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Table S1. Summary of model fits

Trajectory	AvePP for groups (%)							BIC	AIC
	1	2	3	4	5	6	7		
2	90.5	82.2						-70084.69	-70041.05
3	86.5	88.2	88.4					-68400.65	-68329.24
4	80.4	94.8	81.8	90.1				-67836.92	-67737.74
5	82.0	80.7	94.0	84.6	90.8			-67477.04	-67350.08
6	82.7	87.0	93.6	78.6	86.8	89.4		-67296.81	-67142.08
7	82.7	0	93.6	78.6	87.0	86.8	89.4	-67331.58	-67149.08

AvePP = Average Posterior Probability

Table S2. Mean probabilities of trajectories membership for the 6-class model

Trajectory	Number of participants	AvePP (%)	Range of PP (%)
No symptoms	6,407	82.8	60.8 – 96.8
Mild-stable	11,539	93.6	47.8 – 100
Moderate-stable	2,183	78.6	37.0 – 99.7
Severe-decreasing	206	86.1	38.7 – 100
Moderate-increasing	177	86.9	41.4 – 100
Severe-stable	122	90.1	36.4 - 100

AvePP = Average Posterior Probability

Table S3. Mean probabilities of trajectories membership for the training and test data

Trajectory	AvePP (%)	Range of PP (%)
Training		
No symptoms	83.1	64.1 – 96.5
Mild-stable	93.8	46.2 – 100
Moderate-stable	78.9	34.6 – 99.9
Severe-decreasing	83.4	39.2 – 100
Moderate-increasing	79.0	37.6 – 100
Severe-stable	88.9	45.8 - 100
Validation		
No symptoms	82.3	58.3 – 96.8
Mild-stable	93.7	47.8 – 100
Moderate-stable	79.3	47.4 – 99.7
Severe-decreasing	85.8	41.3 – 100
Moderate-increasing	88.4	50.2 – 100
Severe-stable	94.9	46.5 - 100

AvePP = Average Posterior Probability

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Table S4. Association between depressive symptoms trajectories and risk of cardiovascular disease, cancer, and all-cause mortality in the subgroups

Subgroups	Trajectory of depressive symptoms, hazard ratios (95% CIs)					
	No symptoms	Mild-stable	Moderate-stable	Severe-decreasing	Moderate-increasing	Severe-stable
Female						
CVD incidence	1.00 (ref)	1.19 (0.98,1.44)	1.39 (1.03,1.87)	1.63 (0.85,3.13)	0.98 (0.36,2.67)	3.99 (1.95,8.17)
Cancer incidence	1.00 (ref)	0.90 (0.74,1.09)	1.24 (0.93,1.64)	0.61 (0.25,1.51)	0.96 (0.39,2.37)	0.30 (0.04,2.17)
All-cause mortality	1.00 (ref)	0.92 (0.67,1.28)	1.07 (0.65,1.78)	1.20 (0.37,3.91)	2.65 (0.93,7.49)	3.85 (1.28,11.59)
Male						
CVD incidence	1.00 (ref)	1.19 (1.03,1.38)	1.26 (0.95,1.66)	1.15 (0.43,3.12)	1.93 (0.94,3.97)	2.48 (1.28,4.80)
Cancer incidence	1.00 (ref)	1.13 (0.96,1.32)	1.06 (0.76,1.46)	1.37 (0.51,3.70)	0.93 (0.29,2.94)	0.68 (0.17,2.77)
All-cause mortality	1.00 (ref)	1.17 (0.91,1.50)	1.42 (0.90,2.24)	NA	1.80 (0.55,5.90)	2.72 (0.96,7.71)
Age ≤ 60 years						
CVD incidence	1.00 (ref)	1.10 (0.91,1.33)	1.24 (0.95,1.64)	1.15 (0.56,2.35)	1.53 (0.77,3.04)	2.34 (1.28,4.28)
Cancer incidence	1.00 (ref)	0.97 (0.81,1.15)	1.16 (0.89,1.51)	1.01 (0.49,2.07)	0.74 (0.30,1.80)	0.19 (0.03,1.35)
All-cause mortality	1.00 (ref)	0.89 (0.64,1.24)	0.97 (0.59,1.58)	0.37 (0.05,2.71)	1.76 (0.62,4.99)	1.69 (0.56,5.06)
Age > 60 years						
CVD incidence	1.00 (ref)	1.25 (1.08,1.46)	1.34 (0.99,1.83)	1.95 (0.86,4.42)	1.11 (0.35,3.49)	3.41 (1.46,7.96)
Cancer incidence	1.00 (ref)	1.07 (0.90,1.27)	1.26 (0.88,1.80)	0.39 (0.05,2.79)	1.50 (0.47,4.74)	1.60 (0.39,6.52)
All-cause mortality	1.00 (ref)	1.16 (0.91,1.48)	1.55 (0.96,2.48)	1.53 (0.37,6.34)	2.71 (0.83,8.80)	6.25 (2.24,17.43)
BMI ≤ 25 kg/m^2						
CVD incidence	1.00 (ref)	1.34 (1.09,1.64)	1.35 (0.93,1.96)	0.95 (0.23,3.87)	NA	5.09 (2.03,12.75)

