDS/HIV	94	(0.0%)	74	(0.0%)	0.76
Any malignancy ^a	11,343	(4.7%)	8,377	(4.6%)	0.24
Cerebrovascular disease	9,860	(4.1%)	6,971	(3.8%)	<0.01
Chronic pulmonary disease	41,866	(17.3%)	32,093	(17.6%)	<0.01
Congestive heart failure	7,751	(3.2%)	5,710	(3.1%)	0.27
Dementia	291	(0.1%)	190	(0.1%)	0.13
Diabetes mellitus	25,716	(10.6%)	18,755	(10.3%)	<0.01
Hemiplegia or paraplegia	729	(0.3%)	507	(0.3%)	0.19

Liver disease	25,999	(10.7%)	19,725	(10.8%)	0.24
Metastatic solid tumor	2,381	(1.0%)	1,823	(1.0%)	0.53
Myocardial infarction	1,526	(0.6%)	1,092	(0.6%)	0.22
Peptic ulcer disease	24,859	(10.3%)	18,594	(10.2%)	0.68
Peripheral vascular disease	9,623	(4.0%)	7,083	(3.9%)	0.20
	Baseline data in FY2014		Cohort data		P-value^c
<i>N</i>	242,360	(100%)	181,959	(100%)	
Renal disease	2,350	(1.0%)	1,747	(1.0%)	0.75
Rheumatologic disease	3,931	(1.6%)	2,926	(1.6%)	0.72
At least one disease among the top five ^b	69,014	(28.5%)	50,660	(27.8%)	<0.01
Disease no. among CCI (Mean, SD)	0.8	(1.6)	0.8	(1.6)	0.16
0 disease	169,872	(70.1%)	129,037	(70.9%)	<0.01
1 disease	22,514	(9.3%)	15,532	(8.5%)	
2 diseases	16,605	(6.9%)	12,375	(6.8%)	
3 diseases	12,242	(5.1%)	9,046	(5.0%)	
4 diseases	9,076	(3.7%)	6,816	(3.7%)	
≥ 5 diseases	12,051	(5.0%)	9,153	(5.0%)	
Multimorbidity (≥2 diseases among CCI)	49,974	(20.6%)	37,390	(20.5%)	
Composite outcomes	36,893	(15.2%)	31,224	(17.2%)	<0.01
Death	1,507	(0.6%)	1,507	(0.8%)	
Hospitalisation	36,495	(15.1%)	30,826	(16.9%)	

^a Any malignancy includes leukemia and lymphoma.

^b Top 5 diseases include chronic pulmonary disease, diabetes mellitus, liver disease, peptic ulcer disease, and cerebrovascular disease.

SD; standard deviation, CCI; Charlson Comorbidity Index

^c Age (Mean) and Co-morbidity no. (Mean): Student's t-test. All other variables: Pearson's chi-square test.

Supplementary eTable 3A. Prevalence of diagnosed diseases in FY2014 applied to the Japanese total population by gender

