

Adult mortality in preindustrial Quebec

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Abstract

This paper presents the main results of a detailed study on adult mortality in French Canadians born before 1750 and having married in the colony of New France. Using data from parish registers, mortality is studied using abridged life tables, with staggered entries according to age at first marriage. Survival tables and log-Rank tests are used to support the results. Three features were selected for the study of differential mortality: gender, type of residence area (urban or rural), and cohort. The mortality of French Canadians is compared to that of their French contemporaries.

Keywords: *adult mortality, preindustrial Quebec, life tables, historical demography.*

Résumé

Cet article présente les principaux résultats d'une étude détaillée de la mortalité adulte des Canadiens-français nés avant 1750 et ayant contracté mariage sur le territoire de la colonie de Nouvelle-France. Réalisée à partir de données tirées de registres paroissiaux, la mortalité est étudiée par le biais de tables de mortalité abrégées avec entrées échelonnées selon l'âge au premier mariage. Trois caractéristiques ont été retenues pour l'étude de la mortalité différentielle, soit le sexe, le type de région de résidence (urbain ou rural) et la cohorte. En outre, le comportement de mortalité des Canadiens-français est comparé à celui de leurs contemporains Français.

Mots-clés : *mortalité adulte, Québec ancien, tables de mortalité, démographie historique.*

Introduction

French Canadian mortality has already been studied in the past by demographers. Hubert Charbonneau is one of the researchers who contributed the most to the study of this subject matter. He studied the demographic profile of the pioneers (1987) and the first Canadian-born (1975), and participated in the creation of the *Registre de la population du Québec ancien* (RPQA)¹ database. Using the genealogies of Archange Godbout, he estimated that less than 60% of newborns reached the age of majority, or age 25, 37% reached age 50, and 5% reached age 80; about 60% of the Canadian-born who married at age 25 reached age 50 (Charbonneau 1975; Henripin 2003). The demographer also pointed out that women suffered excess mortality during their fertile period due to childbirth complications, and that men experienced excess mortality after the age of 50. However, Charbonneau used the utmost caution in stating that “the condition of data sources” could not allow him to rule on the subject with as much authority he would have liked. In addition, he found that the cohorts (sexes combined) of 1640–79, 1680–99, and 1700–29 had differential mortality (Charbonneau 1975).

1. *Le Programme de recherche en démographie historique* (PRDH). Online: <http://www.genealogie.umontreal.ca/fr/leprdh.htm>.

Otherwise, in implementing what had been observed for the contemporary France population to the New France colony population, Charbonneau also proposed that urban and rural groups of the New France colony had differential mortality (Charbonneau 1976; Gadoury et al. 1985). He also hypothesized that the mortality of the French Canadians was lower than that of the French due to healthier living conditions (Charbonneau 1987).

Various other studies have focused on adult mortality of the first Canadian-born. Hélène Periers (1992), for example, studied Trois-Rivières’ population mortality—without, however, comparing it to that of the rest of the French Canadian population. Louis Pelletier (1993) found during his research on the Catholic clergy in New France that life expectancy at age 20 differed for the clergy and for married French Canadians. Priests and missionaries in New France enjoyed more favourable living conditions than the general population, while the nuns, on the other hand, had the worst living conditions, being exposed to epidemic diseases when providing medical care to the patients of the colony’s hospitals (Pelletier 1993). Carles Simo Nugera (1994) focused on the demographic profile of the New France bourgeoisie which would have had a different demographic profile from the other socioeconomic groups of the colony, and Patrick Paillé (1994) studied smallpox deaths in the overall population. Robert Bourbeau, Jacques Légaré, and Valérie Émond (1997) developed abridged life tables for both sexes of Quebec’s cohorts from 1801 to 1941; according to the abridged life table for Quebec’s 1801 cohort, at age 20 men could expect to live 39.2 years more and women 40.8 years more.

The factors influencing French Canadians’ longevity have been studied using the RPQA database. For example, Bertrand Desjardins and Hubert Charbonneau (1990) published the results of a study that examines “intergenerational longevity.” This study supports the existence of a correlation between parents and their children’s ages at death. Marie-Ève Blackburn et al. (2004) found positive correlations between mothers’ and children’s ages at death and between fathers’ and daughters’ ages at death. They also pointed out that partners’ ages at death could be correlated due to environmental factor influencing longevity. Ryan Mazan and Alain Gagnon (2007) focused on the influence of family and environmental factors on longevity. They estimated that nearly 48% of men and 51% of women for whom the age at death is known lived to at least 50 years old, and found significant differences between urban and rural mortality.

French Canadian mortality has been studied previously on the base of genealogies (Charbonneau 1975) or for immigrants (Charbonneau 1987). The objective of the current study is to establish a new estimation of French Canadian mortality with a much more complete database, as described below, using the same characteristics as Charbonneau did to study differential mortality. This is the first time that life tables for the Canadian-born are published based on the RPQA database.

