

## **Supplementary Files**

**Supplementary File 1.** Cumulative incidence curves for dementia and death for (A) males and (B) females in the combined derivation and validation cohorts

**Supplementary File 2.** Baseline study characteristics of male and female derivation and validation cohorts, with missingness

**Supplementary File 3.** Male and female partial correlation plots

**Supplementary File 4.** DemPoRT subdistribution hazard ratios for full and reduced models – males

**Supplementary File 5.** DemPoRT subdistribution hazard ratios for full and reduced models – females

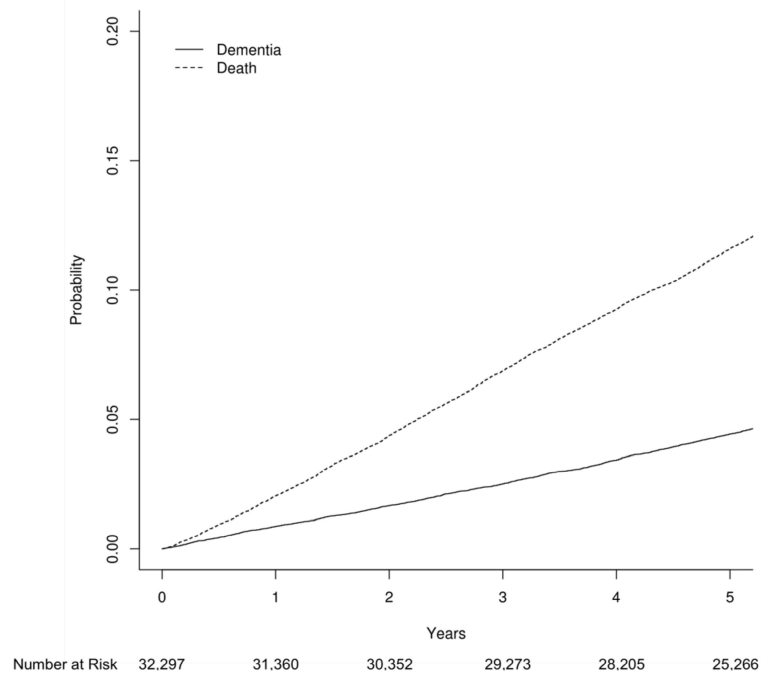
**Supplementary File 6.** DemPoRT reduced formulas for risk

**Supplementary File 7.** Observed versus predicted for subgroups in the validation model – males

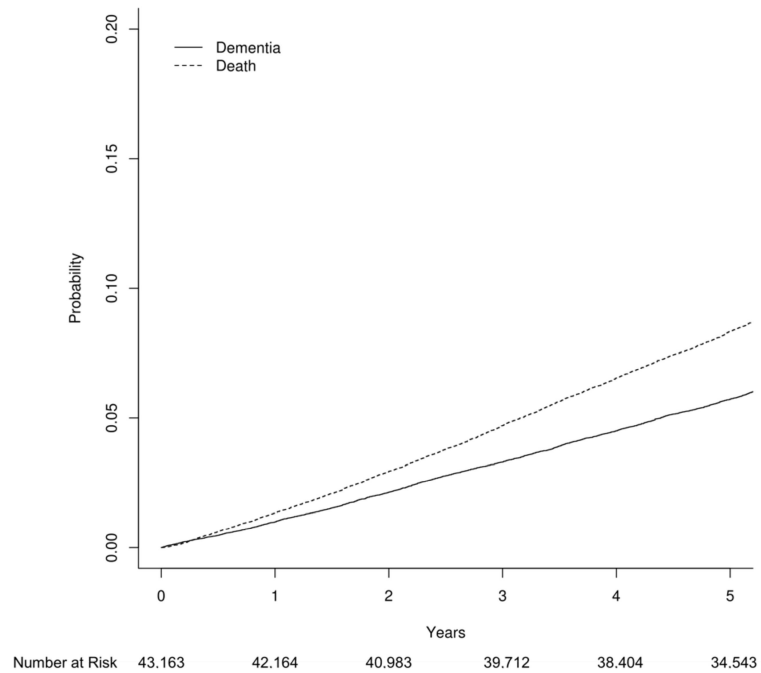
**Supplementary File 8.** Observed versus predicted for subgroups in the validation model – females

**Supplementary File 1.** Cumulative incidence curves for dementia and death for (A) males and (B) females in the combined derivation and validation cohorts

(A)



(B)



**Supplementary File 2.** Baseline study characteristics of male and female derivation and validation cohorts, with missingness

Characteristic <sup>a</sup>	Male Cohort		Female Cohort	
	Derivation <sup>b</sup>	Validation <sup>c</sup>	Derivation <sup>b</sup>	Validation <sup>c</sup>
N	20,506	11,791	27,233	15,930
Person-years of follow-up	94,237	53,979	126,735	73,726
Dementia events (5 years)	2,367	647	4,367	1,067
Deaths (5 years)	905	518	1,616	836
<b>Socio-demographic Factors</b>				
Age, median [IQR]	66.0 (60.0, 74.0)	66.0 [60.0, 74.0]	68.0 [61.0, 76.0]	67.0 (61.0, 76.0)
Ethnicity				
White	19,145 (93.4)	10,785 (91.5)	25,700 (94.4)	14,765 (92.7)
South Asian/Arab/West Asian	347 (1.7)	208 (1.8)	360 (1.3)	184 (1.2)
Japanese/Korean/South East Asian/Filipino	274 (1.3)	224 (1.9)	243 (0.9)	276 (1.7)
Other/Multiple Origin/Unknown	637 (3.1)	479 (4.1)	831 (3.1)	597 (3.7)
Missing	103 (0.5)	95 (0.8)	99 (0.4)	108 (0.7)
Immigrant				
Yes	5,500 (26.8)	2,926 (24.8)	6,804 (25.0)	3,769 (23.7)
No	14,981 (73.1)	8,818 (74.8)	20,391 (74.9)	12,109 (76.0)
Missing	103 (0.5)	47 (0.4)	38 (0.1)	52 (0.3)
Education				
Less than secondary school	6,380 (31.1)	2,792 (23.7)	9,402 (34.5)	3,833 (24.1)
Secondary school graduate	2,902 (14.2)	1,840 (15.6)	5,494 (20.2)	3,429 (21.5)
Some post-secondary	1,148 (5.6)	499 (4.2)	1,454 (5.3)	665 (4.2)
Post-secondary graduate	9,847 (48.0)	6,564 (55.7)	10,636 (39.1)	7,888 (49.5)
Missing	229 (1.1)	96 (0.8)	247 (0.9)	115 (0.7)
Marital status				
Now married/Common-law	14,791 (72.1)	8,316 (70.5)	13,070 (48.0)	7,873 (49.4)
Separated/Divorced	2,122 (10.3)	1,358 (11.5)	3,180 (11.7)	2,130 (13.4)
Widowed	2,224 (10.8)	1,175 (10.0)	9,642 (35.4)	4,928 (30.9)
Single	1,364 (6.7)	934 (7.9)	1,325 (4.9)	981 (6.2)
Missing	5 (0.0)	8 (0.1)	16 (0.1)	18 (0.1)
Neighbourhood Deprivation				
Low	4,153 (20.3)	2,289 (19.4)	4,720 (17.3)	2,677 (16.8)
Moderate	12,753 (62.2)	7,423 (63.0)	17,147 (63.0)	10,160 (63.8)
High	2,997 (14.6)	1,705 (14.5)	4,429 (16.3)	2,538 (15.9)
Missing	603 (2.9)	374 (3.2)	937 (3.4)	555 (3.5)
Multilingual				
Yes	14,018 (68.4)	1,743 (14.8)	7,402 (27.2)	2,103 (13.2)
No	6,471 (31.6)	4,054 (34.4)	19,816 (72.8)	5,741 (36.0)
Missing <sup>d</sup>	17 (0.1)	5,994 (50.8)	15 (0.1)	8,086 (50.8)
<b>General Health</b>				
Sense of belonging				
Very strong	5,075 (24.7)	2,766 (23.5)	7,156 (26.3)	3,987 (25.0)
Somewhat strong	8,951 (43.7)	5,518 (46.8)	12,011 (44.1)	7,657 (48.1)
Somewhat weak	3,805 (18.6)	2,075 (17.6)	5,083 (18.7)	2,709 (17.0)
Very weak	1,628 (7.9)	859 (7.3)	2,271 (8.3)	1,095 (6.9)
Missing	1,047 (5.1)	573 (4.9)	712 (2.6)	482 (3.0)
Self-perceived stress				
Not at all stressful	4,871 (23.8)	2,616 (22.2)	5,102 (18.7)	2,616 (16.4)
Not very stressful	6,420 (31.3)	3,635 (30.8)	8,554 (31.4)	4,772 (30.0)
A bit stressful	6,491 (31.7)	3,867 (32.8)	9,394 (34.5)	5,739 (36.0)
Quite a bit stressful	2,154 (10.5)	1,348 (11.4)	3,353 (12.3)	2,279 (14.3)
Extremely stressful	485 (2.4)	270 (2.3)	728 (2.7)	459 (2.9)
Missing	85 (0.4)	55 (0.5)	102 (0.4)	65 (0.4)
Self-rated health				
Excellent	3,038 (14.8)	1,692 (14.3)	4,009 (14.7)	2,474 (15.5)

