Long-term Employment and Health Inequalities in Canadian Communities

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ABSTRACT

Objectives: This study examines the long-term unemployment rate and various health outcomes across Canadian communities to estimate employment-related health inequalities in these communities.

Methods: The study uses cross-sectional community-level health data along with data on the long-term employment rate for various communities across Canada to quantify health inequalities among these communities. The health outcomes that are considered in this study include total and disease specific mortality rates; health conditions such as high blood pressure, diabetes, injuries, and self rated health; and life expectancies at birth and at age 65. Health inequalities are estimated using the concentration index, which is used to measure health inequalities along socioeconomic dimensions. The concentration index is estimated by a regression of weighted relative health (ill health) over weighted cumulative relative rank of the populations. All the estimates are provided separately for males and females.

Results: The findings of the study support the existence of inequalities in community health outcomes as related to the long-term employment rates in those communities. Communities with lower long term employment rates (higher unemployment rates) have poorer health outcomes in terms of higher mortality rates, worse health conditions, and shorter life expectancies.

Conclusion: Health inequalities related to long-term employment have important policy implications. They call for policies that would increase and maintain long term employment rates as part of a broader socioeconomic approach to health. Long term employment ensures income security and prevents the psychosocial experiences leading to mental and physical ill health.

Key words: Employment; health; inequality; community; Canada

Health inequalities along various socio-economic and political dimensions have been well documented.¹⁻¹⁵ These dimensions have been variously measured by income,^{13,16-23} wealth,^{24,25} education,^{8,26} occupation,^{27,28} social class,^{1,29-32} type of political regime,³³⁻⁴⁰ and the extent of democracy,⁴¹⁻⁴⁴ however income has been the dominant dimension along which health inequalities are estimated. Income is usually measured at the individual or household levels for estimation of health inequalities. Although many studies consider the connection between income and its inequality and health outcomes in Canada,⁴⁵⁻⁵³ there are only a few studies that have estimated income-related health inequalities.^{54,55}

Even though income provides a useful summary measure of economic position or command over material resources, it is subject to short-term variations and may not give a good picture of longer-term (permanent) economic conditions, which is presumably more relevant for the health of people than transitory (current) income. In the absence of data on permanent income, the long-term rate of employment may be considered a suitable proxy for the permanent economic conditions of communities. The long-term employment rate also captures some of the endemic structural features of communities that are not necessarily captured in income, whether transitory or permanent. For example, issues of job insecurity, job control, and job satisfaction are not captured in average measures of income. Moreover, the experience of lasting unemployment goes well beyond income loss and poverty and directly affects the mental as well as physical health of the unemployed. The links between unemployment and health have been vastly researched.⁵⁶⁻⁶⁷ Therefore, long-term employment rate in a community would probably give us a better indication of the enduring economic conditions with their consequent impacts on the health of communities.

This study uses cross-sectional population health data along with data on the long-term employment rate for various communities across Canada to estimate, for the first time, health inequalities that are related to the long-term employment in these communities. Communities in this study are *health regions* that are administrative boundaries for which data are collected by Statistics Canada.⁶⁸

La traduction du résumé se trouve à la fin de l'article.

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TABLE 1

Average Mortality Rates (per 100,000 population) for Communities According to Long-term Employment Rates

Employment Rate		TMR		SUIC-MR		CANC-MR		RESPD-MR		CIRCD-MR	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<94%	SE	890.75	558.31	26.05	5.26	253.46	150.12	80.90	47.06	284.67	191.73
	n	93.16	83.37	12.18	4.14	40.18	18.35	16.93	36.70	66.94	42.21
94%-96%	SE	807.11	510.31	20.32	5.16	228.34	151.42	73.19	40.99	272.71	165.22
	n	76.39	44.04	5.62	2.69	26.86	13.14	10.18	6.17	39.38	23.98
96%-97%	SE	787.45	503.24	17.67	4.32	226.24	153.72	68.42	36.77	268.90	165.04
	n	82.55	48.88	6.86	1.58	31.28	15.47	10.56	6.88	34.02	21.79
97%-98%	SE	765.83	503.92	14.16	4.07	216.27	149.13	63.76	35.63	264.67	169.53
	n	66.49	38.51	4.35	2.20	20.03	13.14	10.12	3.85	31.37	18.55
>98%	SE	764.19	494.06	16.02	3.93	207.59	147.92	66.66	35.41	273.71	168.93
	n	63.64	22.75	4.46	1.72	11.01	11.05	11.45	4.57	24.30	15.23
		13	13	12	12	12	13	13	13	13	13

The p-values for all male/female differences are all extremely small (<0.0005) and therefore are not reported in the table.

