

## **Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley**

**Bertrand Desjardins**  
Université de Montréal  
Montreal, Quebec, Canada

### *Abstract*

Data compiled by the Programme de recherche en démographie historique of the Université de Montréal were used to number and characterize deaths within the population of European extraction from the 1702-1703 smallpox epidemic in the St-Lawrence valley. Between 6% and 6.5% of the settled population in the late fall of 1702 was eliminated by the disease; adding the death of an extra 25% of newborns, the epidemic's toll reached some 1,300. A significant proportion of adults died among the Canadian-born population, surpassing 10% for women of childbearing ages in particular. This proves that contrary to what most observers have written, smallpox was not prevalent among the non-native population during the XVIIth century.

### *Résumé*

Les données du Programme de recherche en démographie historique de l'Université de Montréal ont été utilisées pour chiffrer et caractériser les décès dans la population de souche européenne lors de l'épidémie de variole de 1702-1703 dans la vallée laurentienne. La maladie a emporté entre 6% et 6,5% de la population, à laquelle il convient d'ajouter 25% des enfants nés durant la contagion, pour un total de 1300 personnes. Une proportion non-négligeable de Canadiens de naissance, 10% des femmes en âge d'accoucher par exemple, ont été emportés, prouvant que contrairement à ce que la majorité des observateurs ont écrit, la variole n'était pas endémique au sein de la population coloniale au XVIIe siècle.

*Key Words:* mortality, New France, smallpox

Knowledge of the early mortality of French colonists in the St-Lawrence valley long remained limited to generalities and a few crude rates. In the absence of data, the impressionistic view of settlers decimated by scurvy and contagious diseases, massacred by the Iroquois "hiding behind every tree", and victimized by a very harsh climate, dominated traditional literature. Thanks to research conducted within the "Programme de recherche en démographie historique" at the University of Montreal, we now know that

XVIIth century French pioneers were in fact a selected group which, benefiting from favourable conditions, experienced quite low mortality for the time (Charbonneau et al., 1993: Ch. 7). Foremost among these conditions were a healthy environment, and low population density, which inhibited the spread of diseases; migration from France was weak and returns frequent, so the population grew slowly: less than 20,000 people lived in the colony at the turn of the XVIIIth century, 70 years after colonization began in earnest.

The extent of XVIIth century mortality through contagion, however, is unknown, as the history of epidemics remains to be written. Although the fact the colonists brought contagious diseases prevalent in Europe to North America is evident, published information is scant, imprecise and even contradictory, with historical relations and figures often taken and perpetuated as facts. Many authors seem to have been confused by the references or symptoms of ship fevers, measles, typhus, smallpox and purpura, thus making incorrect conclusions about the nature of the diseases involved. Moreover, the fundamental distinction between passengers disembarking from ships, soldiers stationed in the colony, Indians, and resident French colonists was frequently not made, crises affecting specific groups being presented as relating to the total population.

Miles (1872: 201) wrote that "during the year 1688-1689, the troubles of the unfortunate colonists were grievously increased by disease in the form of smallpox, dysentery, scurvy and fever, by which they were afflicted to such an extent that about fourteen hundred perished during a single year." Explanatory notes accompanying a yearly compilation of burials in Quebec since the beginning of colonization, published with the 1870-71 Canadian census, mentioned ship fevers in 1666, smallpox in 1669-1670, an unspecified epidemic in 1684, a massacre by the Iroquois and infectious diseases in 1687-1689, purpuric fevers in 1697-1698 and smallpox in 1702-1703 (Statistics of Canada, 1878: 167). In his monumental presentation of the medical history of Canada, Heagerty (1928: 67) cited 15 years between 1635 and 1690 where smallpox would have been very prevalent among the French settlers of Canada, and concluded that "in those days, smallpox was always present in the community, and each year carried off considerable numbers. In the year 1699, there were one hundred deaths from smallpox in the city of Quebec, and in 1702, three thousand." Trudel (1968: 241) asserted that "In Canada, epidemics were frequent and, every time, disastrous. Over three-quarters of a century, we can cite about ten of a particular magnitude: in 1685, typhus; in 1687-1688, smallpox, or purpuric fever which might have caused 500 deaths; in 1700, influenza, in 1702-1703, smallpox, which is presumed to have caused, just in the city of Quebec, over 2,000 deaths [...]. Two endemic diseases (influenza and smallpox) killed many adults every year and, with other children's diseases, kept the mortality rate of children at a high level." Finally, the most recent compilation, based on a review of published material, cited five hundred

dead from smallpox among Canadians (as opposed to Indians) in 1687, one hundred in the Quebec region in 1697 and another hundred in the city of Quebec in 1699 (Goulet and Paradis, 1992: 175-179).