Very Good	6,241 (30.4)	3,873 (32.8)	8,467 (31.1)	5,532 (34.7)
Good	6,385 (31.1)	3,771 (32.0)	8,469 (31.1)	4,718 (29.6)
Poor	3,376 (16.5)	1,752 (14.9)	4,521 (16.6)	2,275 (14.3)
Fair	1,442 (7.0)	685 (5.8)	1,737 (6.4)	911 (5.7)
Missing	24 (0.1)	18 (0.2)	30 (0.1)	20 (0.1)
<b>Health Behaviours</b>				
<b>Smoking</b>				
Current smoker	3,747 (18.3)	2,527 (21.4)	11,320 (41.6)	6,396 (40.2)
Pack-years, median [IQR]	40 [23.5, 55.7]	36.5 [22, 52.5]	28.8 [17.6, 47]	27.0 [16.1, 45.3]
Former smoker ≥5 years	9,898 (48.3)	5,340 (45.3)	7,544 (27.7)	4,758 (29.9)
Pack-years, median [IQR]	19.5 [7.2, 36.8]	18 [7, 35]	11.2 [5, 27]	11.0 [5.0, 26.0]
Former smoker <5 years	1,351 (6.6)	627 (5.3)	1,329 (4.9)	673 (4.2)
Pack-years, median [IQR]	46.9 [27.6, 61.3]	45.5 [24.9, 59.4]	34.1 [18, 53.1]	33.8 [19.8, 52.9]
Non-smoker	3,305 (16.1)	1,877 (15.9)	3,972 (14.6)	2,244 (14.1)
Missing	2,205 (10.8)	1,420 (12.0)	3,068 (11.3)	1,859 (11.7)
<b>Alcohol</b>				
Current drinker	16,364 (79.8)	9,436 (80.0)	18,729 (68.8)	11,200 (70.3)
Number of drinks last week, median [IQR]	3 [0, 8]	1 [0, 4]	3 [0, 9]	1 [0, 4]
Former drinker <sup>c</sup>	3,532 (17.2)	2319 (19.7)	6,582 (24.2)	4,682 (29.4)
Non-drinker <sup>c</sup>	545 (2.7)	0 (0)	1,856 (6.8)	0 (0)
Missing	65 (0.3)	36 (0.3)	66 (0.2)	48 (0.3)
<b>Diet</b>				
Fruit and vegetable consumption, median [IQR]	4.3 [3.1, 5.7]	4.1 [2.8, 5.5]	5.0 [3.7, 6.6]	4.8 [3.4, 6.4]
Missing	623 (3.0)	481 (4.1)	409 (1.5)	330 (2.1)
Juice consumption, median [IQR]	1.0 [0.1, 1.0]	0.6 [0.1, 1.0]	1.0 [0.1, 1.0]	0.4 [0.0, 1.0]
Missing	658 (3.2)	515 (4.4)	468 (1.7)	382 (2.4)
Potato consumption, median [IQR]	0.4 [0.3, 0.9]	0.4 [0.1, 0.6]	0.4 [0.1, 0.7]	0.3 [0.1, 0.6]
Missing	688 (3.4)	539 (4.6)	522 (1.9)	416 (2.6)
<b>Physical Activity</b>				
Daily energy expenditure (METs), median [IQR]	1.5 [0.5, 3.0]	1.6 [0.6, 3.0]	1.1 [0.3, 2.3]	1.2 [0.4, 2.5]
Missing	824 (4.0)	425 (3.6)	417 (1.5)	247 (1.6)
<b>Functional Measures</b>				
<b>Personal hygiene and care</b>				
Needs help	656 (3.2)	389 (3.3)	1,154 (4.2)	694 (4.4)
Does not need help	19,838 (96.7)	11,398 (96.7)	26,073 (95.7)	15,232 (95.6)
Missing	12 (0.1)	4 (0.0)	6 (0.0)	4 (0.0)
<b>Locomotion in the home</b>				
Needs help	460 (2.2)	227 (1.9)	781 (2.9)	420 (2.6)
Does not need help	20,037 (97.7)	11,561 (98.0)	26,444 (97.1)	15,507 (97.3)
Missing	9 (0.0)	3 (0.0)	8 (0.0)	3 (0.0)
<b>Meal preparation</b>				
Needs help	833 (4.1)	485 (4.1)	1,394 (5.1)	824 (5.2)
Does not need help	19,665 (95.9)	11,299 (95.8)	25,829 (94.8)	15,103 (94.8)
Missing	8 (0.0)	7 (0.1)	10 (0.0)	3 (0.0)
<b>Running errands</b>				
Needs help	1,413 (6.9)	825 (7.0)	4,127 (15.2)	2,301 (14.4)
Does not need help	19,083 (93.1)	10,962 (93.0)	23,098 (84.8)	13,621 (85.5)
Missing	10 (0.0)	4 (0.0)	8 (0.0)	8 (0.1)
<b>Ordinary housework</b>				
Needs help	1,704 (8.3)	998 (8.5)	4,474 (16.4)	2,552 (16.0)
Does not need help	18,784 (91.6)	10,780 (91.4)	22,746 (83.5)	13,368 (83.9)
Missing	18 (0.1)	13 (0.1)	13 (0.0)	10 (0.1)
<b>Finances</b>				
Needs help	534 (2.6)	416 (3.5)	1,128 (4.1)	788 (4.9)
Does not need help	15,593 (76.0)	11,367 (96.4)	20,183 (74.1)	15,131 (95.0)
Missing <sup>f</sup>	4,379 (21.4)	8 (0.1)	5,922 (21.7)	11 (0.1)



<b>Number of activities need help</b>				
None	14272 (69.6)	10324 (87.6)	16460 (60.4)	12364 (77.6)
1	816 (4.0)	642 (5.4)	2227 (8.2)	1637 (10.3)
2	351 (1.7)	302 (2.6)	1143 (4.2)	827 (5.2)
3	246 (1.2)	192 (1.6)	688 (2.5)	474 (3.0)
4	166 (0.8)	128 (1.1)	380 (1.4)	285 (1.8)
5	143 (0.7)	92 (0.8)	242 (0.9)	180 (1.1)
6	112 (0.5)	87 (0.7)	151 (0.6)	131 (0.8)
Missing <sup>w</sup>	4400 (21.5)	24 (0.2)	5942 (21.8)	32 (0.2)
<b>Health Conditions</b>				
<b>Heart disease</b>				
Yes	3,876 (18.9)	2,133 (18.1)	4,022 (14.8)	1,982 (12.4)
No	16,569 (80.8)	9,613 (81.5)	23,151 (85.0)	13,891 (87.2)
Missing	61 (0.3)	45 (0.4)	60 (0.2)	57 (0.4)
<b>Stroke</b>				
Yes	751 (3.7)	382 (3.2)	859 (3.2)	471 (3.0)
No	19,741 (96.3)	11,389 (96.6)	26,351 (96.8)	15,442 (96.9)
Missing	14 (0.1)	20 (0.2)	23 (0.1)	17 (0.1)
<b>Diabetes</b>				
Yes	3,147 (15.3)	2,203 (18.7)	3,142 (11.5)	2,120 (13.3)
No	17,341 (84.6)	9,578 (81.2)	24,078 (88.4)	13,793 (86.6)
Missing	18 (0.1)	10 (0.1)	13 (0.0)	17 (0.1)
<b>Mood disorder</b>				
Yes	832 (4.1)	754 (6.4)	1,816 (6.7)	1,581 (9.9)
No	15,293 (74.6)	11,020 (93.5)	19,489 (71.6)	14,335 (90.0)
Missing <sup>g</sup>	4,381 (21.4)	17 (0.1)	5,928 (21.8)	14 (0.1)
<b>High blood pressure</b>				
Yes	7,509 (36.6)	5,014 (42.5)	11,533 (42.3)	7,169 (45.0)
No	12,950 (63.2)	6,751 (57.3)	15,671 (57.5)	8,737 (54.8)
Missing	47 (0.2)	26 (0.2)	29 (0.1)	24 (0.2)
<b>COPD</b>				
Yes	1,432 (7.0)	774 (6.6)	2,069 (7.6)	1,344 (8.4)
No	17,430 (85.0)	10,999 (93.3)	23,035 (84.6)	14,544 (91.3)
Missing <sup>h</sup>	1,644 (8.0)	18 (0.2)	2,129 (7.8)	42 (0.3)
<b>Epilepsy</b>				
Yes	73 (0.4)	0 (0)	112 (0.4)	0 (0)
No	14,503 (70.7)	0 (0)	19,505 (71.6)	0 (0)
Missing <sup>i</sup>	5,930 (28.9)	11,791 (100)	7,616 (28.0)	15,930 (100)
<b>Body mass index, median [IQR]</b>				
Missing	26.4 [24.2, 29.2]	26.9 [24.4, 29.7]	25.5 [22.8, 29.0]	25.8 [23.0, 29.6]
Missing	268 (1.3)	491 (4.2)	880 (3.2)	801 (5.0)
<b>Design</b>				
<b>Survey year</b>				
2001	4,370 (21.3)		5,910 (21.7)	
2003	5,200 (25.4)		6,932 (25.5)	
2005	5,009 (24.4)		6,778 (24.9)	
2007/08	5,927 (28.9)		7,613 (28.0)	
2009/10		5,801 (49.2)		7,848 (49.3)
2011/12		5,990 (50.8)		8,082 (50.7)

Abbreviations: COPD = chronic obstructive pulmonary disease; IQR = interquartile range

<sup>a</sup> N and percentage unless otherwise specified

<sup>b</sup> Canadian Community Health Survey cycles conducted in 2000/01, 2003, 2005, and 2007/08

<sup>c</sup> Canadian Community Health Survey cycles conducted in 2009/10 and 2011/12

<sup>d</sup> Multilingualism cannot be derived in CCHS 2011/12

<sup>e</sup> In CCHS 2007/8, former drinkers can only be differentiated from non-drinkers in an optional module performed in only some regions; in 2009/10 and 2011/12, former drinkers cannot be differentiated from non-drinkers

