

Appendix

Appendix A. Definition of Chronic Disease Population Risk Tool (CDPoRT) predictor variables.

Variable	Definition
Alcohol Consumption	
Never drinker	Drinks alcohol less than 3 times per month
Light drinker	Male: less than 3 drinks per week Female: less than 2 drinks per week
Moderate drinker	Male: between 4 and 21 drinks per week Female: between 3 and 14 drinks per week
Heavy drinker	Male: more than 21 drinks per week Female: more than 14 drinks per week
Smoking Behavior	
Daily smoker	At the present time smokes cigarettes daily
Occasional smoker	Smokes less than one cigarette per day
Former smoker	At least one whole cigarette, non-smoker now
Never smoker	Never smoked one whole cigarette
Daily Fruit and Vegetable Consumption	
0 to 3 times	
3 to 6 times	
6 or more times	
Body mass index (BMI) (kg/m²)	
Underweight	< 18.5
Normal	18.5 to 24.9
Overweight	25 to 29.9
Obese class 1	30 to 34.9
Obese class 2	34.9-39.9
Obese class 3	≥40
Unknown BMI	.
Age	
Restricted cubic spine centered at age 45 years with 4 knots (at 23, 37, 53, and 77 years)	
Ethnicity¹	
White	
Visible Minority	
Income	
Low income (Quintile 1)	
Not low income (Quintile 2 to Quintile 5)	
Education	
No post-secondary education	
Post-secondary education (including partial)	
Asthma	
Yes	
No	
High Blood Pressure	
Yes	
No	
Self-Rated Health	
Poor or fair	
Good	
Very good or excellent	
Self-Rated Stress	

Not at all stressful
Not very stressful
A bit stressful
Quite a bit or extremely stressful

¹The Canadian Community Health Survey (CCHS) collects data on ethnicity by asking respondents to identify if they belong to a visible minority group. This terminology represents that employed by Statistics Canada.

Appendix B. Chronic Disease Population Risk Tool (CDPoRT) algorithm (full model).¹**Females:**

full_ip=
-4.3449
+ 0.2395 × heavy drinker
+ 0.1035 × moderate-drinker
+ 0.3163 × non-drinker
+ 0.2722 × always occasional smoker
+ 0.6087 × former daily, now occasional smoker
+ 1.050 × daily smoker
- 0.1565 × former occasional smoker
+ 0.2008 × former daily smoker
- 0.0614 × 3-6 times/day fruit/vegetable consumption
- 0.1168 × >6 times/day fruit/vegetable consumption
+ 0.1285 × age continuous, spline term 1
- 0.2481 × age continuous, spline term 2
+ 0.5088 × age continuous, spline term 3
+ 0.3402 × visible minority
- 0.1046 × post-secondary education
+ 0.0726 × single, never married
+ 0.0849 × widowed, separated or divorced
+ 0.3730 × asthma
- 0.1823 × BMI 18.5 to <25.0
+0.3696 × BMI 25.0 to <30.0
+0.6141 × BMI 30.0 to <35.0
+1.0320 × BMI 35.0 to <40.0
+1.1634 × BMI ≥40.0
+ 0.4308 × BMI unknown
+ 0.3258 × high blood pressure
+0.1939 × poor or fair self-rated health
-0.1850 × very good or excellent self-rated health
-0.0008 × a bit life stress
-0.1031 × not very life stress
+0.0152 × quite a bit or extremely life stress

Shape = 1.1275

Males:

full_ip=
-3.1830
- 0.1188 × heavy drinker
- 0.0091 × moderate-drinker
+ 0.1806 × non-drinker
+ 0.0501 × always occasional smoker
+ 0.3514 × former daily, now occasional smoker
+ 0.8324 × daily smoker

+ 0.0121 x former occasional smoker
 + 0.1619 x former daily smoker
 - 0.0760 x 3-6 times/day fruit/vegetable consumption
 - 0.1626 x >6 times/day fruit/vegetable consumption
 + 0.1900 x age continuous, spline term 1
 + 0.9329 x age continuous, spline term 2
 - 0.4848 x age continuous, spline term 3
 + 0.2690 x visible minority
 + 0.1139 x lowest income quintile
 +0.1345 x unknown income
 + 0.2749 x asthma
 + 0.4222 x BMI 18.5 to <25.0
 +0.1428 x BMI 25.0 to <30.0
 +0.5687 x BMI 30.0 to <35.0
 +0.9830 x BMI 35.0 to <40.0
 +1.1879 x BMI \geq 40.0
 + 0.3607 x BMI unknown
 + 0.3599 x high blood pressure
 +0.1138 x poor or fair self-rated health
 -0.2896 x very good or excellent self-rated health
 -0.0318 x a bit life stress
 -0.0821 x not very life stress
 -0.1284 x quite a bit or extremely life stress

Shape = 1.1770

full_pred_surv = $\exp(-1 * \exp(\text{full_lp}) * ((\text{fu_time})^{\text{shape}}))$

full_pred_risk = $1 - \text{full_pred_surv}$

Predicted number of chronic disease cases = $\text{full_pred_risk} * \text{survey weights}$

Glossary

full_lp: calculates the linear predictor for the full model

full_pred_surv: predicted survival probability for the full model

full_pred_risk: predicted probability of chronic disease for the full model

fu_time: follow-up time in years

References

1. Ng, R., Sutradhar, R., Kornas, K., Wodchis, W. P., Sarkar, J., Fransoo, R., & Rosella, L. C. (2020). Development and validation of the Chronic Disease Population Risk Tool (CDPoRT) to predict incidence of adult chronic disease. *JAMA network open*, 3(6), e204669-e204669.

Appendix C. Proportion of adult population Ontario, Canada characteristics (household income, education, food security and workplace stress) with 0-4 high-risk equity factors, 2017/18¹.

Characteristic; Number of equity factors	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)
Overall	46.6	38.6	12.4	2.34	0.01
Household income					
Q1	0	56.2	35.1	8.38	0.37
Q2	0	65.5	29.4	4.90	0.19
Q3	71.0	25.9	2.87	0.17	0
Q4	72.6	25.9	1.49	0	0
Q5	71.2	27.7	1.03	0.02	0
Education					
Less than secondary	0	34.3	52.4	12.2	1.02
Secondary graduate	51.5	39.1	8.13	1.30	0
Food security					
Food secure	50.6	40.6	8.61	0.23	0
Moderately food insecure	0	16.7	56.4	25.8	1.01
Severely food insecure	0	10.5	57.7	30.1	1.64
Workplace stress					
None	55.7	34.4	8.85	1.08	0
Minimal stress	64.4	29	6.11	0.44	0
A bit of stress	67.8	26.4	5.38	0.39	0
Quite a bit	0	70.3	21.9	7.17	0.58
Extreme stress	0	66.6	23.3	10.2	0

¹ A high-risk equity factor is defined as either populations with quintile 1 or quintile 2 for household income, less than secondary school education, moderately or severely food insecure, and/or quite a bit and extreme workplace stress.