Data source: the Registre de la population du Québec ancien

The RPQA exhaustively covers the Canadian population of European strain and Catholic religion who lived in the St. Lawrence River valley from 1608 to 1799 (Desjardins 1998). A true population laboratory, the RPQA contains approximately 800,000 acts (baptisms, marriages, and burials), “that is to say, all of the acts of the parish registers of Quebec prior to 1800” (Desjardins 1998). All the recorded death acts dated after 1799 concerning married individuals born before 1750 have been identified and attributed to the individuals to which they relate, with a view to studying the mortality of all adults born before 1750. Of some 57,800 Catholic individuals born in the colony before 1750 and who became married, the date of death is known for 88% of them, and another 3% are identified as having left the colony. Such conditions are quite exceptional for a population of the past. The quality of this data source is well documented. Missing acts are the result of random loss of records, without selection that can bias the results (Charbonneau 1975). One caveat, however: at this time, it is possible that some death acts for men of the 1766–99 period have not been assigned to the corresponding person because of their poorer quality; it is not possible to evaluate their exact number, but this might have the effect of slightly underestimating male mortality in the later cohorts.

Corpus: married adults

The exclusion of immigrants and rare natives is done to provide the greatest possible homogeneity to the corpus. Moreover, the reason the study focuses on the married adult population is that it is subject to much better observation than singles. According to Hubert Charbonneau, under-registration of deaths affects singles more than married people. “On the one hand, they [the married people] are better identified in the records; on the other hand, men

Table 1. Distribution of the corpus by sex and knowledge of death date.

	Men	Women	All
	n		
Born and married in Canada before 1800	26,324	30,311	56,635
Known death date	23,254	27,439	50,693
Missing death date	3,070	2,872	5,942
Identified as having left the colony	198	298	496
Individuals taken into account in the life tables	23,452	27,737	51,189
	%		
Born and married in Canada before 1800	100.0	100.0	100.0
Known death date	88.3	90.5	89.5
Missing death date	11.7	9.5	10.5
Identified as having left the colony	0.8	1.0	0.9
Individuals taken into account in the life tables	89.1	91.5	90.4

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

were probably less likely to travel across the Pays-d'en-Haut² once married” (Charbonneau 1975). Also, almost all of the French Canadians who reached adulthood were married (95%). A higher proportion of men than of women remained unmarried definitively. However, the study of the singles’ mortality is complex because of the problem of under-observation of singles.

After removing from the corpus individuals for whom age at death is unknown or who married outside the colony’s territory, it consists of 51,189 individuals (Table 1). Among those individuals, 91.4% are associated with an accurate date of birth, and 8.6% with an estimated date of birth that usually comprises only the year. The reported age in the registered acts is the main element used in estimating dates of events not recorded. The estimation of these dates is of good quality, because the history of French Canadian families is detailed in the database. It ensures the coherence of each birth relative to the others which occurred in the family. When only the year of birth is indicated—that is, for the majority of the approximate dates—it is assumed that they were in the middle of the year, or on July 1, for the purpose of calculating the age at death of those individuals. For some approximate dates of birth, the year and the month are indicated; it was assumed that these births were in the middle of the month, or the 15th day of the month.

Using acts of marriage from parish registers (96.4%) and notarial deeds (3.0%), 99.4% of the dates of first marriage can be determined accurately. For the dates of first marriage that are approximated (0.6%), the hypothesis that those marriages occurred a year before the first birth recorded in the family is assumed. It is based on the fact that a majority of the first births occurred in the first year of marriage in the context of the natural fertility of the time (Henry 1973).

Some 496 individuals are identified as having left the colony in the years that followed their first marriage. For those individuals, only the year of last mention in the records of the colony is indicated in the database. It was hypothesized that the outputs of observation occurred in the middle of the year, or on July 1. In this way, a more accurate estimate of the duration of stay of those persons in the territory of New France was obtained.

Methodology

The main method of analysis used consists of abridged life tables, with entries staggered according to age at first marriage and five-year age intervals. The realization of the life tables is based on the method of Louis Henry (1980). Kaplan Meier type survival curves and log-Rank tests are used to determine whether observed differences between population groups are significant.

Women’s life tables start at age 10. Although the minimum age at marriage for girls permitted by the Catholic Church was 12, six French Canadian girls in the corpus were married before reaching their twelfth birthday: one at

2. According to the *Encyclopédie canadienne*, the *Pays-d'en-haut* during the New France period refers to what is now the northwestern part of the province of Quebec.

Table 2. Population under observation by sex, place of residence and cohort.

	Men	Women	All
Deceased on the territory	23,254	27,439	50,693
Having left the colony	198	298	496
Total	23,452	27,737	51,189
Place of residence			
City	3,375	5,357	8,732
Quebec	1,540	2,555	4,095
Montreal	1,621	2,511	4,132
Trois-Rivieres	214	291	505
Countryside	19,840	22,052	41,892
Undetermined in Quebec	39	30	69
Total	23,254	27,439	50,693
Cohort			
1620–1699	4,289	5,336	9,625
1700–1729	8,619	10,090	18,709
1730–1749	10,346	12,013	22,359
Total	23,254	27,439	50,693

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

age 10 and five at age 11. Men’s life tables start at age 15 since no marriage was contracted before that age by French Canadian boys.

Excluding the emigrants from the population at risk should theoretically overestimate the French Canadian mortality. However, for the study of differential mortality between regions, the place where death occurred is used as a proxy variable for place of residence. Since the emigrants died outside the colony’s territory, they could not be included in the population at risk within the life tables associated with different regions of residence (Table 2). In addition, as identified emigrants are few, they account for less than 1% of the corpus (Table 1). With rounding, the five-year mortality quotients and the life expectancies are the same, whether emigrants are taken into account or not. They were removed from the population at risk in nine of the ten life tables. The difference caused by the exclusion of the emigrants in the population at risk is virtually zero. The difference is 0.1‰ for death rates of exact ages 10, 15, and 20, and 0.0‰ for other exact ages, except at age 70 for men, where a difference of 0.1‰ is observed.

