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ORIGINAL ARTICLE

Diverging socioeconomic inequality in life expectancy of Francophones and Anglophones in Montréal, Québec: tobacco to blame?

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Abstract
Aim We evaluated the ages and causes of death contributing to life expectancy gaps between economically advantaged and disadvantaged Francophones and Anglophones of Montréal, a Canadian metropolitan centre.
Subject and Methods We partitioned the life expectancy gap at birth between socioeconomically disadvantaged and advantaged Francophones and Anglophones of Montréal (Québec) into age and cause of death components for two periods (1989–1993, 2002–2006). Changes in the contributions of causes over time were evaluated.
Results Life expectancy was lower for disadvantaged Francophones and Anglophones by 5 years in men and 1.6 years in women compared with advantaged individuals. Over time, the socioeconomic gap widened for Francophones (men 0.3 years, women 2.8 years), due to smaller reductions in mortality from tobacco-related causes (cardiovascular, cancer, respiratory) in disadvantaged than in advantaged Francophones, especially after age ≥65 years (except lung cancer mortality that increased, particularly in disadvantaged women). The socioeconomic gap narrowed, however, for Anglophones (men 1.0 year, women 0.6 years), due to greater reductions in cardiovascular mortality in disadvantaged than advantaged Anglophones.
Conclusion Socioeconomic inequalities in life expectancy decreased for Anglophones but increased for Francophones in Montréal due to underlying trends in tobacco-related mortality. Despite strong tobacco control laws in Canada, socioeconomic inequality in tobacco-related mortality is widening for Francophones in Montréal.

Keywords Deprivation · Language · Life expectancy · Mortality · Socioeconomic · Tobacco · Trends

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Introduction

Socioeconomic inequality in mortality is widespread and potentially increasing in some countries (Mackenbach et al. 2008; Singh and Siahpush 2006; Steingrimsdottir et al. 2012), but the contribution of specific causes of death to these trends is unclear. Efforts to determine the underlying causes that contribute to socioeconomic inequalities in life expectancy have been few (Adam-Smith et al. 2011; Khang et al. 2010; Schwarz and Pamuk 2008). This knowledge gap is particularly apparent in large urban areas where mortality inequalities are prevalent and gaining attention (Pampalon et al. 2008; World Health Organization 2010). Identifying the causes of socioeconomic inequality in life expectancy is challenging, however, because socioeconomic status is closely intertwined with population traits such as race/ethnicity or other cultural characteristics that may mask socioeconomic gradients (Stronks and Kunst 2009; Williams et al. 2010). Racial/ethnic disparities have been widely documented in the US (Harper et al. 2007; Orsi et al. 2010),

but few studies have sought to demonstrate such differentials in Canada, perhaps because of limited availability of race/ethnicity data in administrative files. Nonetheless, relatively large inequalities in life expectancy between language groups have recently been identified in the province of Québec (Auger et al. 2012), reflecting possible cultural contexts of mortality in Canada. In 2002–2006, Anglophone men in Québec outlived Francophone men by 2.3 years, and Anglophone women outlived Francophone women by 1.4 years, and tobacco-related causes of death made large contributions to these gaps (Auger et al. 2012).

The contribution of socioeconomic status to these differentials is not understood, however, which is troublesome in light of the well-established influence socioeconomic conditions have on mortality (Rask et al. 2009; World Health Organization 2010). We therefore sought to estimate socioeconomic inequalities in life expectancy for Francophones and Anglophones of Montréal, the largest metropolitan center in Canada where Francophones are a majority, and to determine the extent to which tobacco-related mortality contributed to these inequalities. We partitioned the life expectancy gap between advantaged and disadvantaged Francophones and Anglophones into age and cause of death components, and evaluated which components contributed to the life expectancy gap over time. Life expectancy is a widely used summary measure of mortality (Silcocks et al. 2001), and a better understanding of how specific causes of death underlie socioeconomic differentials in life expectancy is useful to guide health policy. Methodological approaches for partitioning life expectancy differences are innovative, and increasingly used for their ability to identify the causes of death that would need to be targeted to reduce inequalities in mortality (Khang et al. 2010).