<sup>f</sup> Needing help with finances was not collected in CCHS 2001

<sup>g</sup> Mood disorder not ascertained in CCHS 2001

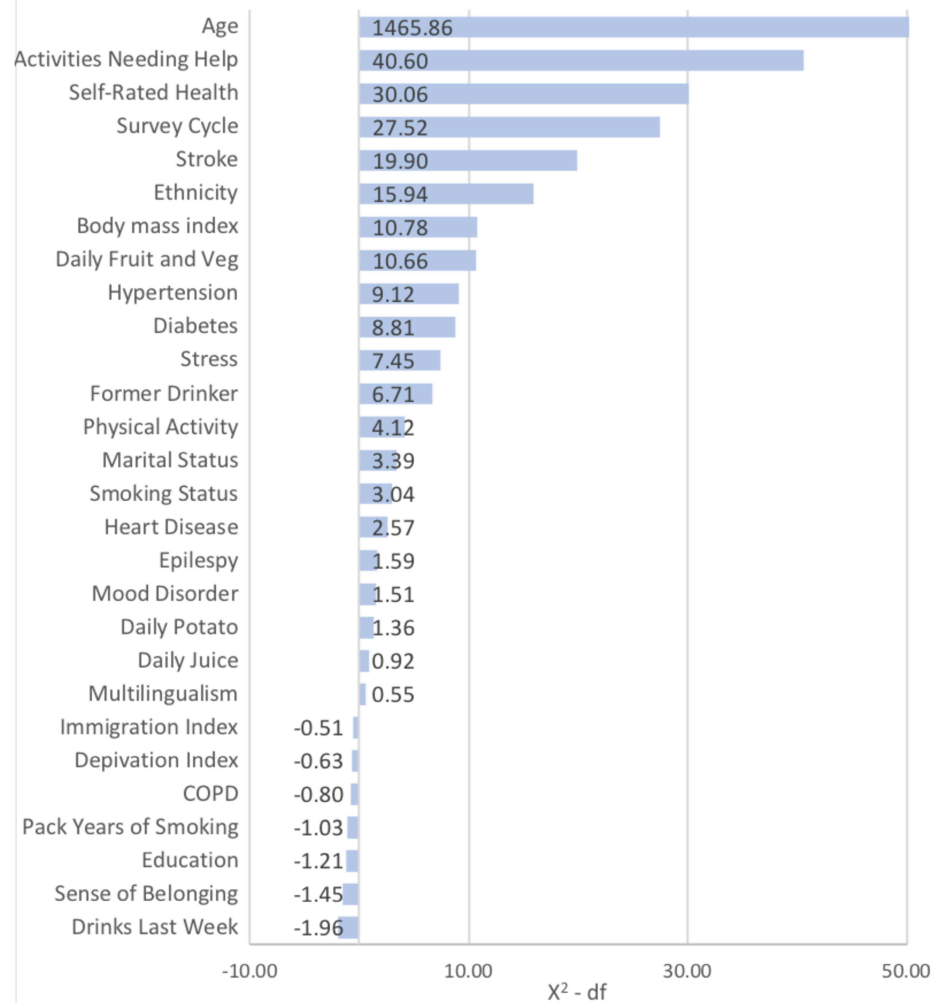
<sup>h</sup> COPD was not available for survey respondents from 2007

<sup>i</sup> Epilepsy not linked in CCHS 2007/8, 2009/10 and 2011/12

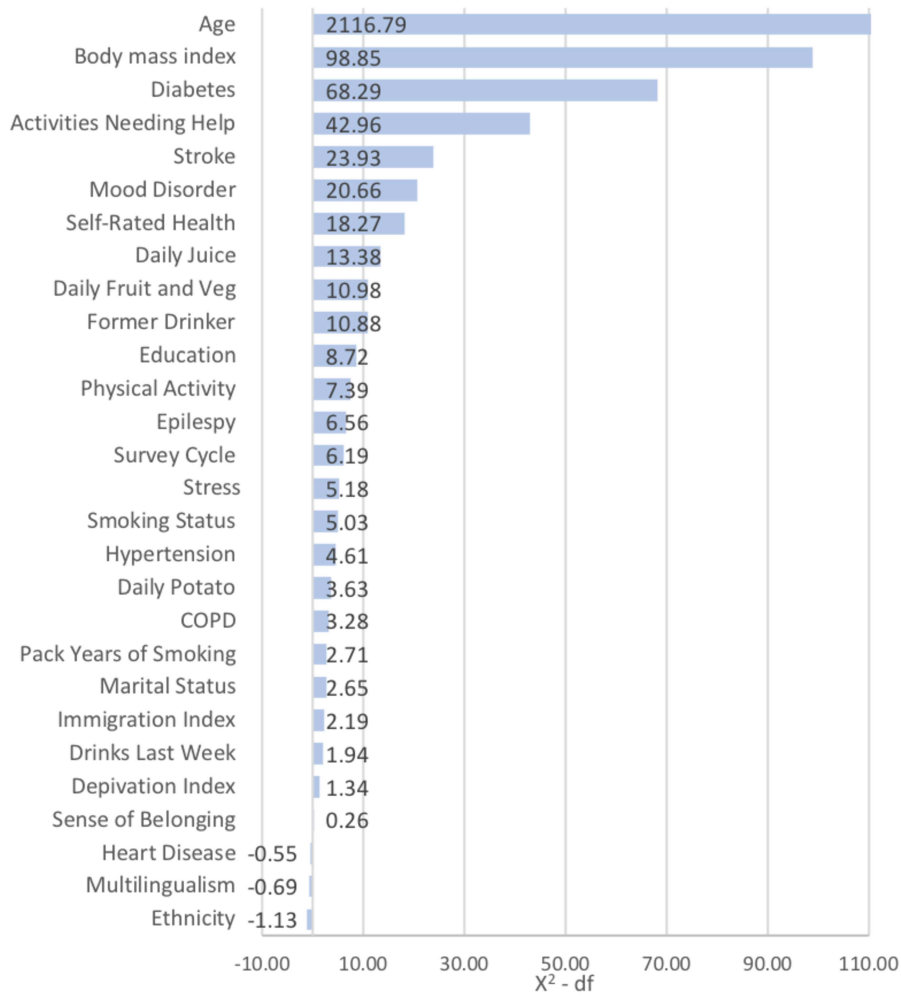
**Supplementary File 3.** Male and female partial correlation plots

- Partial correlation plots show each variable's contribution to the dementia risk calculation in the presence of the other variables
- The Wald chi square statistics, used as a measure of association for each predictor and time to dementia incidence, were penalized for degrees of freedom to level the playing field among predictors with varying degrees of freedom
- See Harrell FE. *Regression Modelling Strategies with Applications to Linear Models, Logistic Regression, and Survival Analysis*. New York: Springer; 2001

Males:



## Females:



**Supplementary File 4. DemPoRT subdistribution hazard ratios for full and reduced models – males<sup>1</sup>**

Variable	Description	sHR (95% CI)	
		Full Model	Reduced Model
AgeC_rcs1	First RCS component for age	1.21 (1.11, 1.31)	1.21 (1.11, 1.31)
AgeC_rcs2	Second RCS component for age	0.81 (0.41, 1.59)	0.80 (0.41, 1.58)
AgeC_rcs3	Third RCS component for age	1.63 (0.31, 8.56)	1.66 (0.32, 8.75)
AgeC_rcs4	Fourth RCS component for age	0.54 (0.15, 1.98)	0.53 (0.15, 1.94)
EthnSEAsian4C_cat	Ethnicity: SE Asian/Chinese/Japanese/Korean/Filipino	0.55 (0.37, 0.81)	0.54 (0.37, 0.80)
EthnOther4C_cat	Ethnicity: Other/Multiple origin/ Unknown	1.02 (0.81, 1.27)	1.02 (0.82, 1.27)
EthnSWAsian4C_cat	Ethnicity: South Asian/Arab/West Asian	0.67 (0.46, 0.98)	0.66 (0.46, 0.96)
ImmigrantC_cat	Immigrant	0.95 (0.87, 1.04)	-
EduHSGrad2C_cat	Education: High school graduate	0.99 (0.88, 1.12)	-
EduSomePS2C_cat	Education: Some post-secondary school	0.94 (0.79, 1.11)	-
EduPSGrad2C_cat	Education: Post-secondary graduate	0.95 (0.88, 1.04)	-
MSDivorcedC_cat	Marital status: Separated/Divorced	1.08 (0.94, 1.24)	-
MSWidowedC_cat	Marital status: Widowed	0.96 (0.87, 1.07)	-
MSSingleC_cat	Marital status: Single	0.92 (0.78, 1.08)	-
MultilingualC_cat	Multilingual	1.08 (1.00, 1.18)	1.07 (0.99, 1.16)
DepIndModC_cat	Deprivation: Moderate	1.02 (0.93, 1.12)	-
DepIndHighC_cat	Deprivation: High	1.06 (0.93, 1.20)	-
BelongSomeC_cat	Sense of Belonging: Somewhat strong	1.00 (0.92, 1.09)	-
BelongSWeakC_cat	Sense of Belonging: Somewhat weak	1.08 (0.96, 1.20)	-
BelongVWeakC_cat	Sense of Belonging: Very weak	1.06 (0.92, 1.23)	-
StressNotVeryC_cat	Stress: Not at all stressful	0.99 (0.90, 1.09)	0.99 (0.90, 1.09)
StressABitC_cat	Stress: A bit stressful	1.13 (1.02, 1.25)	1.13 (1.02, 1.25)
StressQuiteC_cat	Stress: Quite a bit stressful	1.25 (1.08, 1.44)	1.25 (1.09, 1.45)
StressExtremelyC_cat	Stress: Extremely stressful	1.26 (0.96, 1.65)	1.27 (0.98, 1.66)
SRHealthPoorC_cat	Self-rated health: Poor	1.03 (0.90, 1.17)	1.03 (0.91, 1.18)
SRHealthFairC_cat	Self-rated health: Fair	1.18 (1.04, 1.34)	1.19 (1.05, 1.35)
SRHealthGoodC_cat	Self-rated health: Good	1.15 (0.99, 1.33)	1.17 (1.01, 1.35)
SRHealthVGoodC_cat	Self-rated health: Very good	1.09 (0.90, 1.32)	1.11 (0.91, 1.35)
PackYearsC_rcs1	First RCS component of pack years of smoking	0.99 (0.99, 1.00)	0.99 (0.99, 1.00)
PackYearsC_rcs2	Second RCS component of pack years of smoking	1.02 (1.00, 1.03)	1.02 (1.00, 1.03)
SmokeFormer5PlusC_cat	Smoking status: Former smoker quit $\geq 5$ years ago	1.04 (0.89, 1.20)	1.04 (0.90, 1.21)
SmokeFormer0to5C_cat	Smoking status: Former smoker quit $< 5$ years ago	0.95 (0.76, 1.17)	0.95 (0.77, 1.18)
SmokeCurrentC_cat	Smoking status: Current smoker	1.08 (0.88, 1.33)	1.10 (0.90, 1.35)
DrinksLastWeekC_rcs1	First RCS component of drinks last week	0.99 (0.96, 1.01)	0.98 (0.96, 1.01)
DrinksLastWeekC_rcs2	Second RCS component of drinks last week	1.05 (0.90, 1.22)	1.06 (0.91, 1.23)
FormerDrinkerC_cat	Former drinker	1.13 (0.99, 1.29)	1.14 (0.99, 1.30)
FruitVegC_rcs1	First RCS component of daily fruit and vegetable consumption	0.94 (0.89, 1.00)	0.94 (0.89, 0.99)
FruitVegC_rcs2	Second RCS component of daily fruit and vegetable consumption	1.07 (1.01, 1.14)	1.08 (1.01, 1.15)
PotatoC_rcs1	First RCS component of daily potato consumption	0.97 (0.70, 1.34)	0.97 (0.70, 1.34)
PotatoC_rcs2	Second RCS component of daily potato consumption	1.32 (0.84, 2.06)	1.32 (0.85, 2.07)
JuiceC_rcs1	First RCS component of daily juice consumption	1.02 (0.89, 1.17)	1.02 (0.89, 1.17)
JuiceC_rcs2	Second RCS component of daily juice consumption	1.06 (0.94, 1.19)	1.06 (0.94, 1.18)
PhysicalActivityC_rcs1	First RCS component of daily physical activity	0.95 (0.89, 1.01)	0.95 (0.89, 1.01)
PhysicalActivityC_rcs2	Second RCS component of daily physical activity	1.04 (0.96, 1.12)	1.04 (0.97, 1.12)