Results

Female excess mortality during their fertile period

At age 20, married women could expect to live 38.9 years longer and married men 42.6 years longer (Table 3). The five-year mortality quotients established for women are higher than those established for men at the exact ages of 15 to 40, or during the fertile period of women (Fig. 1). This female excess mortality comes from the risks associated with motherhood. Indeed, many women died in childbirth or following a difficult delivery (Charbonneau 1975). The gap between the sexes is about 33 points per thousand at exact age 15, 27 points at age 20, 28 points at ages 25 and 30, 33 points at age 35, and 22 points at age 40. At exact ages 45 to 80, five-year mortality quotients for men are slightly higher than those of women. This could be due to a selection effect for women who have reached the age of 50 and, therefore, survived their fertile period. In the context of the natural fertility of the time, women were having an average 9.2 children each (Charbonneau 1975; Mazan and Gagnon 2007). The women who survived their fertile period could be considered “resistant” (Mazan and Gagnon 2007).

The Kaplan-Meier survival table made for this differential mortality reveals that at age 40, when men’s life expectancy catches up to that of women, 89.5% of the men in the corpus were still alive, compared to 77.8% of the women; the gap is 11.7 percentage points. The proportion of surviving men at age 40 (89.5%) is equivalent to that of the women at age 30 (89.3%). It is only at age 80 that the proportions of surviving men and women are the same (13.7% and 13.5%, respectively). In the corpus, 77% of Canadians whose marriage was celebrated at age 25 reached the age of 50, or 72% of the women and 81% of the men. The log-Rank test for this differential mortality is significant at the 1% threshold, confirming that the survival of both sexes varies significantly.

Table 3. French Canadians' life expectancies at some accurate ages by sex and studied characteristics, %.

Exact ages	All		Areas			Cohorts		
	All ¹	Quebec City	Montreal	Countryside	Before 1700	1700–1729	1730–1749	
Men								
20	42.6	36.7	34.1	38.8	43.7	40.6	42.0	44.0
30	35.6	30.7	28.6	32.2	36.4	33.7	35.0	36.8
40	28.0	24.7	22.7	26.1	28.6	26.7	27.8	28.7
50	20.8	18.4	17.4	19.1	21.1	19.6	21.0	21.0
60	14.0	12.3	11.6	12.6	14.2	13.1	14.5	14.0
70	8.6	7.8	7.2	8.1	8.7	8.2	8.8	8.7
80	5.1	4.7	4.3	4.9	5.1	5.1	5.1	5.1
90	3.2	3.8	3.5	4.1	3.1	2.7	3.4	3.2
Women								
20	38.9	35.0	33.6	36.1	39.9	39.4	38.2	39.2
30	33.7	30.6	29.3	31.5	34.5	33.5	33.2	34.3
40	28.1	25.8	24.6	26.5	28.6	27.8	28.0	28.3
50	21.5	19.6	18.7	20.1	21.9	20.9	21.8	21.5
60	14.6	13.4	12.5	14.0	14.9	14.1	15.0	14.5
70	9.0	8.1	7.7	8.3	9.2	8.5	9.3	9.0
80	5.2	4.8	5.0	4.7	5.3	5.1	5.2	5.2
90	3.4	3.6	3.9	3.4	3.4	3.1	3.5	3.5

¹ Includes Trois-Rivieres' population.