	Baseline data in FY2014						Japanese total population					
	Overall		Men		Women		Overall		Men		Women	
	N=246,671	%	N=144,237	%	N=102,434	%	N=88,923,000	%	N=44,288,000	%	N=44,640,000	%
Men	144,237	58.5	-	-	-	-	44,288,000	49.8	-	-	-	-
Age (Mean, SD)	45.0	12.9	44.6	12.9	45.7	12.8	48.0	15.3	47.7	15.3	48.4	15.4
20-24	18,524	7.5	11,315	7.8	7,209	7.0	6,203,000	7.0	3,192,000	7.2	3,012,000	6.7
25-29	17,251	7.0	12,014	8.3	5,237	5.1	6,677,000	7.5	3,414,000	7.7	3,264,000	7.3
30-34	18,093	7.3	11,104	7.7	6,989	6.8	7,466,000	8.4	3,788,000	8.6	3,680,000	8.2
35-39	23,878	9.7	13,278	9.2	10,600	0.3	8,670,000	9.8	4,394,000	9.9	4,276,000	9.6
40-44	39,721	16.1	21,640	15.0	18,081	17.7	9,793,000	11.0	4,956,000	11.2	4,837,000	10.8
45-49	40,908	16.6	24,191	16.8	16,717	16.3	8,609,000	9.7	4,329,000	9.8	4,278,000	9.6
50-54	29,466	11.9	17,577	12.2	11,889	11.6	7,790,000	8.8	3,903,000	8.8	3,887,000	8.7
55-59	20,149	8.2	11,343	7.9	8,806	8.6	7,653,000	8.6	3,802,000	8.6	3,853,000	8.6
60-64	21,278	8.6	12,706	8.8	8,572	8.4	8,979,000	0.1	4,406,000	9.9	4,573,000	10.2
65-69	11,931	4.8	6,768	4.7	5,163	5.0	9,155,000	10.3	4,414,000	10.0	4,741,000	10.6
70-74	5,472	2.2	2,301	1.6	3,171	3.1	7,928,000	8.9	3,690,000	8.3	4,239,000	9.5
AIDS/												
HIV	96	0.0	62	0.0	34	0.0	34,034	0.0	18,979	0.0	15,055	0.0
Any malignancy ^a	12,047	4.9	5,611	3.9	6,436	6.3	5,775,260	6.5	2,668,349	6.0	3,106,911	7.0
Cerebrovascular disease	10,866	4.4	6,510	4.5	4,356	4.3	5,773,295	6.5	3,023,765	6.8	2,749,530	6.2
Chronic pulmonary disease	43,216	17.5	22,484	15.6	20,732	20.2	17,303,735	19.5	7,713,864	17.4	9,589,871	21.5
Congestive heart failure	8,497	3.4	5,515	3.8	2,982	2.9	4,317,076	4.9	2,459,170	5.6	1,857,906	4.2
Dementia	447	0.2	210	0.1	237	0.2	410,326	0.5	179,350	0.4	230,976	0.5
Diabetes mellitus	27,344	11.1	17,881	12.4	9,463	9.2	12,689,040	14.3	7,122,240	16.1	5,566,801	12.5
Hemiplegia or paraplegia	813	0.3	533	0.4	280	0.3	424,609	0.5	253,040	0.6	171,569	0.4
Liver disease	27,127	11.0	16,954	11.8	10,173	9.9	11,341,444	2.8	6,031,029	13.6	5,310,415	11.9
Metastatic solid tumor	2,532	1.0	1,263	0.9	1,269	1.2	1,235,336	1.4	598,734	1.4	636,601	1.4
Myocardial infarction	1,628	0.7	1,325	0.9	303	0.3	769,977	0.9	575,894	1.3	194,083	0.4
Peptic ulcer disease	26,047	10.6	14,511	10.1	11,536	11.3	11,238,524	12.6	5,485,994	12.4	5,752,530	12.9
Peripheral vascular disease	10,407	4.2	5,723	4.0	4,684	4.6	5,197,644	5.8	2,503,359	5.7	2,694,285	6.0
Renal disease	2,573	1.0	1,751	1.2	822	0.8	1,261,138	1.4	784,770	1.8	476,367	1.1
Rheumatologic disease	4,146	1.7	1,397	1.0	2,749	2.7	1,928,685	2.2	530,072	1.2	1,398,613	3.1
≥1 disease among top 5	71,880	29.1	40,833	28.3	31,047	30.3	30,041,150	33.8	14,676,045	33.1	15,365,106	34.4
Disease no. among CCI												
no disease	171,140	69.4	101,857	70.6	69,283	67.6	57,293,691	64.4	29,006,814	65.5	28,286,877	63.4
1 disease	22,947	9.3	12,032	8.3	10,915	10.7	8,464,436	9.5	3,702,220	8.4	4,762,216	10.7
2 diseases	17,120	6.9	8,994	6.2	8,126	7.9	6,799,080	7.6	3,029,535	6.8	3,769,544	8.4
3 diseases	12,822	5.2	7,273	5.0	5,549	5.4	5,534,827	6.2	2,652,231	6.0	2,882,596	6.5
4 diseases	9,588	3.9	5,874	4.1	3,714	3.6	4,261,753	4.8	2,242,062	5.1	2,019,691	4.5
≥ 5 diseases	13,054	5.3	8,207	5.7	4,847	4.7	6,574,213	7.4	3,655,138	8.3	2,919,075	6.5
Multimorbidity	52,584	21.3	30,348	21.0	22,236	21.7	23,169,873	26.1	11,578,966	26.1	11,590,906	26.0