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Cancer incidence	1.00 (ref)	1.02 (0.83,1.25)	1.15 (0.80,1.66)	0.73 (0.18,2.98)	0.85 (0.21,3.47)	1.62 (0.40,6.67)
All-cause mortality	1.00 (ref)	1.25 (0.90,1.75)	1.55 (0.88,2.72)	1.09 (0.15,8.16)	1.60 (0.22,11.93)	7.26 (2.46,21.44)
BMI > 25 kg/m²						
CVD incidence	1.00 (ref)	1.12 (0.98,1.30)	1.28 (1.01,1.63)	1.60 (0.89,2.87)	1.73 (0.96,3.13)	2.42 (1.37,4.27)
Cancer incidence	1.00 (ref)	1.01 (0.87,1.18)	1.25 (0.96,1.61)	0.96 (0.45,2.06)	0.95 (0.42,2.15)	0.20 (0.03,1.46)
All-cause mortality	1.00 (ref)	0.95 (0.74,1.21)	1.09 (0.71,1.66)	0.73 (0.18,2.98)	2.18 (0.93,5.11)	1.74 (0.61,4.95)
Other education level						
CVD incidence	1.00 (ref)	1.26 (1.08,1.46)	1.26 (0.97,1.62)	1.84 (1.00,3.40)	1.50 (0.70,3.21)	3.93 (2.37,6.53)
Cancer incidence	1.00 (ref)	1.03 (0.88,1.21)	1.18 (0.91,1.55)	0.85 (0.35,2.08)	0.42 (0.10,1.70)	0.68 (0.21,2.15)
All-cause mortality	1.00 (ref)	1.24 (0.96,1.60)	1.39 (0.92,2.10)	0.93 (0.23,3.81)	2.25 (0.81,6.25)	3.92 (1.74,8.86)
College/university						
CVD incidence	1.00 (ref)	1.09 (0.91,1.32)	1.47 (1.06,2.04)	0.83 (0.26,2.61)	1.40 (0.56,3.49)	0.64 (0.09,4.73)
Cancer incidence	1.00 (ref)	1.00 (0.82,1.20)	1.28 (0.92,1.78)	0.95 (0.35,2.57)	1.51 (0.65,3.50)	NA
All-cause mortality	1.00 (ref)	0.83 (0.60,1.14)	1.18 (0.64,2.16)	0.83 (0.11,6.05)	2.20 (0.64,7.52)	1.68 (0.20,14.15)
TDI < median (-2.71)						
CVD incidence	1.00 (ref)	1.18 (1.04,1.33)	1.31 (1.06,1.62)	1.48 (0.84,2.58)	1.24 (0.63,2.41)	2.92 (1.70,5.00)
Cancer incidence	1.00 (ref)	1.03 (0.91,1.18)	1.25 (1.01,1.56)	0.91 (0.45,1.85)	0.71 (0.29,1.74)	0.65 (0.21,2.04)
All-cause mortality	1.00 (ref)	1.04 (0.85,1.28)	1.25 (0.87,1.80)	0.96 (0.30,3.03)	2.33 (1.00,5.38)	4.50 (2.12,9.56)
TDI ≥ median (-2.71)						
CVD incidence	1.00 (ref)	1.40 (0.87,2.26)	1.36 (0.68,2.71)	1.06 (0.14,8.07)	3.45 (0.97,12.20)	4.09 (1.28,13.09)
Cancer incidence	1.00 (ref)	0.90 (0.57,1.41)	1.02 (0.52,1.99)	0.63 (0.08,4.75)	2.03 (0.59,7.03)	NA
All-cause mortality	1.00 (ref)	1.50 (0.76,2.93)	1.50 (0.57,3.93)	NA	2.08 (0.25,17.29)	NA