HeartDisC_cat	Heart disease	0.87 (0.76, 1.00)	0.87 (0.76, 1.00)
StrokeC_cat	Stroke	1.51 (1.20, 1.91)	1.55 (1.23, 1.95)
DiabetesC_cat	Diabetes	1.16 (1.01, 1.32)	1.16 (1.01, 1.32)
MoodC_cat	Mood disorder	1.19 (0.99, 1.44)	1.21 (1.00, 1.45)
HypertensionC_cat	Hypertension	0.92 (0.83, 1.03)	0.92 (0.83, 1.02)
COPDC_cat	COPD	0.91 (0.75, 1.10)	0.91 (0.75, 1.11)
EpilepsyC_cat	Epilepsy	1.55 (0.92, 2.60)	-
BMIC_rcs1	First RCS component of body mass index	0.98 (0.96, 1.00)	0.98 (0.96, 1.00)
BMIC_rcs2	Second RCS component of body mass index	1.01 (0.98, 1.04)	1.01 (0.98, 1.04)
NeedHelp1C_cat	Need help with one functional activity	1.56 (1.29, 1.90)	1.57 (1.29, 1.90)
NeedHelp2C_cat	Need help with two functional activities	1.22 (0.86, 1.73)	1.22 (0.87, 1.73)
NeedHelp3C_cat	Need help with three functional activities	1.39 (0.99, 1.96)	1.40 (0.99, 1.97)
NeedHelp4C_cat	Need help with four functional activities	1.61 (1.08, 2.41)	1.61 (1.08, 2.40)
NeedHelp5C_cat	Need help with five functional activities	2.25 (1.55, 3.27)	2.26 (1.56, 3.28)
NeedHelp6C_cat	Need help with six functional activities	1.25 (0.72, 2.17)	1.27 (0.73, 2.20)
SurveyCycle2C_cat	Survey year: 2003	0.85 (0.76, 0.94)	0.84 (0.76, 0.94)
SurveyCycle3C_cat	Survey year: 2005	0.88 (0.79, 0.99)	0.88 (0.79, 0.98)
SurveyCycle4C_cat	Survey year: 2007/08	0.62 (0.55, 0.70)	0.62 (0.55, 0.70)
SurveyCycle5C_cat	Survey year: 2009/10	0.66 (0.58, 0.75)	0.65 (0.57, 0.74)
SurveyCycle6C_cat	Survey year: 2011/12	0.59 (0.51, 0.68)	0.59 (0.51, 0.68)
AgeCXPackYearsC_int	Interaction between age and pack years of smoking	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXSmokeFormer5PlusC_int	Interaction between age and former smoker quit $\geq 5$ years	0.99 (0.98, 1.01)	0.99 (0.98, 1.01)
AgeCXSmokeFormer0to5C_int	Interaction between age and former smoker quit $< 5$ years	0.99 (0.97, 1.02)	0.99 (0.97, 1.02)
AgeCXSmokeCurrentC_int	Interaction between age and current smoker	0.99 (0.97, 1.01)	0.99 (0.97, 1.01)
AgeCXDrinksLastWeekC_int	Interaction between age and drinks last week	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXFormerDrinkerC_int	Interaction between age and former drinker	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
AgeCXFruitVegC_int	Interaction between age and daily fruit and vegetable consumption	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXJuiceC_int	Interaction between age and daily juice consumption	0.99 (0.98, 1.00)	0.99 (0.98, 1.00)
AgeCXPotatoC_int	Interaction between age and daily potato consumption	0.99 (0.97, 1.00)	0.99 (0.97, 1.00)
AgeCXPhysicalActivityC_int	Interaction between age and physical activity	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXHeartDisC_int	Interaction between age and health disease	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
AgeCXStrokeC_int	Interaction between age and stroke	1.00 (0.97, 1.02)	0.99 (0.97, 1.02)
AgeCXDiabetesC_int	Interaction between age and diabetes	0.99 (0.98, 1.00)	0.99 (0.98, 1.00)
AgeCXMoodC_int	Interaction between age and mood disorder	0.99 (0.97, 1.01)	0.99 (0.97, 1.01)
AgeCXHypertensionC_int	Interaction between age and hypertension	0.99 (0.98, 1.00)	0.99 (0.98, 1.00)
AgeCXCOPDC_int	Interaction between age and COPD	0.99 (0.97, 1.01)	0.99 (0.97, 1.01)
AgeCXEpilepsyC_int	Interaction between age and epilepsy	1.00 (0.93, 1.07)	-
AgeCXBMIC_int	Interaction between age and body mass index	1.00 (1.00, 1.00)	0.98 (0.96, 1.00)
AgeCXNeedHelp1C_int	Interaction between age and need help with one activity	0.98 (0.96, 1.00)	0.99 (0.97, 1.02)
AgeCXNeedHelp2C_int	Interaction between age and need help with two activities	0.99 (0.97, 1.02)	0.99 (0.96, 1.01)
AgeCXNeedHelp3C_int	Interaction between age and need help with three activities	0.99 (0.96, 1.01)	0.97 (0.93, 1.00)
AgeCXNeedHelp4C_int	Interaction between age and need help with four activities	0.96 (0.93, 1.00)	0.96 (0.94, 0.99)
AgeCXNeedHelp5C_int	Interaction between age and need help with five activities	0.96 (0.94, 0.99)	0.97 (0.93, 1.01)
AgeCXNeedHelp6C_int	Interaction between age and need help with six activities	0.97 (0.93, 1.02)	0.98 (0.96, 1.00)

<sup>1</sup> All variables are centered on their means

Abbreviations: CI: confidence interval; COPD= chronic obstructive pulmonary disease; RCS= restricted cubic spline; sHR= subdistribution hazard ratio

**Supplementary File 5. DemPoRT subdistribution hazard ratios for full and reduced models – females<sup>1</sup>**

Variable	Description	sHR (95% CI)	
		Full Model	Reduced Model
AgeC_rcs1	First RCS component for age	1.28 (1.20, 1.36)	1.28 (1.20, 1.36)
AgeC_rcs2	Second RCS component for age	0.55 (0.34, 0.87)	0.55 (0.34, 0.87)
AgeC_rcs3	Third RCS component for age	3.04 (1.17, 7.89)	3.02 (1.17, 7.83)
AgeC_rcs4	Fourth RCS component for age	0.43 (0.21, 0.88)	0.43 (0.21, 0.88)
EthnSEAsian4C_cat	Ethnicity: SE Asian/Chinese/Japanese/Korean/Filipino	0.92 (0.71, 1.19)	1.28 (1.20, 1.36)
EthnOther4C_cat	Ethnicity: Other/Multiple origin/ Unknown	1.02 (0.86, 1.22)	-
EthnSWAsian4C_cat	Ethnicity: South Asian/Arab/West Asian	1.13 (0.84, 1.53)	-
ImmigrantC_cat	Immigrant	0.96 (0.90, 1.03)	-
EduHSGrad2C_cat	Education: High school graduate	0.94 (0.87, 1.02)	0.94 (0.87, 1.01)
EduSomePS2C_cat	Education: Some post-secondary school	0.89 (0.78, 1.01)	0.88 (0.77, 1.00)
EduPSGrad2C_cat	Education: Post-secondary graduate	0.90 (0.84, 0.97)	0.90 (0.84, 0.96)
MSDivorcedC_cat	Marital status: Separated/Divorced	1.11 (0.99, 1.23)	1.11 (1.00, 1.24)
MSWidowedC_cat	Marital status: Widowed	1.05 (0.98, 1.13)	1.06 (0.99, 1.13)
MSSingleC_cat	Marital status: Single	1.08 (0.94, 1.25)	1.09 (0.95, 1.26)
MultilingualC_cat	Multilingual	1.03 (0.96, 1.10)	-
DepIndModC_cat	Deprivation: Moderate	1.01 (0.93, 1.09)	-
DepIndHighC_cat	Deprivation: High	1.02 (0.93, 1.13)	-
BelongSomeC_cat	Sense of Belonging: Somewhat strong	0.98 (0.92, 1.05)	-
BelongSWeakC_cat	Sense of Belonging: Somewhat weak	1.05 (0.97, 1.14)	-
BelongVWeakC_cat	Sense of Belonging: Very weak	1.04 (0.93, 1.16)	-
StressNotVeryC_cat	Stress: Not at all stressful	0.93 (0.86, 1.00)	0.93 (0.86, 1.00)
StressABitC_cat	Stress: A bit stressful	1.01 (0.94, 1.09)	1.02 (0.95, 1.10)
StressQuiteC_cat	Stress: Quite a bit stressful	1.05 (0.95, 1.17)	1.08 (0.97, 1.19)
StressExtremelyC_cat	Stress: Extremely stressful	1.10 (0.91, 1.33)	1.13 (0.94, 1.36)
SRHealthPoorC_cat	Self-rated health: Poor	1.00 (0.90, 1.10)	-
SRHealthFairC_cat	Self-rated health: Fair	1.00 (0.91, 1.10)	-
SRHealthGoodC_cat	Self-rated health: Good	1.08 (0.96, 1.20)	-
SRHealthVGoodC_cat	Self-rated health: Very good	1.07 (0.92, 1.24)	-
PackYearsC_rcs1	First RCS component of pack years of smoking	1.01 (0.99, 1.02)	1.01 (1.00, 1.02)
PackYearsC_rcs2	Second RCS component of pack years of smoking	0.95 (0.88, 1.02)	0.95 (0.88, 1.02)
SmokeFormer5PlusC_cat	Smoking status: Former smoker quit ≥5 years ago	1.03 (0.92, 1.15)	1.03 (0.92, 1.15)
SmokeFormer0to5C_cat	Smoking status: Former smoker quit <5 years ago	1.04 (0.88, 1.22)	1.04 (0.88, 1.23)
SmokeCurrentC_cat	Smoking status: Current smoker	1.13 (0.94, 1.35)	1.13 (0.95, 1.36)
DrinksLastWeekC_rcs1	First RCS component of drinks last week	0.97 (0.94, 1.01)	0.97 (0.93, 1.01)
DrinksLastWeekC_rcs2	Second RCS component of drinks last week	1.03 (0.97, 1.09)	1.03 (0.97, 1.09)
FormerDrinkerC_cat	Former drinker	1.14 (1.04, 1.25)	1.14 (1.04, 1.25)
FruitVegC_rcs1	First RCS component of daily fruit and vegetable consumption	0.94 (0.90, 0.97)	0.94 (0.90, 0.97)
FruitVegC_rcs2	Second RCS component of daily fruit and vegetable consumption	1.04 (1.00, 1.08)	1.04 (1.00, 1.09)
PotatoC_rcs1	First RCS component of daily potato consumption	1.11 (0.87, 1.40)	1.10 (0.87, 1.39)
PotatoC_rcs2	Second RCS component of daily potato consumption	1.12 (0.81, 1.57)	1.13 (0.81, 1.58)
JuiceC_rcs1	First RCS component of daily juice consumption	1.19 (1.08, 1.30)	1.18 (1.08, 1.30)
JuiceC_rcs2	Second RCS component of daily juice consumption	0.96 (0.88, 1.05)	0.96 (0.88, 1.05)
PhysicalActivityC_rcs1	First RCS component of daily physical activity	0.96 (0.91, 1.02)	0.95 (0.90, 1.01)
PhysicalActivityC_rcs2	Second RCS component of daily physical activity	1.06 (0.98, 1.14)	1.07 (0.99, 1.15)