Methods

Data and variables

We included decedents residing in the census metropolitan area of Montréal in 1989–1993 and 2002–2006, the two periods for which population data were available, and for which a decline in life expectancy inequality between Francophones and Anglophones was observed over time (Auger et al. 2012). Death certificates in the province of Québec contain language spoken at home, and 64.1 % of deaths were Francophone with another 16.2 % Anglophone in the periods covered. Language status was imputed for 12.6 % of deaths with missing data (Sterne et al. 2009). We used the monotone discriminant function for nominal data in the MI procedure of SAS to impute language five times based on the observed covariates age, sex, place of birth (Québec, other Canadian province, foreign country), and proportion of Anglophones in local neighbourhoods. Foreign (6.2 %) and bilingual French-English (0.9 %) languages were excluded, leaving 235,080 deaths for analyses. International Classification of Disease (ICD) codes for cause of death were obtained from the Québec Health Ministry (electronic supplementary material, ESM1; Institut National de Santé Publique du Québec 2006).

We used Pampalon's material deprivation score to determine the socioeconomic quintile of decedents. The score is a composite measure of census data on the proportion of the population with no high school diploma, the employment-to-population ratio, and average income for individuals aged ≥15 years in local neighbourhoods. The neighbourhoods, referred to as census enumeration (1991) and dissemination (2001) areas, are the smallest for which census socioeconomic data were available, containing 500–750 individuals on average (Pampalon et al. 2008). The deprivation score was available for all of Québec, and neighbourhoods located in metropolitan Montréal were extracted. Neighbourhoods containing an institutionalized population for which deprivation level could not be obtained (17.2 % of decedents in 1989–1993; 15.3 % in 2002–2006) were not analyzed.

Statistical analysis

We used life tables to calculate life expectancy at birth for Francophone and Anglophone men and women by socioeconomic level for both periods and each imputed dataset (Chiang 1984). Mean life expectancy was calculated, and 95 % confidence intervals were adjusted for the added variance due to imputation (Rubin 2004). Population counts for 20 age groups (<1, 1–4, 5–9 … 80–84, 85–89, ≥90 years) were obtained from the census (≥1 year) and live birth (<1 year) files, by language and socioeconomic quintile. Counts for 2006 were projected to 2004, the central year of 2002–2006. Cause-specific age-adjusted mortality rates were computed (ESM2).

The contribution of age groups and causes of death to socioeconomic inequalities in life expectancy was evaluated using Arriaga's method (Arriaga 1984; Preston et al. 2001). This method was chosen for its ease in identifying the specific age and cause groups responsible for the life expectancy gap (Khang et al. 2010). Arriaga's method requires two steps: (1) calculate the absolute difference in life expectancy between the most socioeconomically advantaged and disadvantaged quintiles for each language and sex, and (2) partition the absolute difference in life expectancy into its age and cause of death components. To illustrate the procedure in a practical example, consider two groups with a 5-year difference in life expectancy, and that Arriaga's decomposition shows cardiovascular causes contributed to 40 % of the difference, injuries to 25 %, and lung cancer to the remaining 35 % (total 100 %). In this example, we can conclude that cardiovascular causes contributed 2.0 years to the life expectancy gap, injuries 1.25 years, and lung cancer 1.75 years (total 5 years). Thus, tobacco-related causes in this

fictitious example accounted for up to 75 % of the life expectancy gap (2.0+1.75=3.75 years), and targeting risk factors or treatments toward these causes by health policy would be warranted to reduce the inequality. Similarly, decomposition of the life expectancy gap can be performed by age group, as well as for causes within a specific age group. We used Arriaga's method to decompose the life expectancy gap between the most socioeconomically advantaged and disadvantaged Montrealers by language and sex. The analysis was performed for each imputed dataset, and the mean was calculated after ensuring that results were similar for each imputation.

In sensitivity analyses, Arriaga's method was used to evaluate the life expectancy gap between the second most disadvantaged and most advantaged quintiles. Statistical analyses were undertaken with SAS 9.1 (SAS Institute Inc., Cary, NC). Data were anonymized, and the institutional review board of the University of Montréal Hospital Centre waived the requirement for ethical review.

