

## **Supplemental Materials for**

### **Area-level income disparities in colorectal screening in Canada: Evidence to inform future surveillance**

A. Blair, L. Gauvin, S. Ouédraogo, G. D. Datta

#### **Listing of Supplemental Material(s):**

Supplemental Table 1 (eTable 1) : Adjusted associations between area-level income and never screening, stratified by individual-level income quartiles, expressed as prevalence ratios (PR) among adults aged 50 through 75 years and participating in the 2005 and 2007 waves of the Canadian Community Health Survey (N=18,362; Weighted N = 4,838,342).

Supplemental Table 2 (eTable 2) : Estimate of the maximum size of an unmeasured factor or matrix of factors' association with area-level income and never screening to bring observed point estimates and lower confidence bounds to cross the null (1). Observed adjusted prevalence ratio (PR) estimates are yielded from GEE Poisson models, performed among adults aged 50 through 75 in the 2005, 2007 waves of the Canadian Community Health Survey (N=18,362; Weighted N = 4,838,342).

**eTable 1** Adjusted associations between area-level income and having never been screened, stratified by individual-level income quartiles, expressed as prevalence ratios (PR) among adults aged 50 through 75 years and participating in the 2005 and 2007 waves of the Canadian Community Health Survey (N=18,362; Weighted N = 4,838,342)

<b>Covariates</b>	<b>Overall Adjusted PR (95% CI)<sup>a,b</sup></b>	<b>Quartile 1 Adjusted PR (95% CI)<sup>b</sup></b>	<b>Quartile 2 Adjusted PR (95% CI)<sup>b</sup></b>	<b>Quartile 3 Adjusted PR (95% CI)<sup>b</sup></b>	<b>Quartile 4 Adjusted PR (95% CI)<sup>b</sup></b>
<b>Age</b>					
50-59 years	1	1	1	1	1
60-75 years	0.73 (0.70-0.77)	0.84 (0.77, 0.92)	0.67 (0.58, 0.77)	0.67 (0.62, 0.74)	0.79 (0.71, 0.88)
<b>Sex</b>					
Female	1	1	1	1	1
Male	1.03 (0.98, 1.08)	1.00 (0.93, 1.11)	1.05 (0.98, 1.14)	1.08 (0.99, 1.17)	0.99 (0.90, 1.08)
<b>Marital Status<sup>c</sup></b>					
Married/com-law	1	1	1	1	1
Div/wid/sep	1.04 (0.99, 1.10)	1.09 (1.00, 1.18)	1.02 (0.93, 1.11)	1.11 (0.99, 1.25)	0.94 (0.79, 1.12)
Single	1.02 (0.96, 1.09)	1.10 (0.98, 1.23)	1.01 (0.89, 1.14)	1.04 (0.92, 1.18)	0.87 (0.68, 1.12)
<b>Immigration<sup>c</sup></b>					
Canadian-born	1	1	1	1	1
Immigrant (Eur., US, Oceania)	1.04 (0.98, 1.11)	1.11 (1.00, 1.24)	1.05 (0.94, 1.16)	1.01 (0.90, 1.12)	1.00 (0.88, 1.14)
Immigrant (Asia, Africa, S./C. Amer.)	1.18 (1.10, 1.26)	1.18 (1.03, 1.36)	1.15 (1.02, 1.31)	1.02 (0.87, 1.19)	1.29 (1.14, 1.46)
<b>Education<sup>c</sup></b>					
HS Graduate	1	1	1	1	1
< HS Degree	1.11 (1.04, 1.18)	1.05 (0.96, 1.15)	1.14 (1.04, 1.25)	1.06 (0.90, 1.22)	1.30 (1.11, 1.52)
<b>Regular MD<sup>c</sup></b>					
Yes	1	1	1	1	1
No	1.31 (1.23, 1.38)	1.25 (1.13, 1.37)	1.30 (1.13, 1.50)	1.33 (1.19, 1.48)	1.34 (1.17, 1.53)
<b>Area Income</b>					
Quartile 1	1.24 (1.16-1.34)	1.21 (1.04, 1.41)	1.11 (0.98, 1.25)	1.20 (1.05, 1.36)	1.27 (1.09,1.48)
Quartile 2	1.25 (1.15, 1.33)	1.14 (0.97, 1.32)	1.03 (0.92, 1.17)	1.25 (1.11, 1.42)	1.33 (1.19, 1.50)
Quartile 3	1.16 (1.08, 1.15)	1.03 (0.87, 1.21)	1.04 (0.94, 1.17)	1.09 (0.97, 1.22)	1.22 (1.08, 1.38)
Quartile 4	1	1	1	1	1

<sup>a</sup>This model was also adjusted for individual-level income (PRs not shown). Full model output was described previously in Table 2. <sup>b</sup>These prevalence ratios (PRs) are adjusted for all covariates. <sup>c</sup>Marital Status: “Com-law” indicates common law marital status; “Div” indicates divorced marital status; “Wid” indicates widowed marital status; “Sep” indicates separated marital status; Regions of immigration include the United States, Europe (Eur.), Oceania; Asia, Africa, South and Central (S./C.) America; Regular “MD” indicates regular physician.

**eTable 2** Estimate of the maximum size of an unmeasured<sup>a</sup> factor or matrix of factors' association with area-level income and never screening to bring observed point estimates and lower confidence bounds to cross the null (1). Observed adjusted prevalence ratio (PR) estimates are yielded from GEE Poisson models, performed among adults aged 50 through 75 in the 2005, 2007 waves of the Canadian Community Health Survey (N=18,362; Weighted N = 4,838,342)

Area-level income	Observed adjusted PR for lifetime never screening (95% CI) <sup>c</sup>	Max value of unmeasured PR <sup>b,d</sup> = [PR <sub>observed</sub> + $\sqrt{(\text{PR}_{\text{observed}} (\text{PR}_{\text{observed}} - 1))}$ ] to explain away:	
		Point Estimate	Lower Confidence Bound
Quartile 1	1.24 (1.16-1.34)	1.79	1.59
Quartile 2	1.25 (1.15, 1.33)	1.81	1.57
Quartile 3	1.16 (1.08, 1.15)	1.59	1.37
Quartile 4	1		

<sup>a</sup> Applying Ding & VanderWeele's Bounding Factor formula (from Ding P, VanderWeele TJ. Sensitivity analysis without assumptions. *Epidemiology* (Cambridge, Mass.). 2016;27(3):368.)

<sup>b</sup> Assuming true PRR is  $\geq 1$

<sup>c</sup> Adjusted point estimates and confidence intervals are from Table II.

<sup>d</sup> This approach aims to describe how large the association would have to be between an unmeasured factor or matrix of factors (U) and both area-level income (A) (PRR<sub>AU</sub>), and the screening outcome (Y) (PR<sub>UY</sub>), to bring the observed point estimate (PR<sub>obs</sub>) and its 95% confidence bound closest to 1 to cross the null. The formula,  $RR_{obs} + \sqrt{(RR_{obs} * (RR_{obs} - 1))}$ , yields the maximum value of PRR<sub>AU</sub> and PR<sub>UY</sub>—the associations between the unmeasured factor or matrix of factors and both area-level income and the independent variable.