## Appendix

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

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

*The 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).\textsuperscript{1}

**Females:**

code{full lp=}

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

Shape = 1.1275

**Males:**

code{full lp=}

-3.1830
- 0.1188 x heavy drinker
- 0.0091 x moderate-drinker
+ 0.1806 x non-drinker
+ 0.0501 x always occasional smoker
+ 0.3514 x former daily, now occasional smoker
+ 0.8324 x 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
- 0.0760  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 ≥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

\[
\text{full\_pred\_surv} = \exp(-1*\exp(\text{full\_lp})*((\text{fu\_time})^\text{shape}))
\]

\[
\text{full\_pred\_risk} = 1 - \text{full\_pred\_surv}
\]

**Predicted number of chronic disease cases** = full\_pred\_risk * 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**

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.

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

¹A 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.