(≥2 diseases among
CCI)

Values are numbers (%) unless otherwise

^a Any malignancy includes leukemia and
lymphoma.

FY; fiscal year

SD; standard deviation

CCI; Charlson Comorbidity Index

Supplementary eTable 3B. Diagnosed disease prevalence in fiscal year 2014 applied to the Japanese total population by age group

	Overall		20-24		25-29		30-34	
	88,923,000	(100%)	6,204,000	(100%)	6,678,000	(100%)	7,468,000	(100%)
Men	44,288,000	(49.8%)	3,192,000	(51.5%)	3,414,000	(51.1%)	3,788,000	(50.7%)
AIDS/HIV	34,034	(0.0%)	1,400	(0.0%)	1,137	(0.0%)	1,394	(0.0%)
Any malignancy ^a	5,775,260	(6.5%)	24,047	(0.4%)	60,604	(0.9%)	103,907	(1.4%)
Cerebrovascular disease	5,773,295	(6.5%)	12,484	(0.2%)	23,767	(0.4%)	40,440	(0.5%)
Chronic pulmonary disease	17,303,735	(19.5%)	656,012	(10.6%)	901,156	(13.5%)	1,184,702	(15.9%)
Congestive heart failure	4,317,076	(4.9%)	21,322	(0.3%)	34,950	(0.5%)	52,469	(0.7%)
Dementia	410,326	(0.5%)	418	(0.0%)	0	(0.0%)	1,053	(0.0%)
Diabetes mellitus	12,689,040	(14.3%)	50,290	(0.8%)	141,852	(2.1%)	228,348	(3.1%)
Hemiplegia or paraplegia	424,609	(0.5%)	3,782	(0.1%)	7,489	(0.1%)	10,227	(0.1%)
Liver disease	11,341,444	(12.8%)	129,091	(2.1%)	259,190	(3.9%)	380,993	(5.1%)
Metastatic solid tumor	1,235,336	(1.4%)	6,706	(0.1%)	9,643	(0.1%)	15,804	(0.2%)
Myocardial infarction	769,977	(0.9%)	3,510	(0.1%)	3,859	(0.1%)	7,438	(0.1%)
Peptic ulcer disease	11,238,524	(12.6%)	213,860	(3.4%)	364,164	(5.5%)	444,445	(6.0%)
Peripheral vascular disease	5,197,644	(5.8%)	20,276	(0.3%)	42,759	(0.6%)	60,055	(0.8%)
Renal disease	1,261,138	(1.4%)	6,164	(0.1%)	11,118	(0.2%)	19,957	(0.3%)
Rheumatologic disease	1,928,685	(2.2%)	17,602	(0.3%)	35,051	(0.5%)	43,777	(0.6%)
no disease	57,293,691	(64.4%)	5,352,990	(86.3%)	5,500,039	(82.4%)	5,935,225	(79.5%)
1 disease	8,464,436	(9.5%)	609,768	(9.8%)	666,087	(10.0%)	805,022	(10.8%)
2 diseases	6,799,080	(7.6%)	163,269	(2.6%)	310,407	(4.6%)	399,222	(5.3%)
3 diseases	5,534,827	(6.2%)	45,066	(0.7%)	104,758	(1.6%)	178,423	(2.4%)
4 diseases	4,261,753	(4.8%)	19,190	(0.3%)	52,301	(0.8%)	77,876	(1.0%)
≥ 5 diseases	6,574,213	(7.4%)	13,716	(0.2%)	44,409	(0.7%)	72,233	(1.0%)
Multimorbidity (≥2 diseases among CCI)	23,169,873	(26.1%)	241,241	(3.9%)	511,875	(7.7%)	727,754	(9.7%)

^aAny malignancy includes leukemia and lymphoma.