SE = standard errors.

n = number of communities in each employment category.

METHODS

Socio-economic health inequalities have been estimated using a variety of measures. One of these measures, the *Concentration Index* (CI) has been used most frequently, given its desirable features that meet the three basic requirements of an index of inequality in health, namely i) being reflective of the socio-economic dimension to inequalities in health; ii) being reflective of the experiences of the entire population; and iii) being sensitive to the changes in the distribution of population across socio-economic groups.⁶⁹ Although a recent study on the welfare economics foundation of health inequality measures questions the acceptability of the equity weights implied in the CI,⁷⁰ it is still widely in use. The CI is defined in terms of a concentration or Lorenz curve (L). The curve plots the cumulative proportion of the population ranked by socio-economic status (beginning with the lowest socio-economic status) against the cumulative proportion of ill health measured by a continuous index as in Figure 1 below.

CI is defined as twice the area between the Lorenz curve and the diagonal. It takes a value of zero when there is no inequality, in which case the Lorenz curve coincides with the diagonal in the box. It is a negative (positive) value when ill health is more concentrated in lower (higher) socio-economic ranks, which is illustrated by the Lorenz curve lying above (below) the diagonal. Alternative formulations for the estimation of CI have been proposed.^{71,72} The latter involve estimation of a weighted

Figure 1. Ill health concentration curve

regression of a measure of relative health or ill health on the relative rank of individuals or groups of individuals ordered along a socio-economic dimension. The weights are the number of individuals or the relative frequency of each socio-economic group.

A novel feature of the present study is the application of those formulations to aggregate data at the community level, where aggregate variables such as employment rate could be meaningfully defined. By doing so, we abstract from *intra-community* inequalities and focus on the *inter-community* health inequalities along the long-term employment dimension.

The communities are ranked according to their rates of long-term employment, starting with the community having the lowest employment rate. Each community's health outcomes are then weighted by

the relative size of its population. Employment-related health inequalities (CIs) for several measures of population health are then estimated by the aforementioned regressions.

This study uses the most recent data on health indicators and long-term employment at the *health region* level provided by the Canadian Institute for Health Information and Statistics Canada. The data for mortality rates and life expectancies are those of 2001. However, data on health conditions and self-rated poor health are those of 2003. The long-term unemployment rate belongs to the year 2001. There were 130 health regions in 2001. Missing data for some health regions resulted in sample sizes of 124 to 127.

The health measures examined include mortality rates, health conditions, and life expectancies. Mortality rates include total

TABLE II

Average Prevalence of Health Conditions (in percentages) for Communities According to Long-term Employment Rates

Employment Rate	Diabetes		p-value	High Blood Pressure		p-value	Self-rated Poor Health		p-value
	Male	Female		Male	Female		Male	Female	
<94%	5.80	5.85	0.499	14.22	18.04	0.002	13.06	13.15	0.000
SE	2.37	2.80		4.55	5.01		3.90	3.13	
n	n = 24	n = 23		n = 28	n = 28		n = 29	n = 30	
94%-96%	5.05	4.88	0.450	13.15	15.42	0.001	12.09	13.44	0.025
SE	1.17	1.34		2.13	2.66		2.56	2.18	
n	n = 26	n = 25		n = 25	n = 25		n = 26	n = 26	
96%-97%	5.25	4.42	0.220	14.35	15.68	0.002	12.13	13.43	0.021
SE	0.92	1.15		1.85	1.59		2.14	2.14	
n	n = 26	n = 27		n = 28	n = 27		n = 24	n = 26	
97%-98%	4.91	3.67	0.150	14.15	14.95	0.125	11.35	12.24	0.120
SE	1.37	0.97		2.56	3.40		2.95	2.50	
n	n = 28	n = 26		n = 29	n = 28		n = 27	n = 26	
>98%	4.32	4.20	0.450	12.33	15.34	0.015	9.83	10.79	0.080
SEn	0.85	0.83		3.09	2.39		1.16	1.72	
n	n = 9	n = 10		n = 11	n = 11		n = 11	n = 11	

TABLE III

Average Life Expectancies (in years) for Communities According to Long-term Employment Rates