Results

The population of Montréal increased from 3.07 million in 1991 to 3.50 million in 2006. The population was 69.2 % Francophone in both periods, but by 2006 there were 1.8 % fewer Anglophones (19.0 % in 1991, 17.2 % in 2006) despite an overall increase in the Anglophone population. The population increased over time in all except the most advantaged quintile, where Anglophones decreased by 16.7 % between 1991 and 2006.

Life expectancy at birth was lower in disadvantaged quintiles in both periods, but the socioeconomic gradient was less apparent for Anglophone women (Table 1). Although life expectancy increased over time for almost all socioeconomic quintiles, the gap between advantaged and disadvantaged men and women increased for Francophones, and decreased for Anglophones. Furthermore, the gap increased more for Francophone women (2.8 years) than men (0.3 years), whereas the gap decreased slightly more for Anglophone men (1.0 year) than women (0.6 years).

The relatively large 2.8-year increase in the socioeconomic gap for Francophone women was caused by underlying trends in cardiovascular disease, cancer and residual causes over the period of study (Fig. 1), as mortality rates for these causes declined more in advantaged than disadvantaged Francophones (except lung cancer mortality rates that increased more in disadvantaged than advantaged women; ESM2). For Francophone men, the smaller 0.3-year increase in the gap was caused by slightly greater contributions from leading tobacco-related causes of death (cardiovascular, cancer, respiratory) over time, for which mortality rates again declined more in advantaged than in disadvantaged Francophones. However, reductions in mortality from HIV and transport injuries in disadvantaged Francophone men over time prevented the gap from widening further. When the increase in the gap over time was partitioned by age, Francophone men and women aged ≥65 years were the main contributors, whereas no clear age-specific pattern was present for Anglophones (data not shown).

Table 1 Life expectancy at birth (95 % confidence interval) for disadvantaged and advantaged Francophones and Anglophones, Montréal, 1989-1993 and 2002-2006

	Francophone		Anglophone	
	1989–1993	2002–20006	1989–1993	2002–2006
Men				
Advantaged	74.1 (74.1–74.1)	79.2 (79.2–79.2)	78.5 (78.4–78.7)	80.4 (80.3–80.4)
Middle-advantaged	73.0 (72.9–73.0)	78.1 (78.1–78.1)	76.5 (76.4–76.6)	79.1 (79.0–79.3)
Middle	72.5 (72.5–72.5)	76.7 (76.7–76.7)	76.0 (75.9–76.2)	79.7 (79.6–79.8)
Middle-disadvantaged	70.4 (70.4–70.4)	75.5 (75.5–75.5)	74.0 (73.8–74.1)	77.4 (77.3–77.6)
Disadvantaged	69.0 (68.9–69.0)	73.7 (73.7–73.8)	72.6 (72.5–72.7)	75.4 (75.2–74.6)
Difference in life expectancy[a]	5.2	5.5	6.0	5.0
Women				
Advantaged	79.9 (79.8–79.9)	84.3 (84.3–84.4)	82.9 (82.8–83.0)	83.8 (83.7–83.9)
Middle-advantaged	79.6 (79.5–79.6)	82.3 (82.3–82.3)	81.6 (81.4–81.8)	84.0 (83.8–84.1)
Middle	79.6 (79.5–79.6)	81.8 (81.8–81.8)	83.6 (83.3–83.8)	83.1 (83.1–83.2)
Middle-disadvantaged	78.3 (78.3–78.3)	81.3 (81.2–81.3)	81.0 (80.9–81.0)	84.2 (84.0–84.5)
Disadvantaged	78.3 (78.3–78.3)	80.0 (80.0–80.0)	80.6 (80.5–80.8)	82.2 (82.1–82.4)
Difference in life expectancy[a]	1.6	4.4	2.2	1.6

[a] Absolute difference in life expectancy at birth between advantaged and disadvantaged quintiles