HeartDisC_cat	Heart disease	1.06 (0.95, 1.17)	1.07 (0.96, 1.19)
StrokeC_cat	Stroke	1.43 (1.19, 1.73)	1.45 (1.20, 1.74)
DiabetesC_cat	Diabetes	1.49 (1.34, 1.67)	1.51 (1.35, 1.68)
MoodC_cat	Mood disorder	1.34 (1.19, 1.51)	1.36 (1.20, 1.53)
HypertensionC_cat	Hypertension	0.99 (0.91, 1.08)	1.00 (0.92, 1.08)
COPDC_cat	COPD	0.82 (0.72, 0.95)	0.83 (0.73, 0.96)
EpilepsyC_cat	Epilepsy	1.43 (1.01, 2.03)	1.43 (1.01, 2.03)
BMIC_rcs1	First RCS component of body mass index	0.96 (0.95, 0.97)	0.96 (0.94, 0.97)
BMIC_rcs2	Second RCS component of body mass index	1.02 (1.00, 1.04)	1.02 (1.00, 1.04)
NeedHelp1C_cat	Need help with one functional activity	1.27 (1.13, 1.44)	1.30 (1.15, 1.46)
NeedHelp2C_cat	Need help with two functional activities	1.45 (1.23, 1.70)	1.48 (1.26, 1.74)
NeedHelp3C_cat	Need help with three functional activities	1.56 (1.28, 1.89)	1.61 (1.33, 1.94)
NeedHelp4C_cat	Need help with four functional activities	1.54 (1.19, 1.98)	1.59 (1.24, 2.05)
NeedHelp5C_cat	Need help with five functional activities	1.35 (0.97, 1.89)	1.39 (1.00, 1.94)
NeedHelp6C_cat	Need help with six functional activities	1.82 (1.32, 2.51)	1.87 (1.36, 2.57)
SurveyCycle2C_cat	Survey year: 2003	1.02 (0.94, 1.10)	1.02 (0.94, 1.10)
SurveyCycle3C_cat	Survey year: 2005	0.87 (0.80, 0.95)	0.87 (0.80, 0.94)
SurveyCycle4C_cat	Survey year: 2007/08	0.80 (0.73, 0.87)	0.79 (0.72, 0.87)
SurveyCycle5C_cat	Survey year: 2009/10	0.70 (0.63, 0.77)	0.69 (0.63, 0.77)
SurveyCycle6C_cat	Survey year: 2011/12	0.63 (0.56, 0.71)	0.63 (0.56, 0.70)
AgeCXPackYearsC_int	Interaction between age and pack years of smoking	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXSmokeFormer5PlusC_int	Interaction between age and former smoker quit $\geq 5$ years	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
AgeCXSmokeFormer0to5C_int	Interaction between age and former smoker quit $< 5$ years	0.99 (0.98, 1.01)	0.99 (0.98, 1.01)
AgeCXSmokeCurrentC_int	Interaction between age and current smoker	0.99 (0.97, 1.00)	0.99 (0.97, 1.00)
AgeCXDrinksLastWeekC_int	Interaction between age and drinks last week	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXFormerDrinkerC_int	Interaction between age and former drinker	0.99 (0.99, 1.00)	0.99 (0.99, 1.00)
AgeCXFruitVegC_int	Interaction between age and daily fruit and vegetable consumption	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXJuiceC_int	Interaction between age and daily juice consumption	0.99 (0.99, 1.00)	0.99 (0.99, 1.00)
AgeCXPotatoC_int	Interaction between age and daily potato consumption	0.99 (0.98, 1.00)	0.99 (0.98, 1.00)
AgeCXPhysicalActivityC_int	Interaction between age and physical activity	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXHeartDisC_int	Interaction between age and health disease	0.98 (0.97, 0.99)	0.98 (0.97, 0.99)
AgeCXStrokeC_int	Interaction between age and stroke	1.00 (0.98, 1.02)	1.00 (0.98, 1.02)
AgeCXDiabetesC_int	Interaction between age and diabetes	0.98 (0.96, 0.99)	0.98 (0.96, 0.99)
AgeCXMoodC_int	Interaction between age and mood disorder	1.00 (0.98, 1.01)	1.00 (0.98, 1.01)
AgeCXHypertensionC_int	Interaction between age and hypertension	0.99 (0.98, 0.99)	0.99 (0.98, 0.99)
AgeCXCOPDC_int	Interaction between age and COPD	0.99 (0.98, 1.01)	0.99 (0.98, 1.01)
AgeCXEpilepsyC_int	Interaction between age and epilepsy	0.97 (0.93, 1.00)	0.97 (0.93, 1.00)
AgeCXBMIC_int	Interaction between age and body mass index	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
AgeCXNeedHelp1C_int	Interaction between age and need help with one activity	0.98 (0.97, 0.99)	0.98 (0.97, 0.99)
AgeCXNeedHelp2C_int	Interaction between age and need help with two activities	0.98 (0.97, 1.00)	0.98 (0.97, 1.00)
AgeCXNeedHelp3C_int	Interaction between age and need help with three activities	0.96 (0.95, 0.98)	0.96 (0.95, 0.98)
AgeCXNeedHelp4C_int	Interaction between age and need help with four activities	0.98 (0.96, 0.99)	0.97 (0.96, 0.99)
AgeCXNeedHelp5C_int	Interaction between age and need help with five activities	0.98 (0.95, 1.00)	0.98 (0.95, 1.00)
AgeCXNeedHelp6C_int	Interaction between age and need help with six activities	0.94 (0.92, 0.96)	0.94 (0.92, 0.96)

<sup>1</sup> All variables are centered on their means

Abbreviations: CI: confidence interval; COPD= chronic obstructive pulmonary disease; RCS= restricted cubic spline; sHR= subdistribution hazard ratio



**Supplementary File 6.** DemPoRT reduced male and female formulas for risk**DemPoRT formula for 5-year risk of dementia:**

$$5 \text{ year dementia risk} = 1 - \exp(- (h_0(5 \text{ years}) * \exp(\text{Score})))$$