Employment Rate	Life Expectancy at Birth		Life Expectancy at Age 65	
	Male	Female	Male	Female
<94%	74.28	79.83	15.72	19.02
SE	2.92	3.24	0.90	2.08
n	30	30	30	30
94%-96%	75.84	81.19	16.60	20.00
SE	1.38	1.33	0.99	1.01
n	28	28	28	28
96%-97%	76.55	81.74	16.91	20.36
SE	1.49	1.71	0.89	0.83
n	28	28	28	28
97%-98%	76.90	81.65	17.01	20.33
SE	1.32	0.87	0.66	0.62
n	28	28	28	28
>98%	76.91	81.88	17.13	20.42
SE	1.23	0.60	0.62	0.41
n	13	13	13	13

Note: The p-values for male/female differences for both LEB and LE65 are extremely small (<0.0005) and therefore are not reported in the table.

mortality rate, and cause-specific mortality rates due to respiratory disease, circulatory disease, cancer, and suicide. Health conditions include prevalence of diabetes and high blood pressure and self-rated poor health. Life expectancies are those estimated at birth and at age 65. These health measures are considered separately for males and females. The ranking variable is the long-term employment rate for each region. It is obtained by subtracting the long-term unemployment rate from 1. The latter captures those who did not have a job during the current or previous year.⁷³

RESULTS

Descriptive summary of data

Tables I, II and III provide summaries of health measures for health regions, categorized into different ranges of long-term employment rates (from less than 94% to more than 98%). Table I shows the average values and standard deviations of total

mortality rates (TMR) along with those for cause-specific mortality rates due to suicide (SUIC-MR), cancer (CANC-MR), respiratory diseases (RESPD-MR), and circulatory diseases (CIRCD-MR) for both males and females for each of the five categories of long-term employment rate.

As can be seen from Table I, both total and cause-specific mortality rates generally appear to decline as we move from lower employment categories to higher ones. The mortality gradients are particularly noticeable between the lowest and the second lowest employment categories. However, given the large standard errors of the mortality rates, in part due to small sample sizes, such variations across the employment categories are not statistically significant. The average mortality rates are all consistently higher for men than for women. Such differences are highly significant, as evidenced by extremely small p-values not reported in the table.

Table II shows the average prevalences of diabetes and high blood pressure in

males and females, along with those for self-rated poor health, for the 5 employment categories.

Generally speaking, the patterns of data in Table II indicate a reduction of ill health conditions (diabetes and high blood pressure) and self-rated poor health at higher levels of employment. However, as in Table I, the variations across employment categories are not statistically significant. The prevalence of high blood pressure appears higher for women than men across the employment categories. This is evident from the p-values for 4 of the 5 employment categories.

Similarly, Table III shows average life expectancies at birth and at age 65 for both males and females for each of the five employment categories. Here, too, a systematic pattern of improvement in health (increase in life expectancies) is generally apparent as we move to higher employment categories. But again, the patterns of change are not statistically significant. As expected, average life expectancies (at birth and at age 65) are consistently higher for women than for men. Again, the extremely small p-values (not reported in the table) strongly support such differences between men and women.

The summary data in the above tables imply a positive association between the long-term employment rate and better population health outcomes at the health region level, which is not statistically significant. However, when weighted data from individual communities are used to estimate health inequalities as related to the long-term employment rates in these communities, the results are statistically significant for most of the health outcomes, as reported in the next section.

Estimates of health inequalities

Long-term employment-related health inequalities as measured by the concentration index are estimated for mortality rates, health conditions, and life expectancies. These estimates are reported in Table IV. In each case, estimates are provided for males and females separately.

The estimated CIs in Table IV for total mortality rate and cause-specific mortality rates reported on the left side of this table are all negative, which indicate that higher rates of mortality are concentrated in communities with lower long-term employment rates. Inequalities as measured by the CIs are highest for suicide mortality rates and lowest for circulatory mortality rates. The estimated inequalities for mortality rates are all statistically significant at 5%, except for CIRCD_MR. The inequalities are higher (in absolute terms) for men for TMR, CANC_MR, and RESPD_MR, but higher for women for SUIC_MR. The corresponding p-values are extremely small (less than 0.0005).

Estimates of CIs for health conditions – diabetes (DIAB) and high blood pressure (HBLP) – as well as self-rated poor health (SRPH) as reported in the upper right portion of Table IV, are also negative. That is, prevalence of diabetes, high blood pressure, and self-rated poor health is higher in communities with lower rates of employment. Inequalities in health conditions (DIAB and HBLP) are greater (in absolute terms) for women, whereas inequalities in SRPH are greater for men. Such differences are supported by very small p-values. Inequality estimates for DIAB and HBLP for men are not statistically different from zero, however.