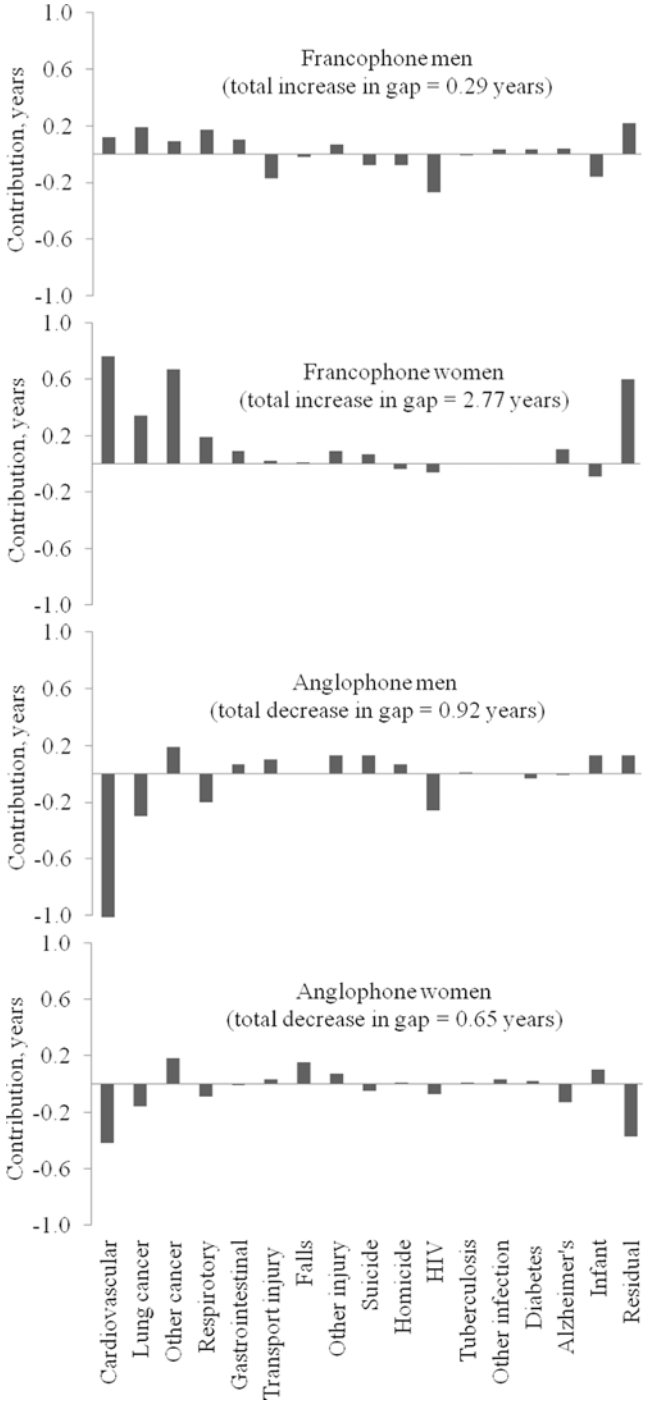

Fig. 1 Change in life expectancy gap between advantaged and disadvantaged Francophones and Anglophones from 1989–1993 to 2002–2006, by cause of death. *Bars pointing upward* widened the gap over time, and *bars pointing downward* narrowed the gap

The 1.0-year decrease in the socioeconomic gap for Anglophone men was caused by reductions in cardiovascular disease mortality (as well as lung cancer, respiratory causes, and HIV; Fig. 1) that were relatively greater in disadvantaged than advantaged Anglophones (ESM2 shows that the speed of the decrease in mortality rates was faster for disadvantaged Anglophones). In women, the 0.6-year decrease in the gap was primarily due to reductions in mortality from cardiovascular disease and residual causes that were relatively greater in disadvantaged Anglophones. Interestingly, lung cancer in women prevented the gap from narrowing because mortality rates increased in advantaged and decreased in disadvantaged Anglophones. There was no clear pattern in age-specific contributions to the socioeconomic gap over time for Anglophone women (data not shown).

By 2002–2006, socioeconomic gaps in life expectancy were wide for Francophone men (5.5 years) and women (4.4 years), as well as Anglophone men (5.0 years)—the gap was narrower for Anglophone women (1.6 years). Top causes contributing to the 5.5-year gap for Francophone men in 2002–2006 were cardiovascular disease (26 %), lung cancer (17.2 %), and other cancers (10.6 %; Table 2). The same causes contributed to the 4.4-year gap in Francophone women, but the contribution from other cancers was greater (17.2 %). In Anglophone men, the 5.0-year gap was caused by cardiovascular causes (23.0 %) and other cancers (21.4 %), and the contribution from lung cancer was smaller though still important (11.3 %). The 1.6-year gap in life expectancy for Anglophone women was also mainly due to contributions from cardiovascular disease (31.3 %) and other cancers (37.5 %). Infant-related causes accounted for a larger proportion of the socioeconomic gap among Anglophones than Francophones. Age-specific contributions in 2002–2006 indicated that individuals aged ≥45 years were the principal contributors to the socioeconomic gap for Francophones (Table 3). The same age groups contributed to the gap for Anglophone men, but not Anglophone women (females aged 45–64 years accounted for 70.0 % of the gap). In sensitivity analyses, similar though slightly attenuated results were obtained for the life expectancy gap between the second most disadvantaged and most advantaged quintiles.