Using a formula devised by Jacques Dupâquier (1979) to measure the intensity of mortality crises from series of death registrations<sup>1</sup>, only three major episodes can be identified during the XVIIth Century among the settled population of European descent. Two, in 1687 and 1699, given contemporary descriptions, were typhus, while the third, in 1700, was influenza. Consequently, it is our hypothesis that contrary to belief, when a smallpox epidemic broke out in the late fall of 1702, a vast majority of the colonists had never been in contact with the disease.

The epidemic was apparently started by an Indian chief from Orange (now Albany, New York), who died in Quebec city on the 19th of October 1702. Sister Juchereau de St-Ignace, annalist of the Hôtel-Dieu hospital (translated from Vallée, 1927), wrote an account which is very indicative of the gravity of the event:

*The sickness started with the house where he [the Iroquois] had stayed and spread in little time with incredible fury; no house was spared in the city, those who remained healthy were too few to mind the sick, entire families were hit by this evil and the little care they received, along with the infectiousness and malignancy of this plague, made them die quite promptly.[...] Mortality was so great that the priests could not suffice to bury the dead and assist the dying. Every day, bodies were carried to the church of the lower city or to the cathedral without any ceremony, and in the evening, they were buried, sometimes up to 15, 16, 17, 18 at a time. This went on for several months, so that death registers counted more than two thousand dead in Quebec, not mentioning the surrounding rural areas which did not enjoy a better fate.*

The figure of 2,000 dead for the city of Quebec given by Sister Juchereau, and cited as a fact by many observers, is clearly unrealistic, since the population barely reached that number at the time (Gauvreau, 1991); Georges Langlois (1935) and Pierre-Georges Roy (1947) appropriately scaled it down to a range of 350 to 400, using burial registration, while in a recent study of the city of Quebec (Hare et al., 1987: 36), a figure of "260 dead, that is 13% of the population of the city" is given, but without any information on sources. In one of the only other published attempts at numbering the dead from the epidemic, Louise Dechéne (1974) evaluated mortality in the city of Montreal at "12 times the average in the first semester [of 1703], 8% of the European population having perished," she

also cited a letter where the authorities of the colony wrote to the King "a sickness of smallpox hit in January [1703], peaked in April, lingered on until July, killing 1,000 to 1,200 people in the colony, Frenchmen and Indians habitués alike." Finally, an exploratory study conducted for the first time at the level of the whole colony concluded that during the epidemic, there had been between 900 and 1,000 deaths due to smallpox, eliminating 5 or 6% of the population (Bernard, 1994). In this paper, we will try to establish the exact severity of the crisis and its demographic impact on the entire settled population, giving particular attention to diverse characteristics of the deceased.

### *Data*

Parish registers for Quebec date from its European origins and have been well preserved, with many other nominal sources available to fill any gaps in registration. The population on the shores of the St. Lawrence, after an initial influx of immigrants, grew essentially on its own, thus remaining relatively small (70,000 in 1765); it was nearly closed, avoiding the observation problems brought about by migration. Given these exceptional circumstances, it has been possible to set up a data bank at the University of Montreal which can be likened to a population register of the French population established in the St. Lawrence valley in the XVIIth and XVIIIth centuries (Légaré, 1989). The register is made up of the demographic biographies of the individuals having settled in the territory of what is now the province of Quebec, reconstructed through the linking of entries concerning them in the baptism, marriage and burial certificates. The basic data and the biographies form a whole which presently includes some 700,000 certificates relating to over 200,000 people. Indians are not included, except the few who assimilated into the population of European descent, because the sources do not contain sufficient information about them.

In a first part, we will study the epidemic on the basis of burial registration, adding however exact age and place of birth of the deceased obtained from the linked population file. We will then relate the number of deaths to the total population, as it can be ascertained from the population register, to try to evaluate mortality according to sex and age.

Despite the general quality of the data, one has to be aware that some information did not reach us, through the loss of registers and also because of a certain underregistration. A portion of individuals of specific groups are unknown altogether, immigrants who remained single and died outside the territory, or newborns who died before baptism, for example; for others, part of the data is incomplete, with death date the main lacuna. Apart from lost registers, this happens because people died outside the area covered by parish registration, and also because of neglect, especially in the case of young

children. For the needs of a study currently being conducted on the Canadian-born of the XVIIth century, losses have been evaluated at approximately 10% of all burials for the period we are studying here. As for underregistration, a problem would arise if it was greater during the epidemic, because of the prevalent disorganization.