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

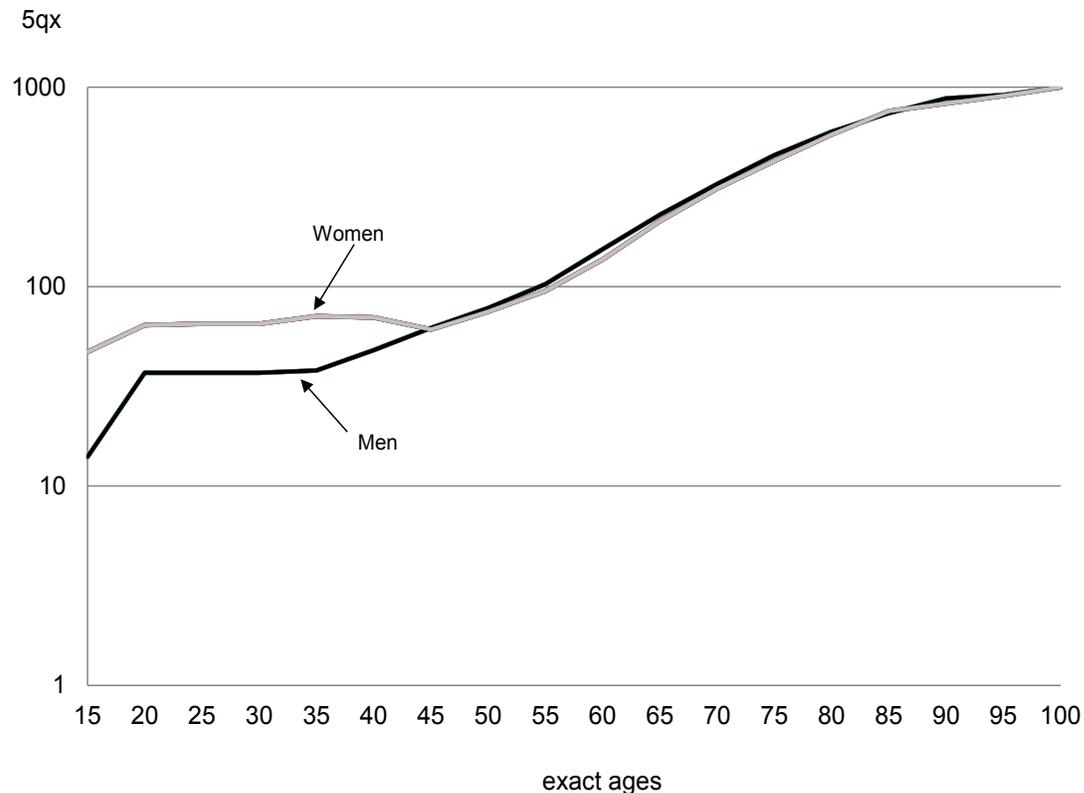


Figure 1. Married French Canadians' five-year death rates by age and sex (cohorts 1620–1749).

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

Higher death rates for urban population

At age 20, women living in the countryside could expect to live 4.9 years longer than those living in cities, and men could expect to live 7 years longer. Concerning the exact ages 20 to 85 for men and 15 to 80 for women, the highest five-year death rates are observed for the combined city population group (Quebec City, Montreal, and Trois-Rivieres) compared to the rural population group (Fig. 2). The Trois-Rivieres population has a mortality more comparable to that of the rural population, but was in the urban group because of the territorial division of the colony at the time, which made Trois-Rivieres an administrative and trade center and a city. Quebec City’s population is distinguished by the highest five-year death rates (Fig. 3) at the exact ages between 20 and 95. They are higher than those of Montreal by more than 25 points per thousand at age 20, and by more than 40 points per thousand at the exact ages 40, 45, and 55 for men. Married men who lived in Quebec City had a life expectancy of 34.1 years at age 20, compared to 38.8 years for those in Montreal and 41.4 years for those in Trois-Rivieres. Differences in the death rates are also observed for women. They reached 79 points per thousand at the exact age of 65, 74 points at age 75, and 50 points at age 15. Life expectancy at age 20 for the women is established at 33.6 years for those who lived in Quebec City, 36.1 years for those in Montreal, and 39.7 years for those in Trois-Rivieres.

The log-Rank tests for those mortality differentials are significant at the 1% threshold, confirming that population survival in urban areas was statistically different from that in rural areas, and that the survival of the population in each urban area was statistically different from that in the other urban areas.

Living conditions appear to be one of the two causes of this differential mortality between the population groups of the various areas, or between the countryside and the cities (Gadoury et al. 1985); this was especially the case in Quebec City, which was exposed to greater risks of early mortality due to an unhealthy environment. Boats of passengers and goods from Europe arrived there, exposing the population to additional risks of epidemics (Mazan and Gagnon 2007). The differential mortality between urban and rural population groups may be also associated with socioeconomic factors (Gadoury et al. 1985). More research is needed to confirm the influence of this latter factor as proposed by Gadoury, Landry, and Charbonneau (1985).

Observed mortality differential between male cohorts

The three female cohorts born in the colony’s territory before 1750 have rather similar mortality. The survival curves for this differential mortality do not attest to significant differences.

In contrast, the three male cohorts born in the colony’s territory before 1750 have differential mortality according to the data source. Indeed, five-year death rates for men born before 1700 appear higher than those of their compatriots born between 1700 and 1749 for almost all the exact ages presented in Table 4. In addition, five-year mortality quotients of those born in the first three decades of the 18th century are close to those of their compatriots born in the 17th century for the exact ages under 50, and close to those of their compatriots born between 1730 and 1749 at the exact ages 75 and 80. At the exact ages from 55 to 70, their death rates are lower than those of the cohorts born in the 17th century, but higher than those of the cohorts born in the two following decades. The five-year mortality quotients of the latter are lower than those of the two other cohorts for the exact ages before age 60. This could be the result of a decrease in the intensity of mortality of Canadians born at the beginning of the 18th century (between 1700 and 1729) for ages 60 to 90, and a decrease in the intensity of mortality among Canadians born between 1730 and 1749 for the ages 20 to 60 compared to the previous cohorts. At age 20, these cohorts had life expectancies of 40.6 years for those born before 1700, 42.0 years for those born in the first three decades of the 18th century, and 44.0 years for those born between 1730 and 1749.

The survival curves drawn for this differential mortality between male cohorts support the proposed hypothesis (Fig. 4). The proportion of survivors reached 83% at age 50 for the cohorts born between 1730 and 1749, compared to 77% for the other two groups; it is 43% and 41% at age 70 for cohorts born between 1700 and 1729 and between 1730 and 1749, respectively, and 36% for those born before 1700. The log-Rank test for this differential is significant at the 1% threshold. Despite this, further research is required in order to confirm or refute this finding because of the abovementioned possible risk of death acts of men not having been assigned. Future research should take this into account and try to determine whether it is due to a gap in the data source or to a real change in men’s mortality.