**5 year baseline hazards:**

$$h_0(5 \text{ years})_{\text{male}} = 0.03026372$$

$$h_0(5 \text{ years})_{\text{female}} = 0.08718073$$

**Beta coefficients:**

Available at <https://github.com/Big-Life-Lab/DemPoRT>

**Male DemPoRT risk score:**

$$\begin{aligned} \text{Score}_{\text{male}} = & (\beta_{\text{AgeC\_rcs1}} * \text{AgeC\_rcs1}) + (\beta_{\text{AgeC\_rcs2}} * \text{AgeC\_rcs2}) + (\beta_{\text{AgeC\_rcs3}} * \text{AgeC\_rcs3}) + (\beta_{\text{AgeC\_rcs4}} * \\ & \text{AgeC\_rcs4}) + (\beta_{\text{EthnSEAsian4C\_cat}} * \text{EthnSEAsian4C\_cat}) + (\beta_{\text{EthnOther4C\_cat}} * \text{EthnOther4C\_cat}) \\ & + (\beta_{\text{EthnSWAsian4C\_cat}} * \text{EthnSWAsian4C\_cat}) + (\beta_{\text{MultilingualC\_cat}} * \text{MultilingualC\_cat}) + \\ & (\beta_{\text{StressNotVeryC\_cat}} * \text{StressNotVeryC\_cat}) + (\beta_{\text{StressABitC\_cat}} * \text{StressABitC\_cat}) + (\beta_{\text{StressQuiteC\_cat}} * \\ & \text{StressQuiteC\_cat}) + (\beta_{\text{StressExtremelyC\_cat}} * \text{StressExtremelyC\_cat}) + (\beta_{\text{SRHealthPoorC\_cat}} * \\ & \text{SRHealthPoorC\_cat}) + (\beta_{\text{SRHealthFairC\_cat}} * \text{SRHealthFairC\_cat}) + (\beta_{\text{SRHealthGoodC\_cat}} * \\ & \text{SRHealthGoodC\_cat}) + (\beta_{\text{SRHealthVGoodC\_cat}} * \text{SRHealthVGoodC\_cat}) + (\beta_{\text{PackYearsC\_rcs1}} * \\ & \text{PackYearsC\_rcs1}) + (\beta_{\text{PackYearsC\_rcs2}} * \text{PackYearsC\_rcs2}) + (\beta_{\text{SmokeFormer5PlusC\_cat}} * \\ & \text{SmokeFormer5PlusC\_cat}) + (\beta_{\text{SmokeFormer0to5C\_cat}} * \text{SmokeFormer0to5C\_cat}) + \\ & (\beta_{\text{SmokeCurrentC\_cat}} * \text{SmokeCurrentC\_cat}) + (\beta_{\text{DrinksLastWeekC\_rcs1}} * \text{DrinksLastWeekC\_rcs1}) + \\ & (\beta_{\text{DrinksLastWeekC\_rcs2}} * \text{DrinksLastWeekC\_rcs2}) + (\beta_{\text{FormerDrinkerC\_cat}} * \text{FormerDrinkerC\_cat}) + \\ & (\beta_{\text{FruitVegC\_rcs1}} * \text{FruitVegC\_rcs1}) + (\beta_{\text{FruitVegC\_rcs2}} * \text{FruitVegC\_rcs2}) + (\beta_{\text{PotatoC\_rcs1}} * \\ & \text{PotatoC\_rcs1}) + (\beta_{\text{PotatoC\_rcs2}} * \text{PotatoC\_rcs2}) + (\beta_{\text{JuiceC\_rcs1}} * \text{JuiceC\_rcs1}) + (\beta_{\text{JuiceC\_rcs2}} * \\ & \text{JuiceC\_rcs2}) + (\beta_{\text{PhysicalActivityC\_rcs1}} * \text{PhysicalActivityC\_rcs1}) + (\beta_{\text{PhysicalActivityC\_rcs2}} * \\ & \text{PhysicalActivityC\_rcs2}) + (\beta_{\text{HeartDisC\_cat}} * \text{HeartDisC\_cat}) + (\beta_{\text{StrokeC\_cat}} * \text{StrokeC\_cat}) + \\ & (\beta_{\text{DiabetesC\_cat}} * \text{DiabetesC\_cat}) + (\beta_{\text{MoodC\_cat}} * \text{MoodC\_cat}) + (\beta_{\text{HypertensionC\_cat}} * \\ & \text{HypertensionC\_cat}) + (\beta_{\text{COPDC\_cat}} * \text{COPDC\_cat}) + (\beta_{\text{BMIC\_rcs1}} * \text{BMIC\_rcs1}) + (\beta_{\text{BMIC\_rcs2}} * \\ & \text{BMIC\_rcs2}) + (\beta_{\text{NeedHelp1C\_cat}} * \text{NeedHelp1C\_cat}) + (\beta_{\text{NeedHelp2C\_cat}} * \text{NeedHelp2C\_cat}) + \\ & (\beta_{\text{NeedHelp3C\_cat}} * \text{NeedHelp3C\_cat}) + (\beta_{\text{NeedHelp4C\_cat}} * \text{NeedHelp4C\_cat}) + (\beta_{\text{NeedHelp5C\_cat}} * \\ & \text{NeedHelp5C\_cat}) + (\beta_{\text{NeedHelp6C\_cat}} * \text{NeedHelp6C\_cat}) + (\beta_{\text{SurveyCycle2C\_cat}} * \\ & \text{SurveyCycle2C\_cat}) + (\beta_{\text{SurveyCycle3C\_cat}} * \text{SurveyCycle3C\_cat}) + (\beta_{\text{SurveyCycle4C\_cat}} * \\ & \text{SurveyCycle4C\_cat}) + (\beta_{\text{SurveyCycle5C\_cat}} * \text{SurveyCycle5C\_cat}) + (\beta_{\text{SurveyCycle6C\_cat}} * \\ & \text{SurveyCycle6C\_cat}) + (\beta_{\text{AgeCXPackYearsC\_int}} * \text{AgeCXPackYearsC\_int}) + \\ & (\beta_{\text{AgeCXSmokeFormer5PlusC\_int}} * \text{AgeCXSmokeFormer5PlusC\_int}) + (\beta_{\text{AgeCXSmokeFormer0to5C\_int}} * \\ & \text{AgeCXSmokeFormer0to5C\_int}) + (\beta_{\text{AgeCXSmokeCurrentC\_int}} * \text{AgeCXSmokeCurrentC\_int}) + \\ & + (\beta_{\text{AgeCXDrinksLastWeekC\_int}} * \text{AgeCXDrinksLastWeekC\_int}) + (\beta_{\text{AgeCXFruitVegC\_int}} * \\ & \text{AgeCXFruitVegC\_int}) + (\beta_{\text{AgeCXPotatoC\_int}} * \text{AgeCXPotatoC\_int}) + (\beta_{\text{AgeCXJuiceC\_int}} * \\ & \text{AgeCXJuiceC\_int}) + (\beta_{\text{AgeCXPhysicalActivityC\_int}} * \text{AgeCXPhysicalActivityC\_int}) + \\ & (\beta_{\text{AgeCXHeartDisC\_int}} * \text{AgeCXHeartDisC\_int}) + (\beta_{\text{AgeCXStrokeC\_int}} * \text{AgeCXStrokeC\_int}) + \\ & (\beta_{\text{AgeCXDiabetesC\_int}} * \text{AgeCXDiabetesC\_int}) + (\beta_{\text{AgeCXMoodC\_int}} * \text{AgeCXMoodC\_int}) + \end{aligned}$$



$$\begin{aligned}
 & (\beta_{\text{AgeCXHypertensionC\_int}} * \text{AgeCXHypertensionC\_int}) + (\beta_{\text{AgeCXCOPDC\_int}} * \text{AgeCXCOPDC\_int}) + \\
 & (\beta_{\text{AgeCXBMIC\_int}} * \text{AgeCXBMIC\_int}) + (\beta_{\text{AgeCXNeedHelp1C\_int}} * \text{AgeCXNeedHelp1C\_int}) + \\
 & (\beta_{\text{AgeCXNeedHelp2C\_int}} * \text{AgeCXNeedHelp2C\_int}) + (\beta_{\text{AgeCXNeedHelp3C\_int}} * \\
 & \text{AgeCXNeedHelp3C\_int}) + (\beta_{\text{AgeCXNeedHelp4C\_int}} * \text{AgeCXNeedHelp4C\_int}) + \\
 & (\beta_{\text{AgeCXNeedHelp5C\_int}} * \text{AgeCXNeedHelp5C\_int}) + (\beta_{\text{AgeCXNeedHelp6C\_int}} * \\
 & \text{AgeCXNeedHelp6C\_int})
 \end{aligned}$$

**Female DemPoRT risk score:**

*Score<sub>female</sub>* =

$$\begin{aligned}
 & (\beta_{\text{AgeC\_rcs1}} * \text{AgeC\_rcs1}) + (\beta_{\text{AgeC\_rcs2}} * \text{AgeC\_rcs2}) + (\beta_{\text{AgeC\_rcs3}} * \text{AgeC\_rcs3}) + (\beta_{\text{AgeC\_rcs4}} * \\
 & \text{AgeC\_rcs4}) + (\beta_{\text{EduHSGrad2C\_cat}} * \text{EduHSGrad2C\_cat}) + (\beta_{\text{EduSomePS2C\_cat}} * \\
 & \text{EduSomePS2C\_cat}) + (\beta_{\text{EduPSGrad2C\_cat}} * \text{EduPSGrad2C\_cat}) + (\beta_{\text{MSDivorcedC\_cat}} * \\
 & \text{MSDivorcedC\_cat}) + (\beta_{\text{MSWidowedC\_cat}} * \text{MSWidowedC\_cat}) + (\beta_{\text{MSSingleC\_cat}} * \\
 & \text{MSSingleC\_cat}) + (\beta_{\text{StressNotVeryC\_cat}} * \text{StressNotVeryC\_cat}) + (\beta_{\text{StressABitC\_cat}} * \\
 & \text{StressABitC\_cat}) + (\beta_{\text{StressQuiteC\_cat}} * \text{StressQuiteC\_cat}) + (\beta_{\text{StressExtreamlyC\_cat}} * \\
 & \text{StressExtreamlyC\_cat}) + (\beta_{\text{PackYearsC\_rcs1}} * \text{PackYearsC\_rcs1}) + (\beta_{\text{PackYearsC\_rcs2}} * \\
 & \text{PackYearsC\_rcs2}) + (\beta_{\text{SmokeFormer5PlusC\_cat}} * \text{SmokeFormer5PlusC\_cat}) + (\beta_{\text{SmokeFormer0to5C\_cat}} * \\
 & \text{SmokeFormer0to5C\_cat}) + (\beta_{\text{SmokeCurrentC\_cat}} * \text{SmokeCurrentC\_cat}) + (\beta_{\text{DrinksLastWeekC\_rcs1}} * \\
 & \text{DrinksLastWeekC\_rcs1}) + (\beta_{\text{DrinksLastWeekC\_rcs2}} * \text{DrinksLastWeekC\_rcs2}) + (\beta_{\text{FormerDrinkerC\_cat}} * \\
 & \text{FormerDrinkerC\_cat}) + (\beta_{\text{FruitVegC\_rcs1}} * \text{FruitVegC\_rcs1}) + (\beta_{\text{FruitVegC\_rcs2}} * \text{FruitVegC\_rcs2}) \\
 & + (\beta_{\text{PotatoC\_rcs1}} * \text{PotatoC\_rcs1}) + (\beta_{\text{PotatoC\_rcs2}} * \text{PotatoC\_rcs2}) + (\beta_{\text{JuiceC\_rcs1}} * \text{JuiceC\_rcs1}) + \\
 & (\beta_{\text{JuiceC\_rcs2}} * \text{JuiceC\_rcs2}) + (\beta_{\text{PhysicalActivityC\_rcs1}} * \text{PhysicalActivityC\_rcs1}) + (\beta_{\text{PhysicalActivityC\_rcs2}} * \\
 & \text{PhysicalActivityC\_rcs2}) + (\beta_{\text{HeartDisC\_cat}} * \text{HeartDisC\_cat}) + (\beta_{\text{StrokeC\_cat}} * \text{StrokeC\_cat}) + \\
 & (\beta_{\text{DiabetesC\_cat}} * \text{DiabetesC\_cat}) + (\beta_{\text{MoodC\_cat}} * \text{MoodC\_cat}) + (\beta_{\text{HypertensionC\_cat}} * \\
 & \text{HypertensionC\_cat}) + (\beta_{\text{COPDC\_cat}} * \text{COPDC\_cat}) + (\beta_{\text{EpilepsyC\_cat}} * \text{EpilepsyC\_cat}) + \\
 & (\beta_{\text{BMIC\_rcs1}} * \text{BMIC\_rcs1}) + (\beta_{\text{BMIC\_rcs2}} * \text{BMIC\_rcs2}) + (\beta_{\text{NeedHelp1C\_cat}} * \text{NeedHelp1C\_cat}) + \\
 & (\beta_{\text{NeedHelp2C\_cat}} * \text{NeedHelp2C\_cat}) + (\beta_{\text{NeedHelp3C\_cat}} * \text{NeedHelp3C\_cat}) + (\beta_{\text{NeedHelp4C\_cat}} * \\
 & \text{NeedHelp4C\_cat}) + (\beta_{\text{NeedHelp5C\_cat}} * \text{NeedHelp5C\_cat}) + (\beta_{\text{NeedHelp6C\_cat}} * \text{NeedHelp6C\_cat}) \\
 & + (\beta_{\text{SurveyCycle2C\_cat}} * \text{SurveyCycle2C\_cat}) + (\beta_{\text{SurveyCycle3C\_cat}} * \text{SurveyCycle3C\_cat}) + \\
 & (\beta_{\text{SurveyCycle4C\_cat}} * \text{SurveyCycle4C\_cat}) + (\beta_{\text{SurveyCycle5C\_cat}} * \text{SurveyCycle5C\_cat}) + \\
 & (\beta_{\text{SurveyCycle6C\_cat}} * \text{SurveyCycle6C\_cat}) + (\beta_{\text{AgeCXPackYearsC\_int}} * \text{AgeCXPackYearsC\_int}) + \\
 & (\beta_{\text{AgeCXSmokeFormer5PlusC\_int}} * \text{AgeCXSmokeFormer5PlusC\_int}) + (\beta_{\text{AgeCXSmokeFormer0to5C\_int}} * \\
 & \text{AgeCXSmokeFormer0to5C\_int}) + (\beta_{\text{AgeCXSmokeCurrentC\_int}} * \text{AgeCXSmokeCurrentC\_int}) + \\
 & (\beta_{\text{AgeCXDrinksLastWeekC\_int}} * \text{AgeCXDrinksLastWeekC\_int}) + (\beta_{\text{AgeCXFruitVegC\_int}} * \\
 & \text{AgeCXFruitVegC\_int}) + (\beta_{\text{AgeCXPotatoC\_int}} * \text{AgeCXPotatoC\_int}) + (\beta_{\text{AgeCXJuiceC\_int}} * \\
 & \text{AgeCXJuiceC\_int}) + (\beta_{\text{AgeCXPhysicalActivityC\_int}} * \text{AgeCXPhysicalActivityC\_int}) + \\
 & (\beta_{\text{AgeCXHeartDisC\_int}} * \text{AgeCXHeartDisC\_int}) + (\beta_{\text{AgeCXStrokeC\_int}} * \text{AgeCXStrokeC\_int}) + \\
 & (\beta_{\text{AgeCXDiabetesC\_int}} * \text{AgeCXDiabetesC\_int}) + (\beta_{\text{AgeCXMoodC\_int}} * \text{AgeCXMoodC\_int}) + \\
 & (\beta_{\text{AgeCXHypertensionC\_int}} * \text{AgeCXHypertensionC\_int}) + (\beta_{\text{AgeCXCOPDC\_int}} * \text{AgeCXCOPDC\_int}) + \\
 & (\beta_{\text{AgeCXEpilepsyC\_int}} * \text{AgeCXEpilepsyC\_int}) + (\beta_{\text{AgeCXBMIC\_int}} * \text{AgeCXBMIC\_int}) + \\
 & (\beta_{\text{AgeCXNeedHelp1C\_int}} * \text{AgeCXNeedHelp1C\_int}) + (\beta_{\text{AgeCXNeedHelp2C\_int}} * \\
 & \text{AgeCXNeedHelp2C\_int}) + (\beta_{\text{AgeCXNeedHelp3C\_int}} * \text{AgeCXNeedHelp3C\_int}) + \\
 & (\beta_{\text{AgeCXNeedHelp4C\_int}} * \text{AgeCXNeedHelp4C\_int}) + (\beta_{\text{AgeCXNeedHelp5C\_int}} * \\
 & \text{AgeCXNeedHelp5C\_int}) + (\beta_{\text{AgeCXNeedHelp6C\_int}} * \text{AgeCXNeedHelp6C\_int})
 \end{aligned}$$