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All adjusted for age (years), sex (female or male), ethnicity (white or others), Townsend Deprivation Index, education (college/university or others), and body-mass-index, smoke status (never, former, or current), alcohol frequency (never, occasions, 1-3 times/month, 1-2 times/week, 3-4 times/week, and daily or almost daily), diet scores (0 to 7), sleep scores (0 to 5), history of hypertension (yes or no), and history of diabetes (yes or no), and use of antidepressants (yes or no).

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Table S5. Trajectories of depressive symptoms and risk of cardiovascular disease, cancer, and all-cause mortality, excluding events that occurred within the first 2 years of follow up
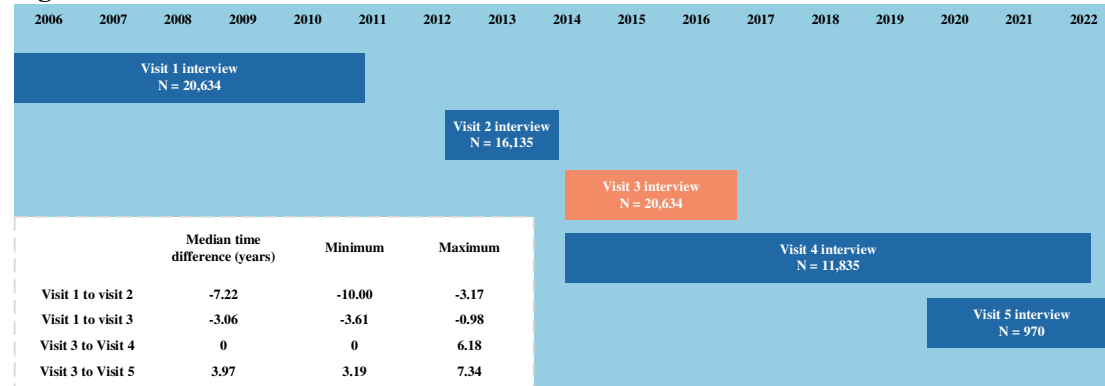
Trajectory	Outcomes, hazard ratios (95% CIs)		
	CVD incidence	**Cancer incidence**	**All-cause mortality**
No symptoms	1.00 (ref)	1.00 (ref)	1.00 (ref)
Mild-stable	1.17 (1.01,1.35)	1.15 (0.99,1.34)	1.07 (0.85,1.34)
Moderate-stable	1.29 (1.01,1.65)	1.31 (1.01,1.70)	1.35 (0.92,1.98)
Severe-decreasing	1.55 (0.82,2.93)	0.77 (0.32,1.88)	1.12 (0.35,3.58)
Moderate-increasing	1.83 (0.96,3.47)	1.11 (0.49,2.53)	2.19 (0.87,5.51)
Severe-stable	2.78 (1.51,5.10)	0.49 (0.12,2.01)	4.34 (1.93,9.73)

All adjusted for age (years), sex (female or male), ethnicity (white or others), Townsend Deprivation Index, education (college/university or others), and body-mass-index, smoke status (never, former, or current), alcohol frequency (never, occasions, 1-3 times/month, 1-2 times/week, 3-4 times/week, and daily or almost daily), diet scores (0 to 7), sleep scores (0 to 5), history of hypertension (yes or no), and history of diabetes (yes or no), and use of antidepressants (yes or no).
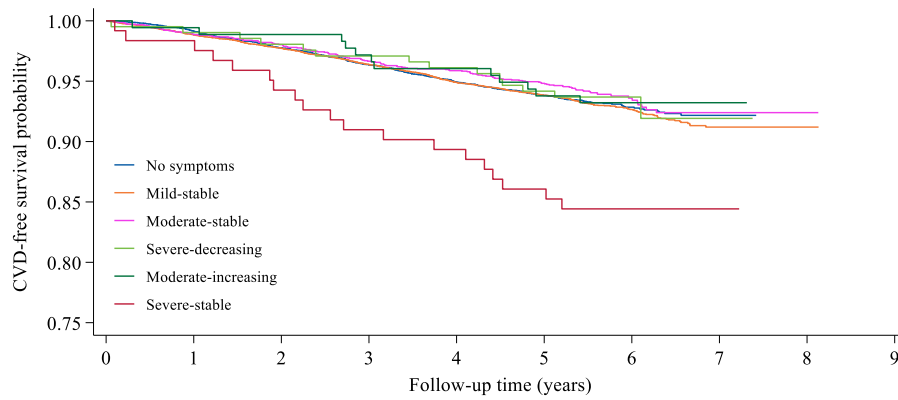
Table S6. Trajectories of depressive symptoms and risk of cardiovascular disease, cancer, and all-cause mortality, including first assessment of PHQ-4 as an additional covariate