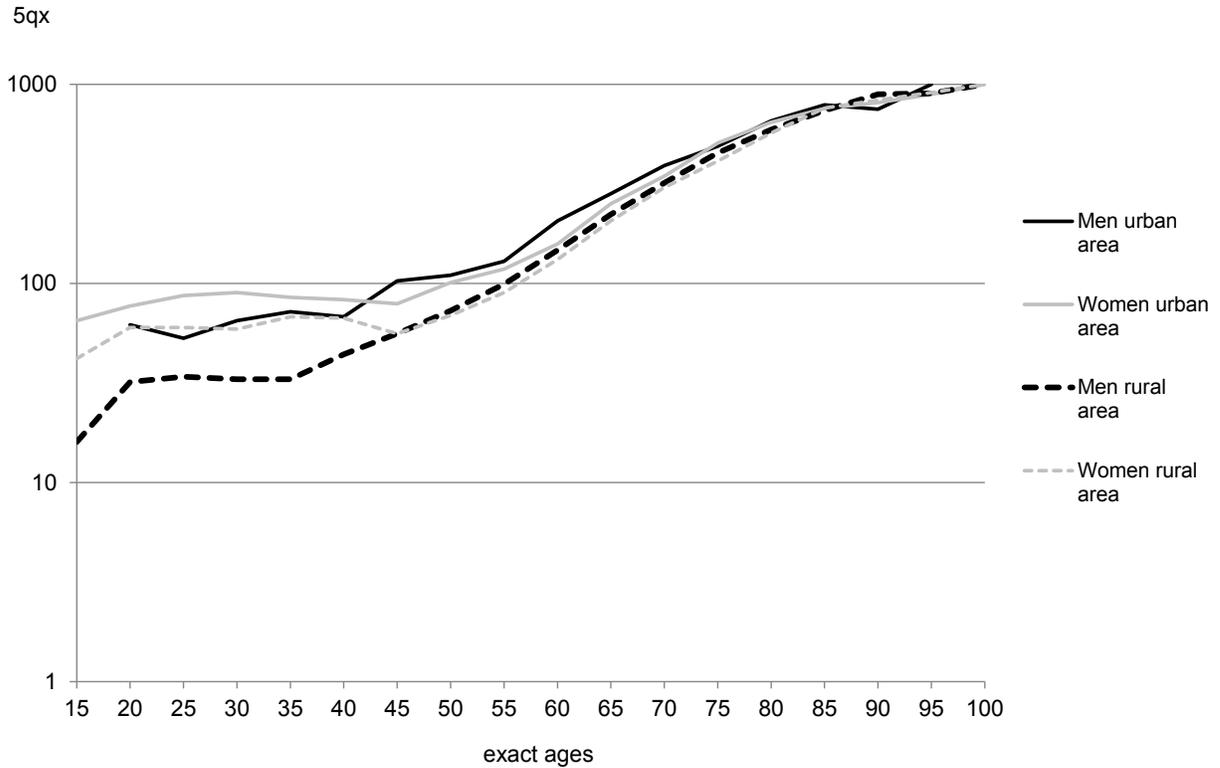


Figure 2. Married French Canadians' five-year death rates by sex, age, and type of residence area (cohorts 1620–1749).