Supplementary eTable 3. (continued) Diagnosed disease prevalence in fiscal year 2014 applied to the Japanese total population by age group

	Overall		35-39		40-44		45-49	
	88,923,000	(100%)	8,670,000	(100%)	9,793,000	(100%)	8,607,000	(100%)
Men	44,288,000	(49.8%)	4,394,000	(50.7%)	4,956,000	(50.6%)	4,329,000	(50.3%)
AIDS/HIV	34,034	(0.0%)	4,592	(0.1%)	4,124	(0.0%)	3,069	(0.0%)
Any malignancy ^a	5,775,260	(6.5%)	198,069	(2.3%)	308,591	(3.2%)	393,299	(4.6%)
Cerebrovascular disease	5,773,295	(6.5%)	93,413	(1.1%)	170,645	(1.7%)	265,098	(3.1%)
Chronic pulmonary disease	17,303,735	(19.5%)	1,446,109	(16.7%)	1,613,639	(16.5%)	1,462,084	(17.0%)
Congestive heart failure	4,317,076	(4.9%)	90,394	(1.0%)	155,193	(1.6%)	201,862	(2.3%)
Dementia	410,326	(0.5%)	734	(0.0%)	1,490	(0.0%)	3,606	(0.0%)
Diabetes mellitus	12,689,040	(14.3%)	352,333	(4.1%)	553,455	(5.7%)	737,731	(8.6%)
Hemiplegia or paraplegia	424,609	(0.5%)	13,621	(0.2%)	12,793	(0.1%)	19,669	(0.2%)
Liver disease	11,341,444	(12.8%)	577,316	(6.7%)	784,095	(8.0%)	858,769	(10.0%)
Metastatic solid tumor	1,235,336	(1.4%)	29,912	(0.3%)	56,656	(0.6%)	78,055	(0.9%)
Myocardial infarction	769,977	(0.9%)	8,925	(0.1%)	25,198	(0.3%)	37,793	(0.4%)
Peptic ulcer disease	11,238,524	(12.6%)	589,633	(6.8%)	749,581	(7.7%)	856,494	(10.0%)
Peripheral vascular disease	5,197,644	(5.8%)	127,339	(1.5%)	201,866	(2.1%)	288,167	(3.3%)
Renal disease	1,261,138	(1.4%)	30,634	(0.4%)	46,209	(0.5%)	73,397	(0.9%)
Rheumatologic disease	1,928,685	(2.2%)	79,300	(0.9%)	108,081	(1.1%)	143,756	(1.7%)
no disease	57,293,691	(64.4%)	6,707,086	(77.4%)	7,389,249	(75.5%)	6,205,507	(72.1%)
1 disease	8,464,436	(9.5%)	879,686	(10.1%)	969,263	(9.9%)	762,446	(8.9%)
2 diseases	6,799,080	(7.6%)	529,075	(6.1%)	633,182	(6.5%)	588,650	(6.8%)
3 diseases	5,534,827	(6.2%)	284,566	(3.3%)	352,334	(3.6%)	416,546	(4.8%)
4 diseases	4,261,753	(4.8%)	152,965	(1.8%)	232,087	(2.4%)	297,143	(3.5%)
≥ 5 diseases	6,574,213	(7.4%)	116,621	(1.3%)	216,885	(2.2%)	336,707	(3.9%)
Multimorbidity (≥2 diseases among CCI)	23,169,873	(26.1%)	1,083,227	(12.5%)	1,434,488	(14.6%)	1,639,046	(19.0%)

^aAny malignancy includes leukemia and lymphoma.