Trajectory	Outcomes, hazard ratios (95% CIs)		
	CVD incidence	**Cancer incidence**	**All-cause mortality**
No symptoms	1.00 (ref)	1.00 (ref)	1.00 (ref)
Mild-stable	1.15 (1.01,1.32)	1.04 (0.91,1.20)	1.12 (0.89,1.40)
Moderate-stable	1.20 (0.90,1.59)	1.31 (0.97,1.77)	1.48 (0.92,2.40)
Severe-decreasing	1.16 (0.57,2.36)	1.06 (0.45,2.46)	1.23 (0.30,5.01)
Moderate-increasing	1.33 (0.72,2.46)	1.01 (0.48,2.11)	2.60 (1.13,6.01)
Severe-stable	2.36 (1.19,4.70)	0.57 (0.16,2.03)	4.72 (1.54,14.47)

All adjusted for age (years), sex (female or male), ethnicity (white or others), Townsend Deprivation Index, education (college/university or others), and body-mass-index, smoke status (never, former, or current), alcohol frequency (never, occasions, 1-3 times/month, 1-2 times/week, 3-4 times/week, and daily or almost daily), diet scores (0 to 7), sleep scores (0 to 5), history of hypertension (yes or no), and history of diabetes (yes or no), use of antidepressants (yes or no), and the score of PHQ-4 in the first interview (0 to 12).

Figure S1. Timeline of some covariates collection

	Median time difference (years)	Minimum	Maximum
Visit 1 to visit 2	-7.22	-10.00	-3.17
Visit 1 to visit 3	-3.06	-3.61	-0.98
Visit 3 to Visit 4	0	0	6.18
Visit 3 to Visit 5	3.97	3.19	7.34

The covariates with repeated measurements including education level, BMI, smoking status, alcohol frequency, diet scores, and sleep scores were obtained from touchscreen questionnaires at the time-point closest to the baseline of this study.

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Figure S2. CVD-free survival across different trajectories of depressive symptoms

The figure shows Kaplan-Meier survival data for cardiovascular disease for different trajectories of depressive symptoms in 20,634 individuals ($P = 0.006$ by log-rank test).

Figure S3. Cancer-free survival across different trajectories of depressive symptoms
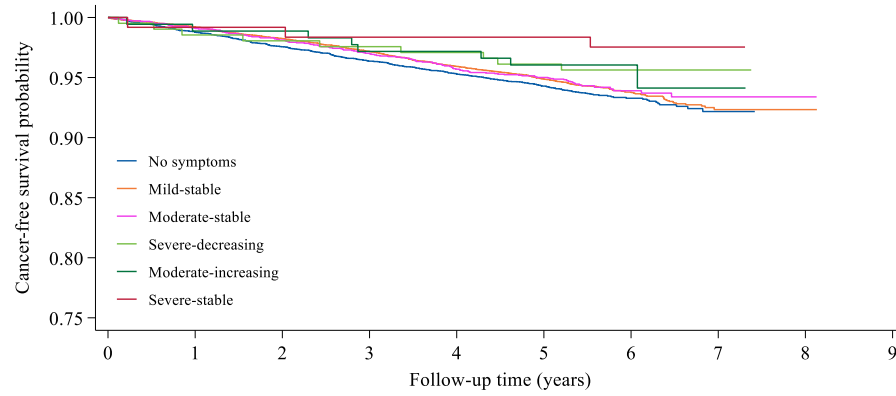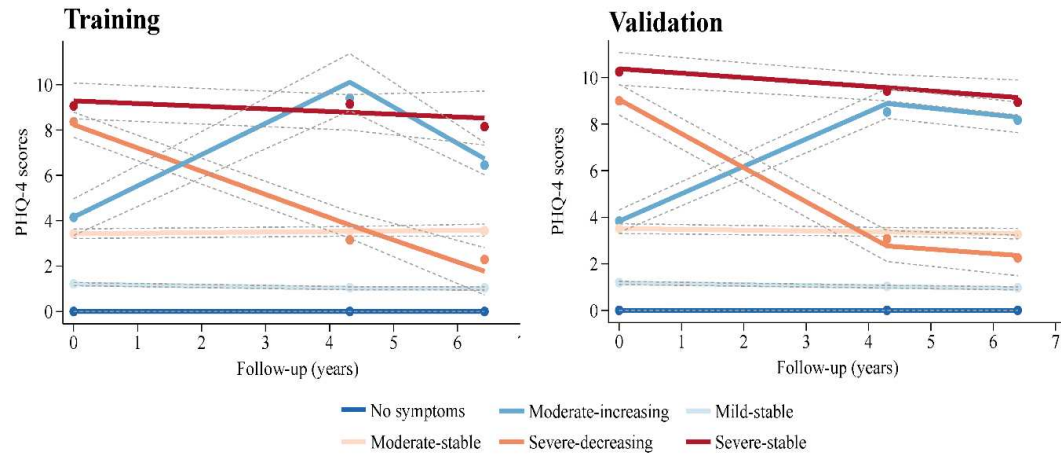