To investigate this possibility, we examined the proportion of individuals in the population register for which only a baptism is known for the birth cohorts preceding the epidemic. If underregistration of deaths was greater in troubled times, this proportion would be expected to rise with successive cohorts, because mortality was certainly highest at younger ages. But it remained constant at around 9%. Likewise, the proportion of individuals born in 1703, but whose baptism is lacking, is no different than the one for surrounding years. It thus seems that the clergy succeeded in maintaining good registration throughout the epidemic, and possibility of bias can be considered to be negligible. It is probable, however, that a greater proportion of births followed by a very early death escaped registration during the crisis.

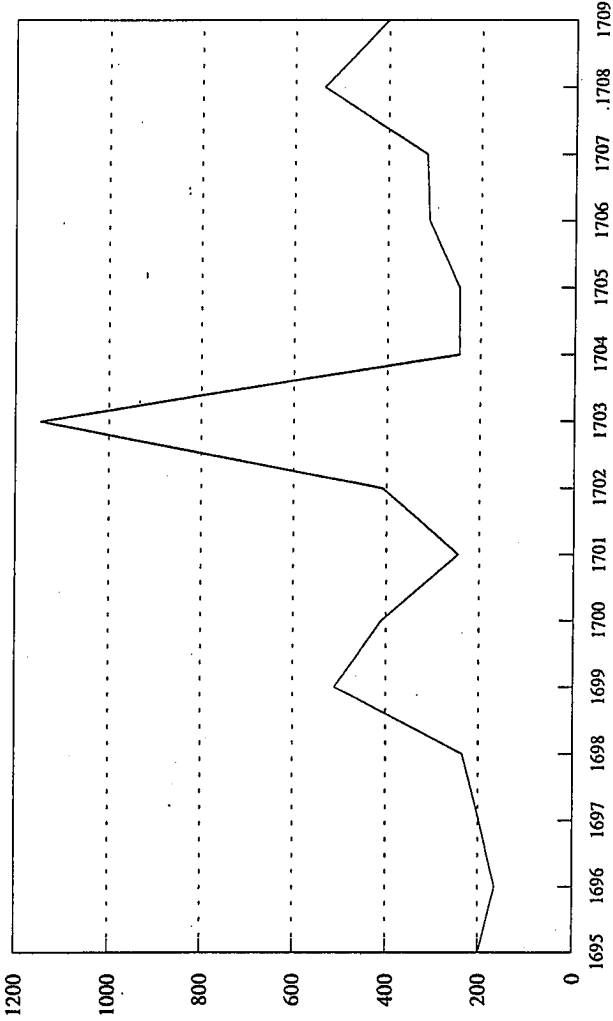
### *The Epidemic*

The severity of the epidemic is immediately apparent from the annual distribution of burials registered in the colony in the 1695-1709 period (Figure 1)<sup>2</sup> In 1703 alone, 1148 deaths were recorded—3.6 times the average of the other years of the period, and 4.7 times the number registered in 1701, the nearest year without "abnormal" mortality. These numbers easily rank it as the most severe to have hit the settled population since the founding of the colony, with a Dupâquier index for 1703 of 15.6, at the threshold between a major and a super crisis (see note 7).

More precision is obtained by breaking down the registered deaths by month and by government<sup>3</sup> (Figure 2) and comparing them with the numbers of the preceding year, which on the basis of surrounding years can be deemed a year of normal mortality (Table 1). The government of Trois-Rivières was not included in the table because given the size of its population, not enough burials were registered to warrant it.

The epidemic started in December of 1702 and peaked immediately in the Quebec government, with 267 deaths registered in January, 25 times the number of a year before; by the month of May, it had subsided, thus having lasted some five months during which 761 deaths were recorded, compared to 61 a year before. Apparently sparing Trois-Rivières, the disease spread to the Montreal area as early as January. The crisis took more time to peak, in April and May, and lingered on longer, lasting around nine months, with 353 dead compared to 51 a year earlier. On the basis of these figures, and allowing for the loss of 10% of burials, the epidemic's death toll would then be in the vicinity of eleven hundred people. The ratio of deaths in the