Supplementary eTable 3. (continued) Diagnosed disease prevalence in fiscal year 2014 applied to the Japanese total population by age group

	Overall		50-54		55-59		60-64	
	88,923,000	(100%)	7,790,000	(100%)	7,655,000	(100%)	8,979,000	(100%)
Men	44,288,000	(49.8%)	3,903,000	(50.1%)	3,802,000	(49.7%)	4,406,000	(49.1%)
AIDS/HIV	34,034	(0.0%)	2,979	(0.0%)	3,324	(0.0%)	5,281	(0.1%)
Any malignancy ^a	5,775,260	(6.5%)	483,592	(6.2%)	624,101	(8.2%)	958,696	(10.7%)
Cerebrovascular disease	5,773,295	(6.5%)	387,663	(5.0%)	573,513	(7.5%)	965,151	(10.7%)
Chronic pulmonary disease	17,303,735	(19.5%)	1,469,169	(18.9%)	1,565,078	(20.4%)	2,074,822	(23.1%)
Congestive heart failure	4,317,076	(4.9%)	316,491	(4.1%)	443,956	(5.8%)	694,542	(7.7%)
Dementia	410,326	(0.5%)	7,254	(0.1%)	14,375	(0.2%)	27,048	(0.3%)
Diabetes mellitus	12,689,040	(14.3%)	1,028,899	(13.2%)	1,477,049	(19.3%)	2,197,472	(24.5%)
Hemiplegia or paraplegia	424,609	(0.5%)	26,826	(0.3%)	43,702	(0.6%)	56,416	(0.6%)
Liver disease	11,341,444	(12.8%)	1,063,948	(13.7%)	1,316,086	(17.2%)	1,785,515	(19.9%)
Metastatic solid tumor	1,235,336	(1.4%)	104,654	(1.3%)	136,279	(1.8%)	204,377	(2.3%)
Myocardial infarction	769,977	(0.9%)	65,457	(0.8%)	76,970	(1.0%)	130,757	(1.5%)
Peptic ulcer disease	11,238,524	(12.6%)	977,192	(12.5%)	1,190,533	(15.6%)	1,633,285	(18.2%)
Peripheral vascular disease	5,197,644	(5.8%)	411,839	(5.3%)	554,776	(7.2%)	876,673	(9.8%)
Renal disease	1,261,138	(1.4%)	95,578	(1.2%)	126,432	(1.7%)	202,057	(2.3%)
Rheumatologic disease	1,928,685	(2.2%)	191,910	(2.5%)	235,332	(3.1%)	326,918	(3.6%)
no disease	57,293,691	(64.4%)	5,087,646	(65.3%)	4,435,684	(57.9%)	4,468,987	(49.8%)
1 disease	8,464,436	(9.5%)	687,805	(8.8%)	680,727	(8.9%)	859,388	(9.6%)
2 diseases	6,799,080	(7.6%)	631,794	(8.1%)	687,732	(9.0%)	933,542	(10.4%)
3 diseases	5,534,827	(6.2%)	510,570	(6.6%)	638,438	(8.3%)	881,741	(9.8%)
4 diseases	4,261,753	(4.8%)	382,265	(4.9%)	509,123	(6.7%)	729,058	(8.1%)
≥ 5 diseases	6,574,213	(7.4%)	489,921	(6.3%)	703,297	(9.2%)	1,106,284	(12.3%)

Multimorbidity (≥2 diseases among CCI)	23,169,873	(26.1%)	2,014,550	(25.9%)	2,538,590	(33.2%)	3,650,625	(40.7%)
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^aAny malignancy includes leukemia and lymphoma.

