Appendix 3 (as supplied by the authors): Equations used for the calculation the cumulative proportion of population by deprivation quintile, the cumulative proportion of outcome by deprivation quintile, and the area-level concentration coefficient (ALCC)

1. Cumulative proportion of population by deprivation quintile

Equation 1:

$$x_k = \frac{\sum_{i=1}^{k} p_1}{\mathrm{P}}$$

Where:

$$\mathrm{P} = \sum_{i=1}^{n} p_1 = Total\ population$$

$$\sum_{i=1}^{k} p_1 = Sum\ of\ population\ for\ all\ i\ in\ k$$

$$i = 1, \dots, k$$

$$k = 1, \dots, n$$

$$k = \begin{cases} Q5\ if\ i = 1 \\ Q4\ if\ i = 1 \\ Q3\ if\ i = 1 \\ Q2\ if\ i = 1 \\ Q1\ if\ i = 1 \end{cases}$$

The x-coordinates have the following properties:

$$0 < x_{Q5} < x_{Q4} < x_{Q3} < x_{Q2} < x_{Q1} = 1$$

2. Cumulative proportion of outcome by deprivation quintile

Equation 2:

$$y_k = \frac{\sum_{i=1}^{k} d_1}{\mathrm{D}}$$

Where:

$$\mathrm{D} = \sum_{i=1}^{n} d_1 = Total\ disease\ cases$$

$$\sum_{i=1}^{k} d_1 = Sum\ of\ disease\ cases\ for\ all\ i\ in\ k$$

$$i = 1, \dots, k$$

Appendix to: Neudorf C, Fuller D, Cushon J, Glew R, Turner H, Ugolini C. An analytic approach for describing and prioritizing health inequalities at the local level in Canada: a descriptive study. *CMAJ Open* 2015. DOI:10.9778/cmajo.20150049.

$$k = 1, \ldots, n$$

$$k = \begin{cases} Q5 \; if \; i = 1 \\ Q4 \; if \; i = 1 \\ Q3 \; if \; i = 1 \\ Q2 \; if \; i = 1 \\ Q1 \; if \; i = 1 \end{cases}$$

The y-coordinates have the following properties:

$$0 < y_{Q5} < y_{Q4} < y_{Q3} < y_{Q2} < y_{Q1} = 1$$

3. Area-level concentration coefficient

Equation 3:

$$\text{ALCC} = \frac{Concentration\ Area}{Maximum\ Concentration\ Area\ (0.5)}$$

$$\text{Z} = \text{ Area under the Area-level concentration curve}$$

$$\text{Z} = \sum_{i}^{n} \text{Z}_k = \sum_{i}^{n} \frac{(y_k + y_{k-1})(x_k - x_{k-1})}{2}$$

$$\text{ALCC} = \frac{\left(\sum_{i}^{n} \frac{(y_k + y_{k-1})(x_k - x_{k-1})}{2}\right) - 0.5}{0.5}$$