Figure 1  
Annual number of burials

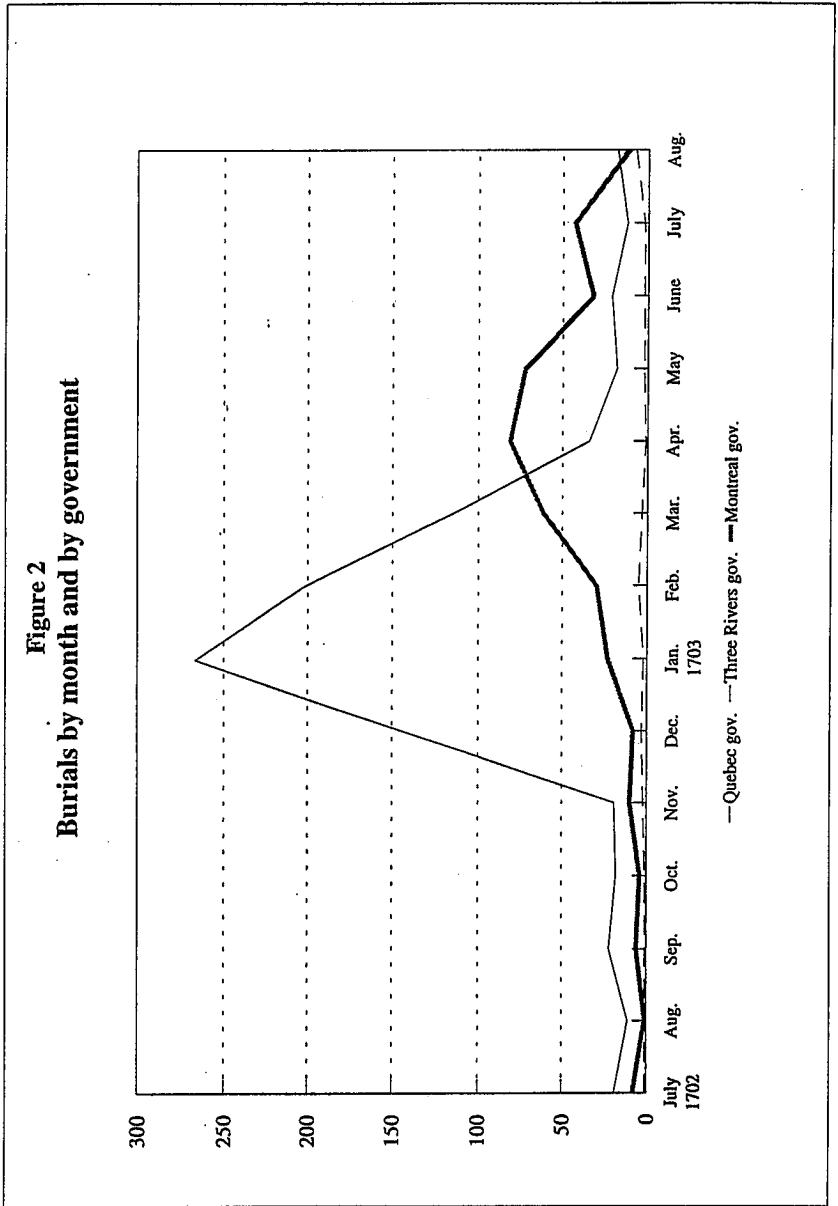


*Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley*

government of Quebec over those in the Montreal area during the nine months of the epidemic was 2.3, compared to 2.0 a year earlier; the epidemic thus appears to have been a little more severe in terms of mortality around Quebec city.

**TABLE 1. REGISTERED DEATHS BY MONTH AND BY GOVERNMENT IN 1702 OR 1703 AND A YEAR BEFORE**

Month/year	Quebec Government		Montreal Government	
	Deaths	Deaths a year before	Deaths	Deaths a year before
Nov. 1702	19	17	10	10
Dec.	143	9	8	8
Jan. 1703	267	11	23	5
Feb.	202	11	30	8
March	115	17	61	9
Apr.	34	13	81	4
May	18	12	72	10
June	21	16	32	6
July	12	19	43	8
Aug.	18	11	11	1
Sep.	11	22	6	6





*Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley*

**TABLE 2. REGISTERED DEATHS IN THE CITIES OF QUEBEC AND MONTREAL AND IN THE REST OF THEIR RESPECTIVE GOVERNMENTS**

Month/year	Quebec Government		Montreal Government	
	City	Rural	City	Rural
Dec. 1702	100	43	5	3
Jan. 1703	111	156	14	9
Feb.	50	152	26	4
March	14	101	44	17
Apr.	6	28	57	24
May	3	15	41	31
June	9	12	6	26
July	6	6	13	30
Aug.	6	12	3	8
Total	305	525	209	152

How the epidemic spread is also apparent when the cities are distinguished from the rural areas (Table 2). Contagion hit the rural areas around Quebec almost immediately; in March, the city of Quebec was clearly in the last stages, while Montreal had not yet peaked. The disease reached the outlying areas around Montreal only at the end of spring, where the epidemic died out during the summer. Surprisingly perhaps, the proportion of deaths registered in the Notre-Dame-de-Québec parish compared to its surrounding rural parishes did not differ significantly from usual during the period of the epidemic (37% instead of 40%); this would indicate that the epidemic was as virulent and lethal in the countryside than in the city, in the Quebec region. Notre-Dame-de-Montréal parish, on the other hand, witnessed a rise of the proportion of urban deaths, from 52% to 59%, which is what would be expected. Cities and its surrounding rural areas were in close contact, and contagion thus knew no boundaries; people of the Montreal area, however, because of the time-lag, maybe adjusted their behaviour somewhat, hence the difference between the two regions. Population was also more spread out around Montreal.