Discussion

Main finding of this study

This study found widespread socioeconomic inequalities in life expectancy among Francophones and Anglophones of a large Canadian metropolitan centre, driven primarily by tobacco-related diseases, including cardiovascular and lung cancer mortality. Furthermore, substantial changes in life expectancy over time occurred across socioeconomic quintiles for both language groups, patterned by underlying trends in tobacco-related mortality that differed by socioeconomic level. Socioeconomic inequalities in life expectancy increased for Francophones, but decreased for Anglophones, and the underlying reasons were that reductions in tobacco-related

Table 2 Causes of death contributing to the life expectancy gap between advantaged and disadvantaged Francophones and Anglophones, Montréal, 2002–2006. Percentages correspond to the proportionate contribution of the cause relative to the difference in life expectancy at birth for each language group

	Francophone		Anglophone	
	Men, years (%)	Women, years (%)	Men, years (%)	Women, years (%)
Cardiovascular	1.42 (26.0 %)	1.13 (25.9 %)	1.16 (23.0 %)	0.50 (31.3 %)
Cancer				
Lung	0.94 (17.2 %)	0.63 (14.5 %)	0.57 (11.3 %)	0.19 (11.9%)
Other	0.58 (10.6 %)	0.75 (17.2 %)	1.08 (21.4 %)	0.60 (37.5 %)
Respiratory	0.43 (7.9 %)	0.34 (7.8 %)	0.29 (5.8 %)	0.02 (1.3 %)
Gastrointestinal	0.39 (7.1 %)	0.23 (5.3 %)	0.39 (7.7 %)	0.18 (11.3 %)
Injury				
Transport injuries	0.07 (1.3 %)	0.05 (1.2 %)	0.01 (0.2 %)	0 (0 %)
Falls	0.04 (0.7 %)	−0.01 (−0.2 %)	0.04 (0.8 %)	0.06 (3.8 %)
Other unintentional	0.22 (4.0 %)	0.11 (2.5 %)	0.27 (5.4 %)	0.10 (6.3 %)
Suicide	0.32 (5.9 %)	0.19 (4.4 %)	0.21 (4.2 %)	−0.03 (−1.9 %)
Homicide	0.04 (0.7 %)	0.01 (0.2 %)	0.17 (3.4 %)	0.06 (3.8 %)
Infectious diseases				
HIV	0.09 (1.7 %)	0.03 (0.7 %)	0.04 (0.8 %)	−0.02 (−1.3 %)
Tuberculosis	0.01 (0.2 %)	0 (0 %)	0.01 (0.2 %)	0.02 (1.3 %)
Other reportable	0.02 (0.4 %)	0 (0 %)	0 (0 %)	0.02 (1.3 %)
Diabetes	0.03 (0.6 %)	0 (0 %)	0.02 (0.4 %)	0.01 (0.6 %)
Alzheimer's	0.02 (0.4 %)	0.07 (1.6 %)	−0.01 (−0.2 %)	−0.15 (−9.4 %)
Infant	0.17 (3.1 %)	0.12 (2.8 %)	0.29 (5.8 %)	0.22 (13.8 %)
Residual	0.66 (12.1 %)	0.71 (16.3 %)	0.50 (9.9 %)	−0.19 (−11.9 %)
Difference in life expectancy[a]	5.46	4.36	5.04	1.60

[a] Absolute difference in life expectancy at birth between advantaged and disadvantaged quintiles

mortality were larger for advantaged than disadvantaged Francophones, whereas mortality reductions were larger for disadvantaged than advantaged Anglophones.