Number at risk

No symptoms	6407	6328	6251	6174	6106	6041	1347	198	0	0
Mild-stable symptoms	11539	11446	11337	11213	11069	10948	2708	468	5	0
Moderate-stable symptoms	2183	2164	2142	2117	2089	2074	531	83	1	0
Severe-decreasing symptoms	206	203	202	201	200	198	61	10	0	0
Moderate-increasing symptoms	177	175	175	172	172	170	51	8	0	0
Severe-stable symptoms	122	121	121	120	120	120	35	7	0	0

The figure shows Kaplan-Meier survival data for cancer for different trajectories of depressive symptoms in

20,634 individuals ($P = 0.154$ by log-rank test)

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Figure S4. Death-free survival across different trajectories of depressive symptoms
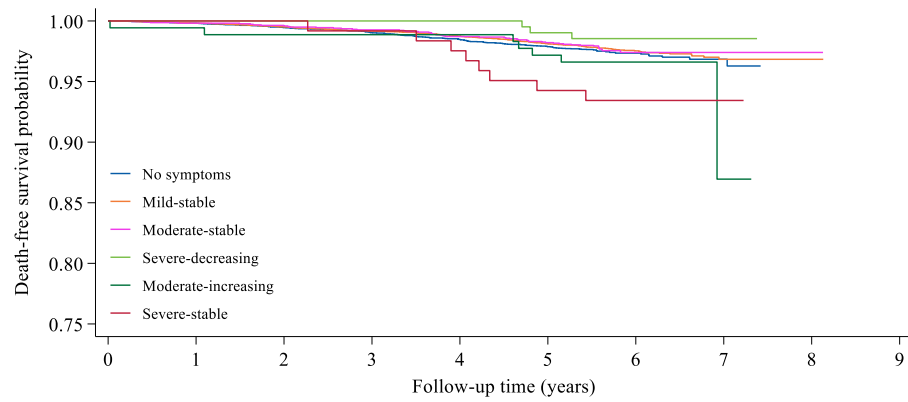
Number at risk									
No symptoms	6407	6395	6372	6345	6309	6271	1408	206	0	0
Mild-stable symptoms	11539	11518	11483	11443	11396	11322	2798	485	5	0
Moderate-stable symptoms	2183	2179	2174	2167	2155	2144	550	90	1	0
Severe-decreasing symptoms	206	206	206	206	206	204	65	10	0	0
Moderate-increasing symptoms	177	176	175	175	175	172	53	8	0	0
Severe-stable symptoms	122	122	122	121	119	115	34	6	0	0

The figure shows Kaplan-Meier survival data for mortality for different trajectories of depressive symptoms in 20,634 individuals ($P = 0.032$ by log-rank test)

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Figure S5. Group-based trajectory modeling in the training and validation cohorts

Group-based trajectory modeling of depressive symptoms in the training and validation cohorts. Using group-based trajectory modeling, six distinct trajectories were identified in the training and validation cohorts. Dotted lines represent confidence bands for the calculated trajectory.