*The Victims*

As one's burial is linked to the person's birth information in the population register, exact age and place of birth are available to characterize the individuals having died during the epidemic (Table 3). The absolute numbers in the table are dependent on the size of the population of each category; so what is interesting here is the comparison with the year before, as it gives an indication of the relative impact of the epidemic on each group.

TABLE 3. REGISTERED DEATHS DURING THE EPIDEMIC COMPARED TO A YEAR BEFORE, FOR IMMIGRANTS, CANADIAN-BORN CHILDREN (LESS THAN 15 YEARS OF AGE) AND ADULTS

	Deaths from Dec. 1702 to Aug. 1703 (1)	Deaths a year before (2)	(1) / (2)
Immigrants	85	50	1.7
Canadian-born children	716	122	5.9
Canadian-born adults	420	23	18.3
Total	1221	195	6.3

The immigrants were all adults; there was a 70% rise in the number of their deaths during the nine months of the epidemic compared to the same period a year earlier, and average age at death remained the same, around age 50. Individuals born in Canada were hit much harder. More Canadian children died than adults, but the epidemic did three times more damage among the adults, relatively speaking; one must remember, however, that a greater proportion of infant deaths than usual might be missing, which might exaggerate the difference to some extent.

*Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley*

The difference in severity between children and adults is actually only a reality for infants. Of the 122 deaths of children a year before the epidemic (see Table 3), 107 relate to individuals not having reached their first birthday; this means that from age one, only a few deaths occurred over nine months in five year age groups, since a mere 38 cases (15 children, 23 adults) are to be distributed over the entire age span. Table 4 then gives a picture of the impact of the epidemic for every age group beyond infancy. There were three times more deaths (324 compared to 107) of children aged less than one during the nine months of the epidemic compared the same nine months of the year before, but twenty times more from age one on. The proportion is high at every age, and the sex distribution clearly shows women of childbearing ages were the hardest hit.

TABLE 4. REGISTERED DEATHS DURING THE EPIDEMIC OF PEOPLE BORN IN CANADA ACCORDING TO AGE AND SEX\*

Age	Males	Females
less than 1 year	160	149
1-4 years	124	113
5-9 years	43	63
10-14 years	19	19
15-19 years	23	28
20-24 years	34	56
25-29 years	42	74
30-34 years	35	62
35-39 years	12	22
40 years and over	16	14
Total	508	600

\* the sex is unknown in 26 cases; all were infants having received only a provisional baptism and died soon after, except one who was aged 5 to 9 years.

Such an excess female mortality has been found for measles, using contemporary data; the author hypothesized levels of female steroids, which peak during the female reproductive period and are especially high during pregnancy, and which are known to be negatively linked to cellular immunity (Garenne, 1994).

### *The Total Population*

Up to this point, we have limited our analysis to the burials registered during and around the epidemic. We will now try to corroborate and qualify our findings by matching deaths in different age, sex and place of birth categories with their total population.

In theory, exact population counts at any given moment can be obtained from a population register; but in practice here, the task is complicated by missing information. Firstly, since there was no systematic registration of travellers to and from New France, the dates of arrival for immigrants and departure for emigrants are generally unknown. While departure of emigrants can be estimated statistically, taking into account when individuals last appeared in the documents, immigrants can be considered under systematic observation only from the moment they marry in the colony. Hence single immigrants appearing in the register are a fraction of a group whose total size is unknown, and they will have to be excluded from this part of our study; the population figures below then concern the Canadian born and the immigrants who married. Twenty-seven burials during the epidemic were of single immigrants, around twice the number for this group in surrounding years; this level assures us that the exclusion imposed by our sources concerns but a very small segment of the total population.

Secondly, a fraction of death dates are missing, with differences according to sex and age. Using all available information to define dates up to when an individual is alive and from when he is deceased alleviates the problem; but because of this lacuna, total population estimates at a given moment always carry a margin of error.

Given these limitations, the population register yields for December 1, 1702 a minimum population of 17,308 and a maximum of 19,010. For convenience, we will use the average of the minimum and maximum values for each sex and age group, giving a total of 18,159 individuals, with, on the whole, a 5% margin of error. 2,529 are (married) immigrants, 1,753 men and 776 women; 15,630 were born in Canada.