**Components of restricted cubic spline with  $j = 1 \dots k$  knots:**

$$X_{\text{rcs}1} = X$$

$$X_{\text{rcs}_{j+1}} = \left( \frac{(X - \text{knot}_j)}{(\text{knot}_k - \text{knot}_1)^{2/3}} \right)_+^3 + (\text{knot}_{k-1} - \text{knot}_j) \left( \frac{(X - \text{knot}_k)}{(\text{knot}_k - \text{knot}_1)^{2/3}} \right)_+^3 - (\text{knot}_k - \text{knot}_j) \left( \frac{X - \text{knot}_{k-1}}{(\text{knot}_k - \text{knot}_1)^{2/3}} \right)_+^3 / (\text{knot}_k - \text{knot}_{k-1})$$

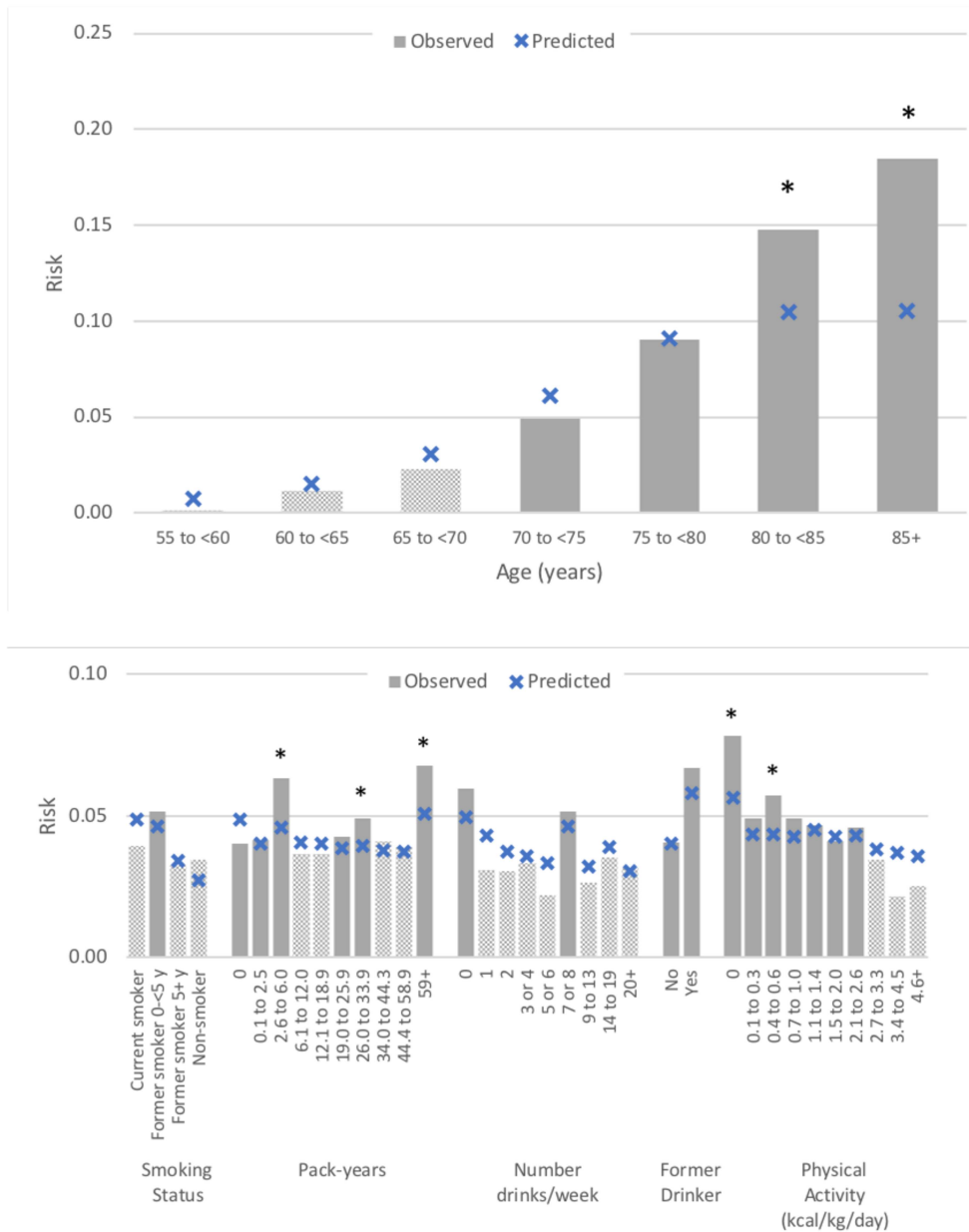
Where:

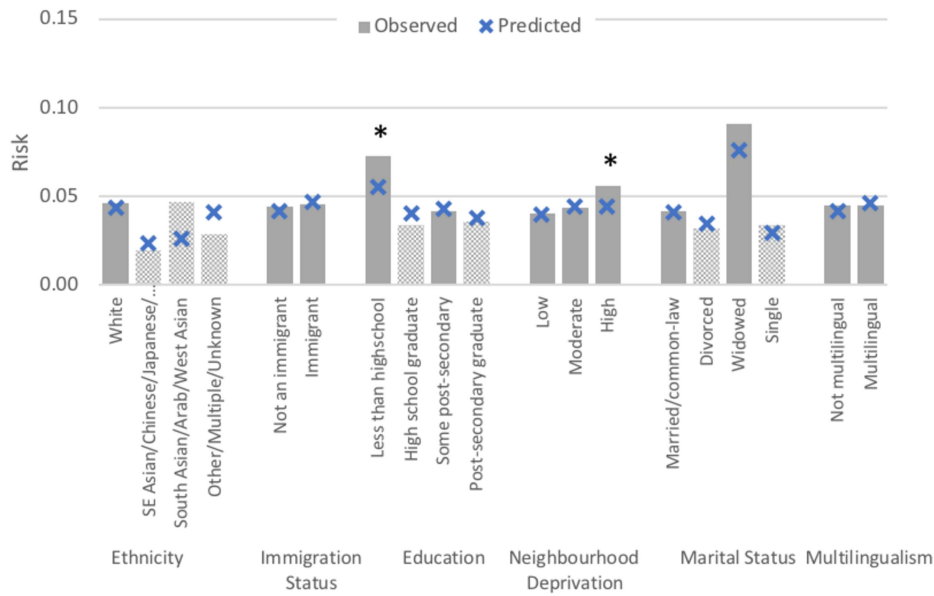
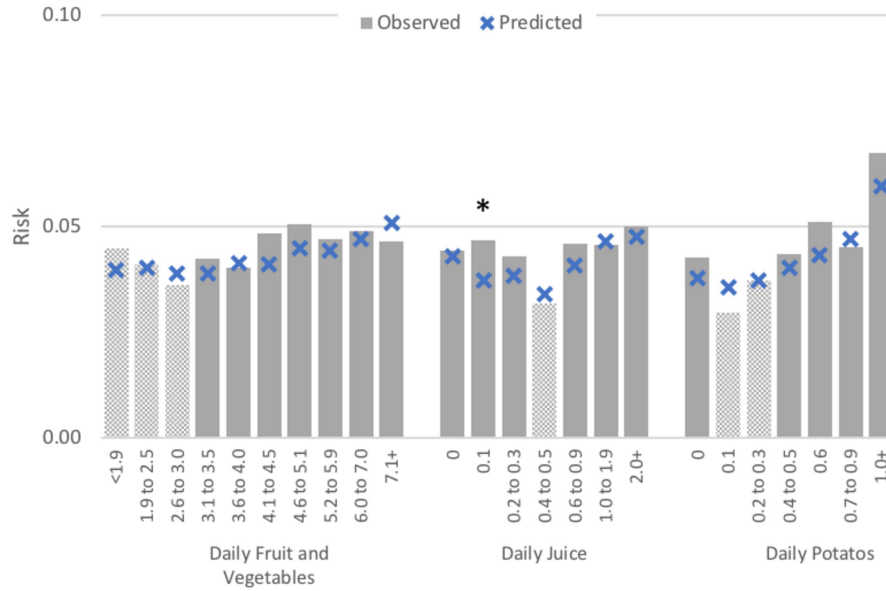
$$\begin{aligned} (X - \text{knot})_+ &= X - \text{knot}, & X - \text{knot} > 0 \\ &= 0, & X - \text{knot} \leq 0 \end{aligned}$$

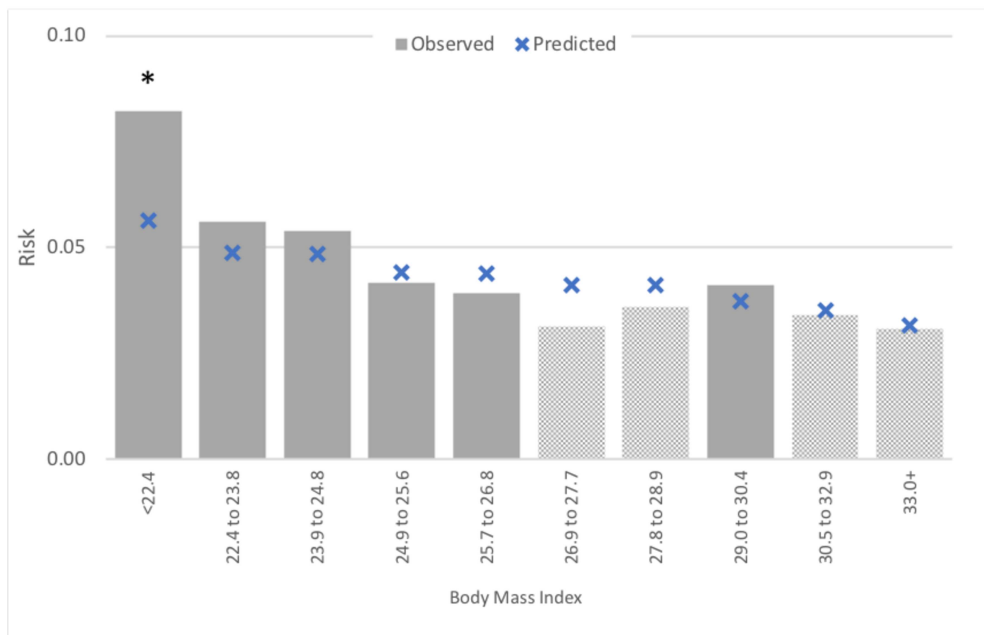
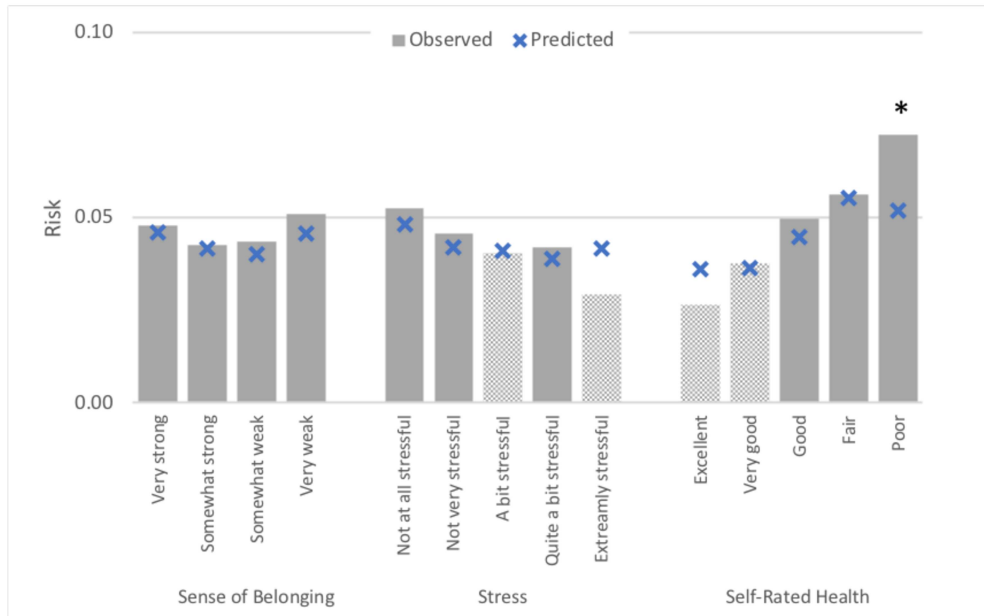
(ref: <http://biostat.mc.vanderbilt.edu/wiki/pub/Main/SasMacros/survrisk.txt>)

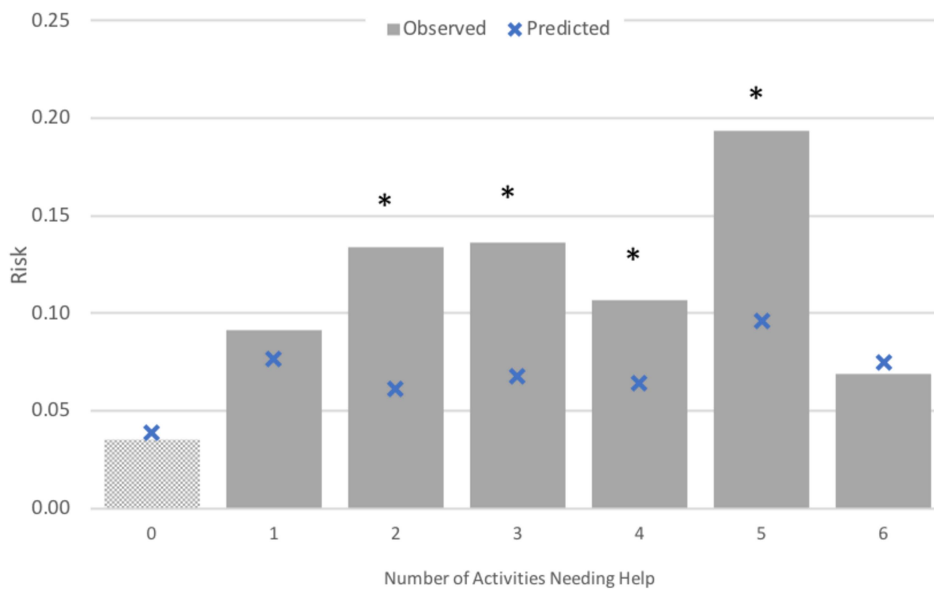
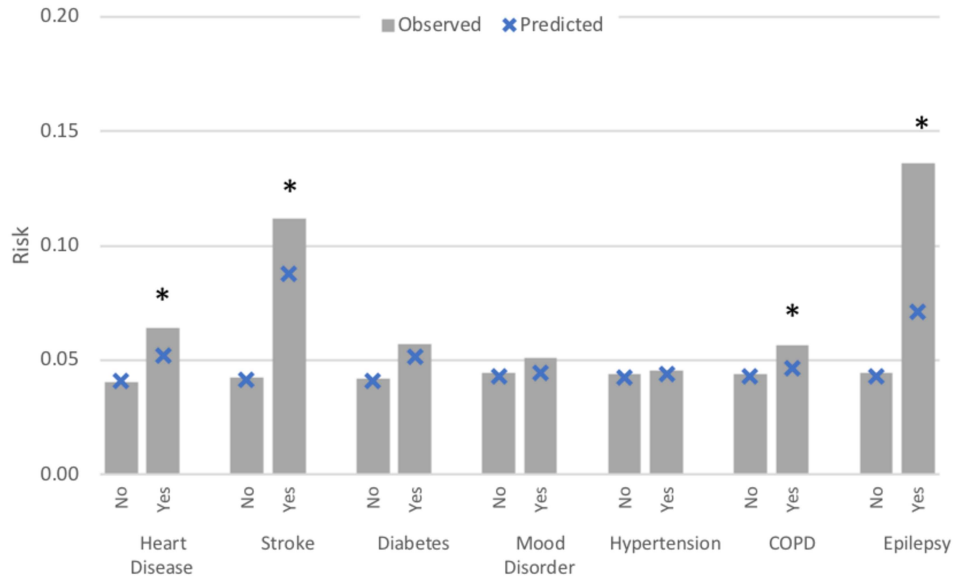
**Supplementary File 7.** Observed versus predicted for subgroups in the validation model – males

- Light patterned bars indicate less than 5% dementia prevalence within the subgroup
- Asterisk indicates that observed and predicted risks are more than 20% different; only evaluated within subgroups with at least 5% dementia prevalence









**Supplementary File 8.** Observed versus predicted for subgroups in the validation model – females

- Light patterned bars indicate less than 5% dementia prevalence within the subgroup
- Asterisk indicates that observed and predicted risks are more than 20% different; only evaluated within subgroups with at least 5% dementia prevalence