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

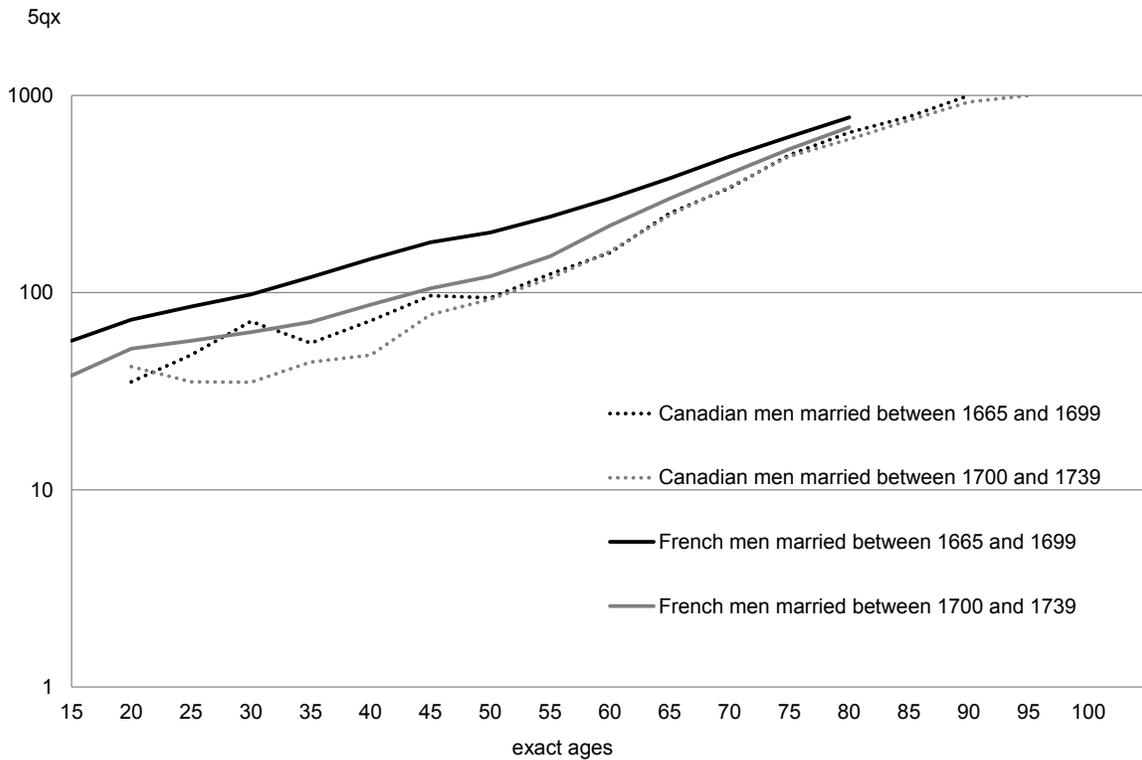


Figure 3. Married French Canadians' five-year death rates by sex, age, and city of residence (cohorts 1620–1749).

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

Table 4. French Canadians’ five-year mortality rates at some exact ages by sex and studied characteristics, %.

Exact ages	All		Areas			Cohorts		
	All ¹	Cities		Countryside		Before 1700	1700–1729	1730–1749
		Quebec City	Montreal					
	Men							
20	37	62	73	48	32	41	36	36
30	37	65	74	62	33	48	43	29
40	48	68	93	51	44	50	57	40
50	78	110	120	99	73	86	84	70
60	154	206	230	201	147	178	138	158
70	327	390	419	386	320	353	316	327
80	598	655	702	627	592	603	599	595
90	881	750	800	667	890	967	850	875
	Women							
20	64	77	83	73	60	48	66	70
30	65	90	98	81	59	68	71	59
40	70	83	89	77	67	65	72	71
50	75	101	105	102	69	78	76	72
60	137	158	182	144	132	146	133	135
70	310	346	371	335	303	341	288	314
80	579	645	620	668	569	584	575	580
90	829	809	722	862	832	871	818	826

¹ Includes Trois-Rivieres' population.

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

Lower death rates for Canadian adults compared to French adults

Hubert Charbonneau (1970) found that Canadians born before 1750 had lower adult mortality rates than those of their French contemporaries before age 80. Using extrapolated mortality quotients for married adults in Trourouvre-au-Perche in France (Charbonneau 1970), which can be considered representative of French rural mortality in Normandy, the Canadians’ mortality was compared to that of the French to see whether a similar conclusion to that of Hubert Charbonneau could be found.

For men married between 1665 and 1699, the Canadians’ death rates are actually lower than those for the French (Fig. 5). The gap, accounting for several points per thousand between the five-year death rates at all accurate ages between 20 and 80, reached 38 points per thousand at age 20, 64 points at age 35, 108 points at age 50, and 119 points at age 60. For those married between 1700 and 1739, the gap is the smallest. It is 28 points per thousand at age 30, 39 points at age 40, 28 points at age 50, and 53 points at age 65.

For women married between 1665 and 1699, the Canadian death rates are also lower than the French rates for almost all exact ages from 20 to 80 (Fig. 6). At age 15, the two female populations share the same mortality quotient of 56 per thousand. The mortality quotients of the Canadians are lower by 11 points per thousand at age 25, 43 points at age 40, 93 points at age 55, and 75 points at age 70. For those married between 1700 and 1739, the Canadian death rates are lower than those of the French at all accurate ages starting at 25. At ages 15 and 20, the two female populations have similar death rates.

The lower mortality rates observed for Canadians compared to those of the French should be due to a low population density and the slowness of transportation within the New France colony, which limited the spread of epidemics (Mazan and Gagnon 2007).

Conclusion

The mortality of adults in the past has always been difficult to measure because of the high degree of missing death information due to migration. The problem has been overcome in this case, since 90% of death dates are known. The mortality of French Canadians born before 1750 and married on New France’s territory depends on certain characteristics such as gender, type of residence area, and cohort. The study of the influence of those charac-