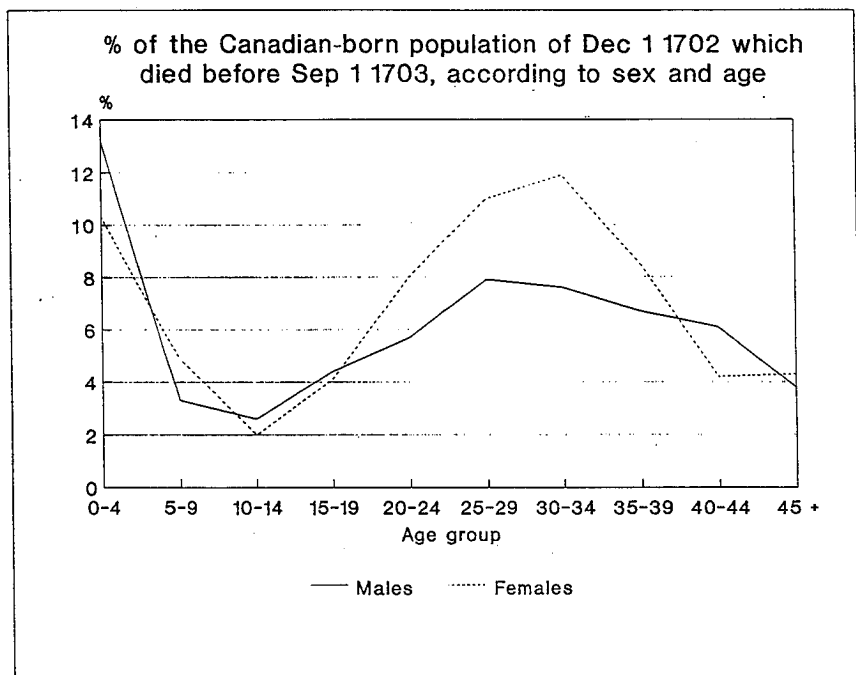
The figure of 10% we cited in the first part of our paper as the ratio of missing burials through the loss of registers is necessarily a rough approximation. To try to strengthen our results, we calculated proportions of

*Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley*

persons dying during the period of the epidemic by sex, age and place of birth using for the denominator only those for whom the population register includes the exact death date. These proportions were then applied to the total number of persons of each category to obtain a "corrected" number of deaths.<sup>4</sup>

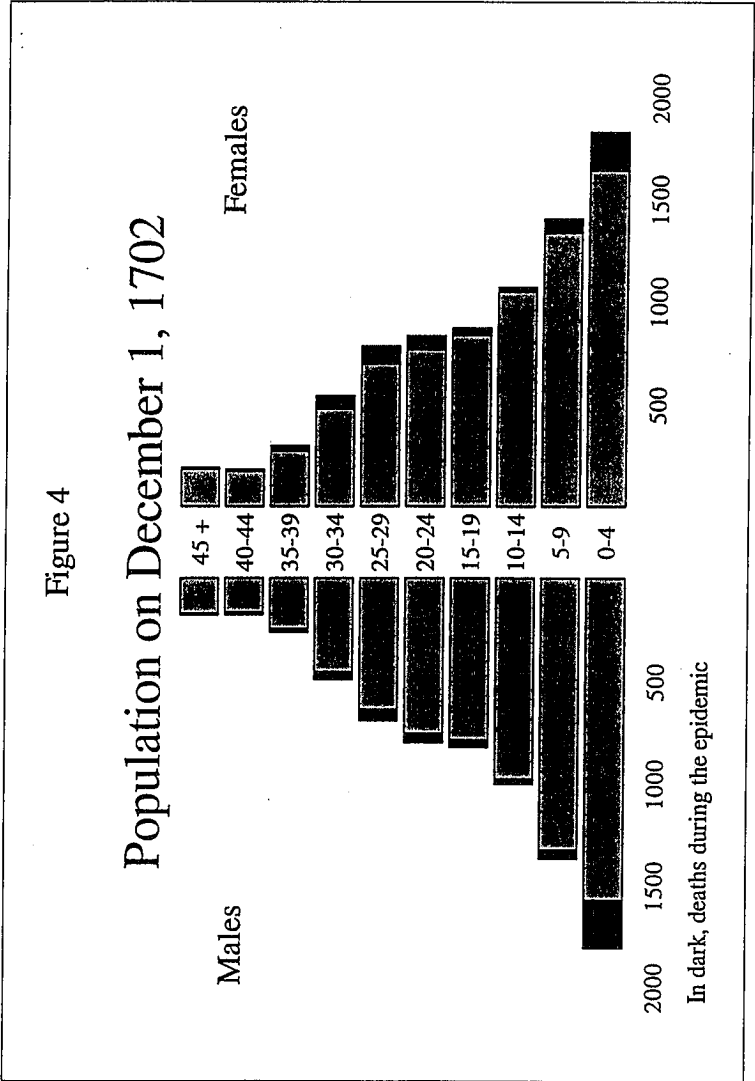
This procedure yields exact measures only if underregistration is the same during the epidemic as during the rest of the period when the individuals died. If it was not, since in all probability it would be greater during the epidemic, our results are to be considered as minimal.