What is already known and what this study adds

Existing data suggest that socioeconomic inequalities in mortality between poor and wealthy neighbourhoods of metropolitan areas gradually decreased in Canada over time (James et al. 2007; Wilkins et al. 2002), which contrasts with increasing inequalities observed in Québec alone (Adam-Smith et al. 2011). Trends in the whole of Canada, however, represent the Anglophone majority, whereas those in Québec where French is the official language are dominated by Francophones. Our results therefore suggest that the increase in socioeconomic inequalities in mortality found for Québec (Adam-Smith et al. 2011) was driven by Francophones. The primary reason for this increase was tobacco-related and due to rates of cardiovascular and cancer mortality that fell more quickly for advantaged than disadvantaged Francophones (except female lung cancer mortality rates that increased, especially for disadvantaged women). Although the upstream reasons that led to the divergence in socioeconomic inequality between Francophones and Anglophones are unclear and historical data on tobacco consumption patterns of the two groups are not available, we hypothesize that underlying differences in social status (and, consequently, tobacco use) may be related. Francophones were historically disadvantaged relative to Anglophones, but evidence of convergence in socioeconomic status of both groups in past decades (Auger et al. 2012) may have preferentially decreased mortality of advantaged over disadvantaged Francophones. In contrast, mortality of advantaged Anglophones may have improved much earlier in the century, with mortality of disadvantaged Anglophones catching up later on. Although this hypothesis cannot be verified, its implication is that mortality of disadvantaged Francophones may eventually catch up to advantaged Francophones. This process may, however, be slow without concerted efforts to reduce cardiovascular and cancer mortality in disadvantaged Francophones, and inequalities may potentially widen more beforehand. Tobacco reduction strategies may be particularly warranted, since smoking is a well-established risk factor for both cardiovascular and cancer mortality.

Table 3 Age groups contributing to the life expectancy gap between advantaged and disadvantaged Anglophones and Francophones, Montréal, 2002–2006. Percentages correspond to the proportionate contribution of the cause relative to the difference in life expectancy at birth of the language group

	Francophone		Anglophone	
	Men, years (%)	Women, years (%)	Men, years (%)	Women, years (%)
1–14 years				
<1	0.18 (3.3 %)	0.14 (3.2 %)	0.29 (5.8 %)	0.22 (13.8 %)
1–4	0.10 (1.8 %)	0.08 (1.8 %)	0.01 (0.2 %)	0.13 (8.1 %)
5–14	0.08 (1.5 %)	0.03 (0.7 %)	0.03 (0.6 %)	−0.06 (−3.7 %)
15–44 years				
15–24	0.18 (3.3 %)	0.13 (3.0 %)	0.17 (3.4 %)	0.04 (2.5 %)
25–34	0.08 (1.5 %)	0.08 (1.8 %)	0.17 (3.4 %)	0.06 (3.7 %)
35–44	0.50 (9.2 %)	0.35 (8.1 %)	0.23 (4.6 %)	0.24 (15.0 %)
45–64 years				
45–54	1.00 (18.3 %)	0.70 (16.1 %)	0.85 (16.8 %)	0.23 (14.4 %)
55–64	1.09 (20.0 %)	0.80 (18.4 %)	1.03 (20.4 %)	0.89 (55.7 %)
≥65 years				
65–74	1.41 (25.8 %)	1.03 (23.6 %)	1.61 (31.9 %)	0.71 (44.4 %)
75–84	0.65 (11.9 %)	0.55 (12.6 %)	0.41 (8.2 %)	0.18 (11.2 %)
≥85	0.18 (3.3 %)	0.48 (11.0 %)	0.25 (5.0 %)	−1.05 (−65.6 %)
Difference in life expectancy[a]	5.46	4.36	5.04	1.60

[a] Absolute difference in life expectancy at birth between advantaged and disadvantaged quintiles