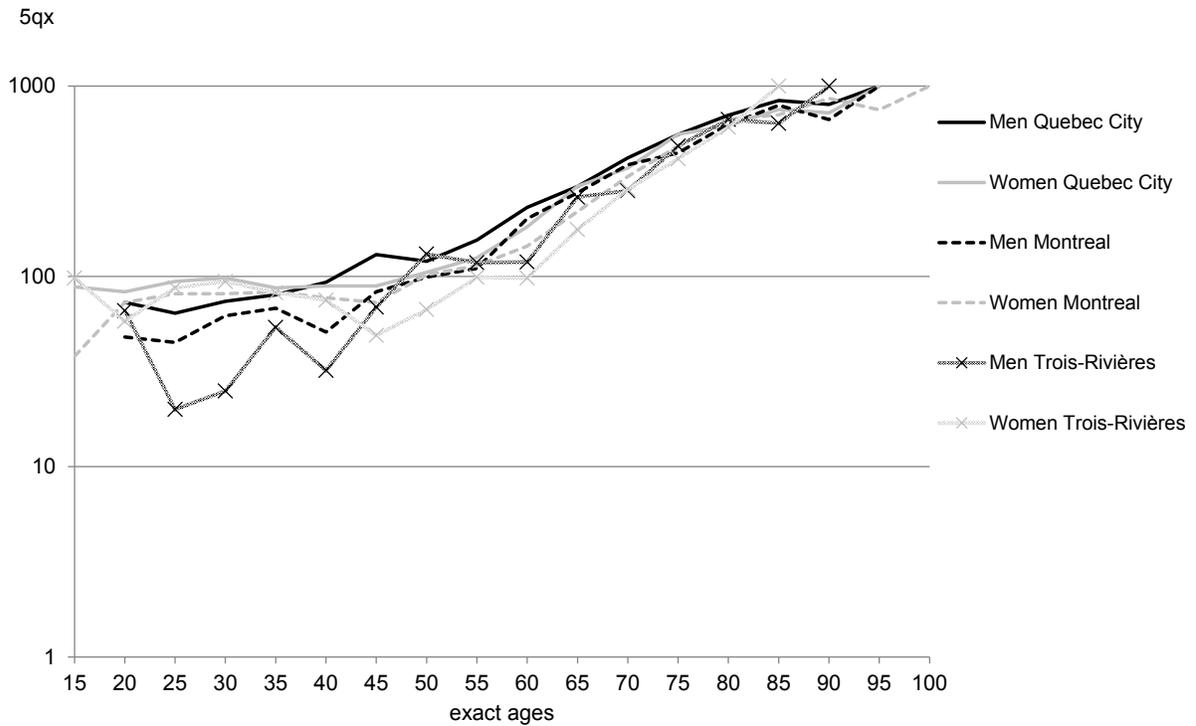


Figure 4. Married French Canadians' survival curves by sex and cohorts, 1620-1749.

Source: Programme de recherche en démographie historique (Historical demography research program), Registre de la population du Québec ancien.

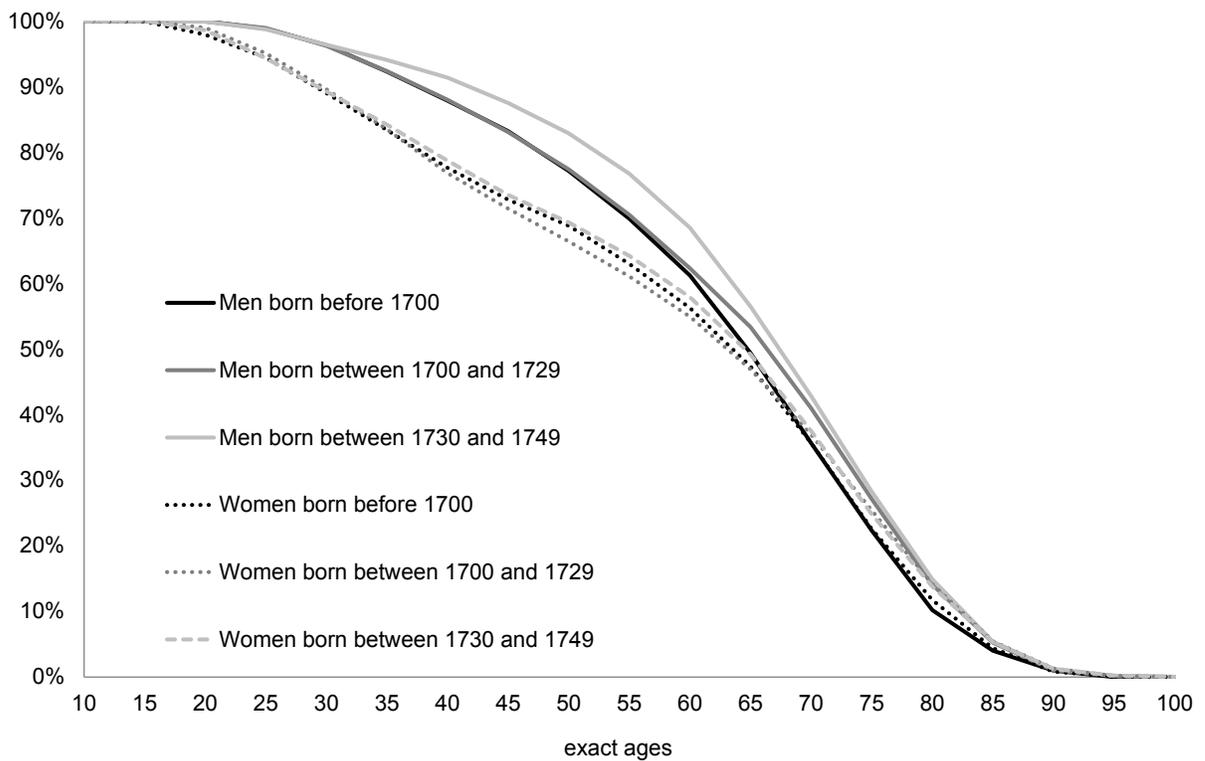


Figure 5. Married French and Canadian men's five-year death rates by age and cohort (1665-1739).

Source: Programme de recherche en démographie historique, Registre de la population du Québec ancien and Charbonneau (1970).