Figure 3



-25-

Figure 4  
Population on December 1, 1702



*Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley*

On this basis, 2.9% of married immigrants counted on December 1, 1702, died before September, 1703; this proportion then yields 74 dead, compared to the 61 burials that were registered for this group. Relatively more women died, 3.2% vs 2.8%; the difference affects the 25 to 44 years age group, where 7 women out of 80 died compared to 7 men out of 578. But figures of this magnitude are subject to large random variations and are to be treated with caution.

The corresponding figure for the Canadian-born population is 7.0%, with an adjusted number of deaths at 1,094. The proportions are given by sex and age group in Figure 3. The lowest levels are between five and twenty years of age, and the highest is for children under five. Within the latter, children not having reached age one died twice as often. Once again, women of childbearing ages stand out as having particularly suffered: nearly 10% of those aged 20 to 40 years died within the nine months considered here; between the ages of 25 and 35, a greater proportion died than girls under five. Figure 4 gives the number of Canadians counted in December 1702 by sex and age with the number of dead during the next nine months in black.

Our adjusted figures show that 1,168 of the 18,159 habitants in December 1702 died. Of course, not all these deaths were due to the smallpox epidemic, as a certain number of people would have died anyway over those nine months, especially very young children. On the basis of the number of burials registered a year earlier, adjusted using the same method, 80 deaths would have occurred in the absence of the contagion; 1,088 are thus to be ascribed to the epidemic.

The mortality of children born during the epidemic remains to be taken into account. 578 births were registered during the nine months of the epidemic compared to 747 twelve months earlier. Such a decrease was to be expected with the number of women who had to be pregnant when they caught the disease and the mortality of women aged between twenty and forty years. Over 5% of the births were of babies having received only a provisional baptism and dying shortly thereafter, two and a half times the usual proportion. Between 37% and 46% of the 578 died during the crisis. Subtracting the number of "normal" deaths evaluated from the year before, some 150 deaths of newborns are to be blamed on the disease. This brings the total number of deaths due to smallpox to near 1,300, an increase of 200, or 18%, on our estimate based solely on death registration.

### *Conclusion*

Benefiting from excellent sources of data, we feel we have succeeded in establishing with reasonable precision the impact of the 1702-1703 smallpox epidemic in the St-Lawrence valley. Between 6% and 6.5% of the settled population in the late fall of 1702 had disappeared by the end of the

following summer directly because of smallpox; adding the death of an extra 25% of newborns, the epidemic's toll reached some 1,300. Deaths were concentrated in the governments with the two major cities of the colony, with rural areas being as severely affected as the urban areas.

Apart from the sheer number of deaths, terror and other psychological factors certainly contributed to the impact of mortality crises on historical populations. Beyond the immediate, however, the long term demographic effects are difficult to evaluate. Here, the loss of 10% of childbearers had to reduce population growth to some extent, but many compensating factors probably came into play to attenuate the effects. Marriage, in particular, would have to be investigated closely as quick remarriages or earlier first marriages could be a consequence of the need to care for families and farms. The first nine months of 1704 do show an increase of 25% of the number of births over the same period of 1702, a normal recovery as life returned to normal. Over the long term, population trends do not reflect any significant break around the time of the epidemic (Lalou and Boleda, 1988: 67).

On another level, the annalist of Montreal's "Hôpital Général" (translated from Roy, 1923: 112) expressed what must have been the common bewilderment:

*This sickness, which in France is not nasty and which, at the most, kills but a few children, was so cruel in this country, that it removed a great number of persons of all ages, from one end of the colony to the other.*

Our results show that indeed a significant proportion of adults died among the Canadian-born population, surpassing 10% for women of childbearing ages in particular. This proves without a doubt that contrary to what most observers have written, smallpox was not prevalent among the non-native population during the XVIIth century; in 1702, the disease hit people who, not having been in contact with it, had no immunity, hence the damage it caused. The reputation of smallpox as a children's problem, so clear in the annalist's mind, was linked, of course, to a context where few people could reach adulthood without having had the disease and thus, no adults were around that were not immune. In a sense, the colony's blessing of being spared smallpox became a devil in disguise in 1702. A pattern then emerged: conditions of size and density of the population prevented smallpox from becoming endemic, and the people were immune. New generations were bred which reached adulthood without being in contact with the disease; necessarily, as their numbers grew, conditions were again established for another crisis. Indeed, the colony experienced another major outbreak thirty years later, in 1733.