Employment-related inequalities in life expectancies at birth (LEB) and at age 65 (LE65), as measured by the respective CIs are reported in the lower right portion of Table IV. All the estimates are positive, which indicate that lower life expectancies are concentrated in communities with lower long-term employment rates. The estimated CIs for both measures of life expectancy are statistically significant at 5%. As was the case with most mortality rates, inequalities in life expectancies are larger for men than for women. Again, the relevant p-values are extremely small for both LEB and LE65. The inequalities in life expectancies are generally smaller in

TABLE IV

Estimates of Health Inequalities – Concentration Indexes

Mortality Rates			Health Conditions and Life Expectancies		
		Male			Female
TMR		-0.0310	DIABSE		-0.0372*
	SE	0.0063		SE	-0.0865
SUIC_MR		-0.0944	HBLPSE		0.0200
	SE	0.0300		SE	(0.0146)
CANC_MR		-0.0362	SRPH		-0.0151*
	SE	0.0060		SE	-0.0485
RESPD_MR		-0.0561	LEB		0.0122
	SE	0.0121		SE	0.0090
CIRCD_MR		-0.0088*	LE65SE		-0.0677
	SE	0.0103		SE	-0.0351
					0.0105
					0.0018
					0.0007
					0.0049
					0.0021

* Estimate is not significant at 5%.

magnitude than those for mortality rates and health conditions, however.

DISCUSSION

The findings of the study as reported in Table IV support the existence of inequalities in population health across Canadian communities along the socio-economic dimension represented by the long-term employment rate. Communities with lower rates of long-term employment (or higher rates of unemployment) appear to have higher mortality rates, poorer health conditions both subjectively as measured by self-rated poor health and objectively as measured by prevalence of diabetes and high blood pressure, and shorter life expectancies at birth as well as at age 65. These inequalities are between-community inequalities and do not capture within-community inequalities in health that may be more substantial. Moreover, since these communities (health regions) are administratively defined, they may not be considered as “natural” communities that evolve over time by common modes of life, shared sense of geography, and distinct economies. Consequently, aggregate measures of health for these communities may be mitigated by administrative delineation of communities.

Although summary measures of community health such as mortality rates and life expectancies do capture population health in a broad sense, an examination of specific health conditions or morbidities, in particular those presumed to be most related to unemployment, may provide us with a better understanding of the extent of health inequalities as related to long-term employment. Long-term unemployment is associated with high levels of psychosocial stress that could initiate suicidal behaviour

and increase risk of suicide.⁶⁶ Psychosocial stress could also initiate other physical health conditions such as adult diabetes, hypertension, atherosclerosis, and autoimmune disorders.⁷⁴ The findings of the current study are consistent with the aforementioned findings. Nevertheless, further research using mental health outcomes at the community level is needed to better inform the nature of relationships between health and long-term employment.

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RÉSUMÉ

Objectifs : Notre étude compare les taux de chômage à long terme et divers résultats cliniques dans des localités canadiennes afin d'évaluer les inégalités en santé liées à l'emploi dans ces localités.

Méthode : Des données transversales sur la santé et des données sur les taux d'emploi à long terme dans diverses localités du Canada ont servi à quantifier les inégalités en santé d'une localité à l'autre. Les résultats cliniques pris en compte étaient les taux de mortalité totaux et par maladie; les troubles médicaux comme l'hypertension artérielle, le diabète, les blessures et l'état de santé auto-évalué; et l'espérance de vie à la naissance et à 65 ans. Les inégalités en santé ont été évaluées à l'aide d'un indice de concentration, qui sert à mesurer les inégalités en santé dans leurs dimensions socioéconomiques. L'indice de concentration est calculé par la régression de l'état de santé relatif pondéré (la morbidité) sur le rang cumulatif relatif pondéré des populations. Toutes les estimations sont fournies séparément pour les hommes et pour les femmes.

Résultats : L'étude confirme l'existence d'inégalités dans les résultats cliniques des localités par rapport à leurs taux d'emploi à long terme. Les localités où les taux d'emploi à long terme sont faibles (taux de chômage élevé) affichent de moins bons résultats cliniques (des taux de mortalité supérieurs, davantage de troubles médicaux et une espérance de vie plus courte).

Conclusion : Le lien entre les inégalités en santé et l'emploi à long terme a d'importantes répercussions stratégiques. Il faudrait des politiques pour accroître et soutenir les taux d'emploi à long terme dans le cadre d'une approche socioéconomique élargie de la santé. L'emploi à long terme garantit la sécurité du revenu et prévient les expériences psychosociales qui mènent aux problèmes de santé mentale et physique.

Mots clés : emploi; santé; inégalités; localités; Canada

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