It is interesting to point out that language-based differentials in mortality independent of social status were found in Finland, where the Finnish-speaking majority had higher mortality from suicide, injury, and alcohol-related causes than the Swedish-speaking minority (Sipila and Martikainen 2009). Although similar causes contributed to Francophone-Anglophone differences in life expectancy in Québec (Auger et al. 2012), the socioeconomic (rather than linguistic) gap in life expectancy was by 2002–2006 mainly driven by tobacco-related causes and mortality at older ages, as well as infant mortality in Anglophones. It is also interesting that the life expectancy gap between advantaged and disadvantaged individuals increased in Finland since the 1970s, mainly due to trends in cancer and cardiovascular mortality that were less favourable in disadvantaged Finns (Martikainen et al. 2001; Tarkiainen et al. 2012). The gap was, however, not decomposed by language and it is difficult to know if patterns may have been different for Finnish than for Swedish-speakers, as was the case for Anglophones and Francophones in Québec. To our knowledge, Korea is the only other place where socioeconomic inequalities in life expectancy were decomposed: cancer, cardiovascular disease, digestive disease, transport injury, and suicide were important contributors to the Korean gap (Khang et al. 2010). Racial/ethnic gaps in life expectancy that were partitioned in the US suggest that cardiovascular disease, homicide, HIV and infant mortality were important contributors to the Black-White gap (Harper et al. 2007), and interestingly that cardiovascular disease in Israel was an important contributor to the Arab-Jewish gap (Na'amnih et al. 2010). Taken as a whole, the large contribution of cardiovascular disease and cancer to inequalities in life expectancy in these countries attests to the importance of tobacco use as a driver of not only socioeconomic but also racial/ethnic or cultural inequalities worldwide.

Policy implications

This study found that socioeconomic inequalities in life expectancy of Francophones and Anglophones were driven largely by causes of death linked with tobacco use. Although Canada is a leader in tobacco control, efforts to reduce the burden of disease from smoking are likely needed to reduce socioeconomic inequalities in mortality, especially in Québec, the province with the highest smoking rates (Canadian Tobacco Use Monitoring Survey 2003). Canada's strict tobacco laws (Department of Justice 1997), supplemented with laws in Québec regulating marketing to children and youth (Office de la Protection du Consommateur 1978), were insufficient to prevent an increase socioeconomic inequality in mortality among Francophones from causes known to be linked with tobacco. Our findings imply that renewed efforts to promote tobacco cessation, prevent smoking initiation in youth, and enhance tobacco laws may be warranted, particularly for disadvantaged Francophones of Québec. It may be helpful to determine whether the tobacco industry specifically targeted

Francophones in marketing, so as to strengthen existing tobacco laws and protect vulnerable populations in Canada.

Limitations of this study

This study has limitations. Data were aggregated, and inference to individuals should be avoided due to potential for ecologic bias. Individual data on potential mediators such as income and education were not available, and use of a composite index of deprivation did not allow us to determine the contribution of specific components of socioeconomic status to mortality inequalities. Misclassification of language or cause of death on death certificates may have attenuated the results since errors were likely non-differential. The extent to which Anglophones who moved to other provinces may have influenced results is unknown, though it is reassuring that results for Anglophones resembled the rest of Canada. Mobility of Anglophones is expected to have attenuated the degree of socioeconomic inequality in life expectancy, since Anglophones who moved likely had higher longevity due to socioeconomic advantage and greater health (Floch and Pocock 2008). A relatively large proportion of the population was institutionalized at time of death, and information on socioeconomic deprivation was therefore missing. Our results therefore potentially underestimate the degree of socioeconomic inequality in life expectancy, since individuals with low socioeconomic status may be more likely to be institutionalized. Generalizability to non-urban areas or other countries is unclear. Lastly, Arriaga's method may underestimate the contribution of causes that are concentrated at older ages (Beltran-Sanchez et al. 2008); hence, our results represent conservative estimates.

Conclusion

This study found that socioeconomic inequalities in mortality increased for Francophones in a Canadian metropolitan centre over time, and decreased for Anglophones. Using innovative methods in demography, we illustrate how analytic approaches based on decomposition of measures of inequality can be used to determine the contribution of specific causes of death to inequalities in health. In this Canadian setting, health policies to reduce socioeconomic inequalities in mortality should acknowledge the significantly lower life expectancy of disadvantaged Francophones, and focus interventions on leading causes of mortality including cardiovascular disease and cancer. Because tobacco use is a major risk factor for both these causes, socioeconomic inequality in Francophone life expectancy is unlikely to decrease without substantial investment in prevention and reduction of tobacco use in disadvantaged populations.

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Conflict of interest The authors declare that they have no conflict of interest.

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