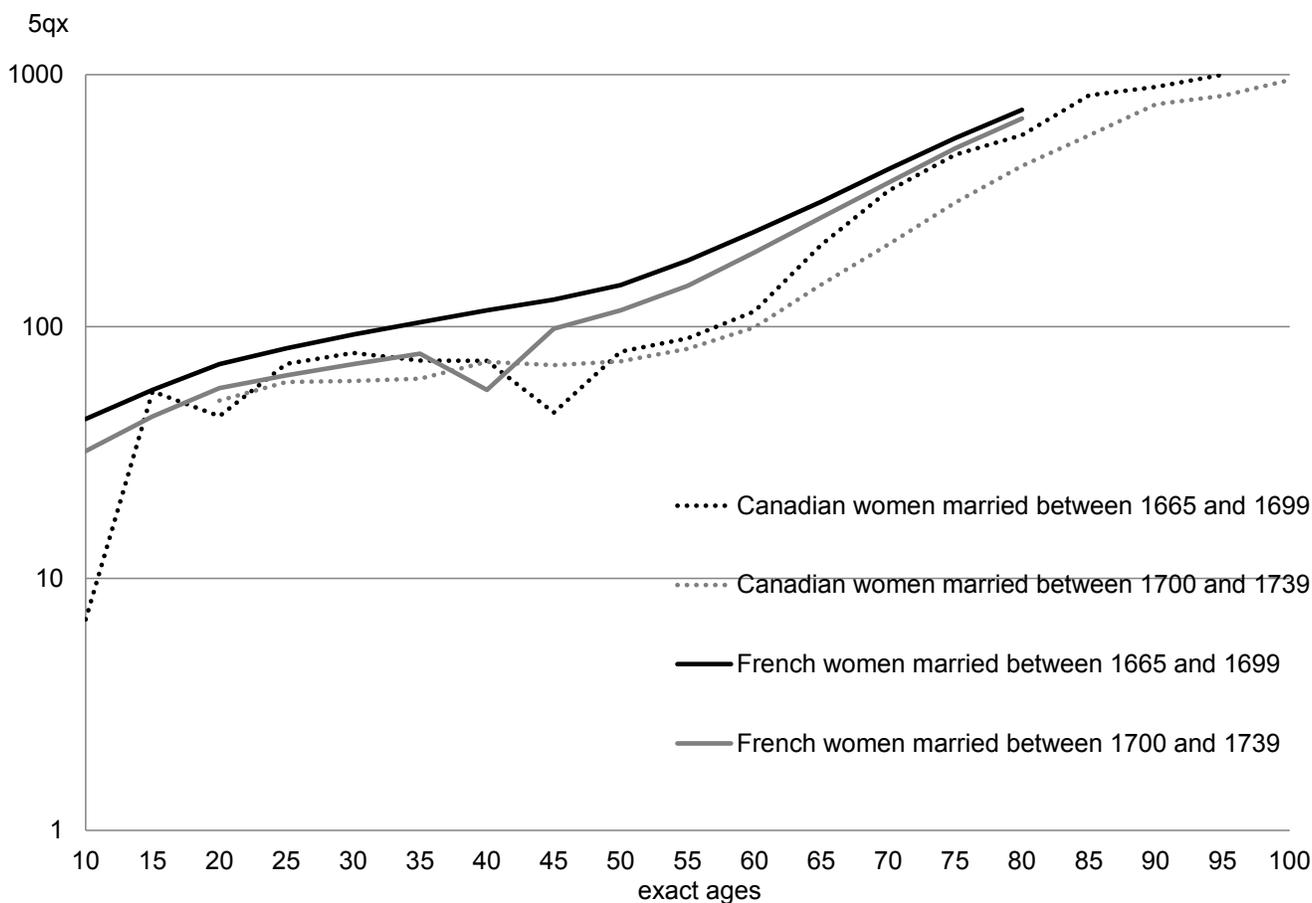


Figure 6. Married French and Canadian women five-year death rates by age and cohort, 1665–1739.
 Source: Programme de recherche en démographie historique, Registre de la population du Québec ancien and Charbonneau (1970).

teristics on adult mortality highlights the contrasts existing within the same population. As pointed out by Charbonneau (1975), female excess mortality was found during the fertile period of women due to pregnancy and delivery complications, while men presented slightly higher death rates for the ages 50 to 80.

The study of differential mortality between urban and rural population groups corroborates what Gadoury, Landry, and Charbonneau (1985) highlighted about the higher risks of early mortality in the cities than in the countryside. The results of the current study also suggest greater risks for Quebec City’s population compared to those of the other two cities. Healthier living conditions in rural rather than urban areas are purportedly the principal reason for this differential mortality. Quebec City presumably had the worst living environment for its population within the various regions studied. Gadoury, Landry, and Charbonneau (1985) suggest that socioeconomic differences between urban and rural population groups could also be part of the explanation for the observed differential mortality. The current study does not focus on this characteristic because the data source does not allow it.

Between the cohorts studied, no significant differences were observed for women. However, differences were found for men, for whom the results show a change in mortality between the cohorts. Indeed, a decrease in the intensity of mortality has been revealed for French Canadians born at the beginning of the 18th century (between 1700 and 1729) for ages 60 to 90, and a decrease in the intensity of mortality revealed among French Canadians born between 1730 and 1749 for ages 20 to 60, compared to the previous cohort. This result should be interpreted very carefully and could be the subject of further investigation in order to confirm or refute it, as the result could be attributable to a bias in the data source.

Finally, in comparing married French Canadians’ mortality to that of another contemporary population, such as France’s married population, the first appears to be lower than the second for the exact ages 20 to 80. This was previously suggested by Hubert Charbonneau (1970).

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