*Acknowledgements*

An earlier version of this text was presented at the panel: "The fight against smallpox: social and demographic implications", at the Social Science History Association nineteenth annual meeting, Atlanta, Georgia, October 13-16 1994. The author wishes to thank the Social Sciences and Humanities Research Council of Canada, the Fonds FCAR of the Government of Quebec and the Université de Montréal for their financial support.

*References*

- Bernard, P. 1994. *La mortalité différentielle par variole en Nouvelle-France*. Master's dissertation, Demography Department, Université de Montréal.
- Charbonneau, H., B. Desjardins, A. Guillemette, Y. Landry, J. Légaré and F. Nault. 1993. *The First French Canadians. Pioneers in the St. Lawrence Valley*. Newark, NJ: University of Delaware Press, and London and Toronto: Associated University Presses.
- Dechêne, L. *Habitants et marchands de Montréal au XVII<sup>e</sup> siècle*. Paris: Plon.
- Dupâquier, J. 1979. L'analyse statistique des crises de mortalité. In Hubert Charbonneau and André LaRose eds., *The great mortalities: methodological studies of demographic crises in the past*. Liège: Ordina: 83-112.
- Garenne, M. 1994. Sex Differences in Measles Mortality: a World Review, *International Journal of Epidemiology*, 3:632-42.
- Gauvreau, D. 1991. *Québec. Une ville et sa population au temps de la Nouvelle-France*. Québec: Presses de l'Université du Québec.
- Goulet, D. and A. Paradis. 1992. *Trois siècles d'histoire médicale au Québec*. Montréal: VLB éditeur.
- Hare, J., M. LaFrance and D.T. Ruddel. 1987. *Histoire de la ville de Québec 1608-1871*. Montreal: Boréal/Musée canadien des civilisations.
- Heagerty, J.J. 1928. *Four Centuries of Medical History in Canada*. Toronto: Macmillan Company of Canada.
- Lalou R. and M. Boleda. 1988. Une source en friche: les dénombrements sous le Régime français, *Revue d'histoire de l'Amérique française* 42-1:67.

Langlois, G. 1935. *Histoire de la population canadienne-française*. Montréal: Editions Albert Lévesque.

Légaré, J. 1989. A population register for Canada under the French regime: context, scope, content and applications, *Canadian Studies in Population* 15: 1-16.

Miles, H.H. 1872. *The History of Canada under French regime, 1535-1763*. Montreal: Dawson Brothers.

Roy, P.-G. 1923. Une épidémie de petite vérole à Québec en 1702-1703, *Le vieux Québec*: 112.

Roy, P.-G. 1947. L'épidémie de petite vérole, *Bulletin des recherches historiques* 53-1:16.

Statistics of Canada 1878. *Census of Canada 1870-71. Vol. V 1608 to 1876*. Ottawa: Maclean, Roger & Co.

Trudel, M. 1968. *An Introduction to New-France*. Montreal: Holt, Rinehart et Winston.

Vallée, A. 1927. *Michel Sarrazin, 1659-1735; sa vie, ses travaux et son temps*. Québec: Imprimeur du Roi.

*Received August 1995, revised May 1996.*

### Footnotes

- <sup>1</sup> The index of a given year is the difference between the number of deaths in that year and the average number of deaths over ten of the preceding twelve years (the two most extreme are not used), divided by the standard deviation of those ten years (so the index is more sensitive to relative variations in the series from large populations). The index rises with the seriousness of the crisis:

Magnitude	Seriousness	Value
1	minor	1 - 2
2	moderate	2 - 4
3	high	4 - 8
4	major	8 - 16
5	super	16 - 32
6	catastrophe	32 +

*Demographic Aspects of the 1702-1703 Smallpox Epidemic in the St-Lawrence Valley*

- <sup>2</sup> Parish and hospital registers contain 5 976 burial certificates for the years 1695-1709. 394 were set aside because they relate to Indians, who can not be studied here because the sources do not cover them systematically, or because they are double counts (people registered both at the hospital and in their parish), or for other miscellaneous reasons.
- <sup>3</sup> The settled area of the colony was a narrow strip on both shores of the St.Lawrence, bounded upstream by the island of Montreal, to the southwest, and extending northeast beyond Quebec city, the town of Trois-Rivières, in the middle, although founded early, never developed into anything near the importance of the other two. The territory was divided into three administrative districts, called "governments", centered around each of the three cities.
- <sup>4</sup> For example, exact date of death is known for 556 males born 25-29 years before December 1702. Of those, 44, or 7.9%, died during the epidemic. Applying this proportion to the 692 males aged 25-29 years enumerated in the register for December 1 1702 (average of the minimum and maximum values) yields a corrected figure of 55 deaths.