Supplementary eTable 3. (continued) Diagnosed disease prevalence in fiscal year 2014 applied to the Japanese total population by age group

	Overall		65-69		70-74	
	88,923,000	(100%)	9,155,000	(100%)	7,929,000	(100%)
Men	44,288,000	(49.8%)	4,414,000	(48.2%)	3,690,000	(46.5%)
AIDS/HIV	34,034	(0.0%)	3,793	(0.0%)	2,940	(0.0%)
Any malignancy ^a	5,775,260	(6.5%)	1,296,908	(14.2%)	1,323,445	(16.7%)
Cerebrovascular disease	5,773,295	(6.5%)	1,404,663	(15.3%)	1,836,456	(23.2%)
Chronic pulmonary disease	17,303,735	(19.5%)	2,445,425	(26.7%)	2,485,540	(31.3%)
Congestive heart failure	4,317,076	(4.9%)	931,107	(10.2%)	1,374,790	(17.3%)
Dementia	410,326	(0.5%)	83,286	(0.9%)	271,063	(3.4%)
Diabetes mellitus	12,689,040	(14.3%)	2,891,848	(31.6%)	3,029,762	(38.2%)
Hemiplegia or paraplegia	424,609	(0.5%)	81,998	(0.9%)	148,087	(1.9%)
Liver disease	11,341,444	(12.8%)	2,094,406	(22.9%)	2,092,035	(26.4%)
Metastatic solid tumor	1,235,336	(1.4%)	300,280	(3.3%)	292,970	(3.7%)
Myocardial infarction	769,977	(0.9%)	197,033	(2.2%)	213,037	(2.7%)
Peptic ulcer disease	11,238,524	(12.6%)	2,053,538	(22.4%)	2,165,800	(27.3%)
Peripheral vascular disease	5,197,644	(5.8%)	1,181,335	(12.9%)	1,432,557	(18.1%)
Renal disease	1,261,138	(1.4%)	257,988	(2.8%)	391,604	(4.9%)
Rheumatologic disease	1,928,685	(2.2%)	374,826	(4.1%)	372,134	(4.7%)
no disease	57,293,691	(64.4%)	3,803,485	(41.5%)	2,407,794	(30.4%)
1 disease	8,464,436	(9.5%)	785,842	(8.6%)	758,403	(9.6%)
2 diseases	6,799,080	(7.6%)	1,013,307	(11.1%)	908,900	(11.5%)
3 diseases	5,534,827	(6.2%)	1,074,487	(11.7%)	1,047,899	(13.2%)
4 diseases	4,261,753	(4.8%)	886,159	(9.7%)	923,584	(11.6%)

≥ 5 diseases	6,574,213	(7.4%)	1,591,721	(17.4%)	1,882,418	(23.7%)
Multimorbidity (≥2 diseases among CCI)	23,169,873	(26.1%)	4,565,674	(49.9%)	4,762,801	(60.1%)

^aAny malignancy includes leukemia and lymphoma.

Supplementary eTable 4. Hazard ratios in multimorbid individuals based on hospitalisation or death rates in a 5-year cohort of $n = 111\ 088$ men and $n = 70\ 871$ women. Cox regression analysis

Overall ^a	Full Model		20-39 years		40-59 years		60-71 years					
	HR	95%CI	HR	95%CI	HR	95%CI	HR	95%CI				
Age	1.02	1.01	1.02									
Sex	0.97	0.95	0.99	0.36	0.34	0.37	1.29	1.25	1.33	1.44	1.38	1.51
≥2 diseases	2.17	2.12	2.21	2.17	2.05	2.29	2.31	2.24	2.38	2.05	1.97	2.14
Men ^b												
Age	1.03	1.03	1.04									
≥2 diseases	2.04	1.98	2.10	2.81	2.56	3.07	2.25	2.17	2.34	1.94	1.84	2.04
Women ^b												
Age	0.99	0.99	1.00									
≥2 diseases	2.22	2.15	2.30	1.91	1.78	2.04	2.42	2.30	2.54	2.28	2.12	2.44

^aReferences are female for sex, no disease for morbidity variables

^bReference is no disease for morbidity variables

HR; hazard ratio, CI; confidence interval