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QUÉBEC LONGITUDINAL STUDY
OF CHILD DEVELOPMENT
(QLSCD 1998-2002)

COLLECTION Health and Wellness

FROM BIRTH TO 29 MONTHS

Socioeconomic Conditions
and Health

Volume 2, Number 3

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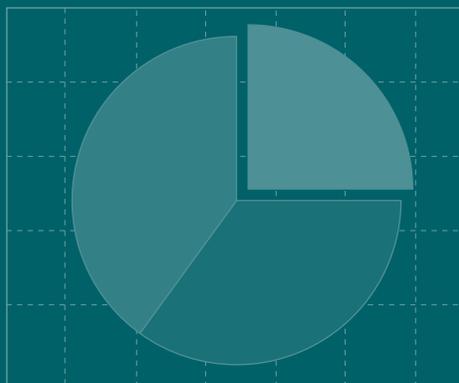


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This report was produced and published by
the Institut de la statistique du Québec.

National Library of Canada
Bibliothèque nationale du Québec

ISBN 2-551-21553-6
ISBN 2-551-21778-4
(édition originale) ISBN 2-551-21544-7
ISBN 2-551-21775-X

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May 2003

Foreword

The publication of this second volume of the QLSCD 1998-2002 series is the result of close collaboration among university researchers, the public health network and the *Direction Santé Québec*¹ (Health Québec Division) of the *Institut de la statistique du Québec* – ISQ (Québec Institute of Statistics), who have been working on this project since 1996.

Two years after the publication of Volume 1 in this series, an interdisciplinary group of more than 80 researchers contributed to producing this second volume, which presents the very first longitudinal results of our survey. These much-anticipated results describe the environment and development of the children based on the first three data collections conducted when they were 5, 17 and 29 months of age. To fully comprehend the importance of these data on early childhood, I would like to remind the reader of the primary goal of the Québec Longitudinal Study of Child Development 1998-2002 as stated in Volume 1 of this series. The QLSCD will help gain a better understanding of the PRECURSORS of social adjustment by first studying adjustment to school, identifying adjustment PATHS and PROCESSES, and examining the CONSEQUENCES of these later in life.

By analyzing data from the first three years of the survey, the ISQ is pleased to be associated with the development of a such powerful survey and research instrument, and particularly with the accomplishment of a study that will serve both as a preventive tool and an aid in the design of effective early interventions. As Director General, I cannot help but take great pride in the model of partnership which has produced such impressive results, many of which may indeed be harbingers of the future.

Yvon Fortin
Director General

1. Certain French appellation in italics in the text do not have official English translations. The first time one of these appears, the unofficial English translation is shown immediately after it. Following this, for ease in reading, only the official French name appears in the text in italics and it is suggested the reader refer to the Glossary for the English translation.

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Volume 2 of QLSCD 1998-2002 was produced by the:

Direction Santé Québec, ISQ

QLSCD 1998-2002 is sponsored by:

Ministère de la Santé et des Services sociaux du Québec (MSSS)
l'Institut national de santé publique du Québec
Canadian Institutes of Health Research (CIHR formerly the NHRDP)
Social Sciences and Humanities Research Council of Canada (SSHRC)
Fonds québécois de la recherche sur la société et la culture (ancien CQRS)/Québec Fund for Research on Society and Culture (formerly the CQRS)
Fonds québécois de la recherche sur la nature et les technologies (ancien FCAR)/Québec Fund for Research on Nature and Technology (formerly the FCAR)
Fonds de la recherche en santé du Québec (FRSQ)/Health Research Fund of Québec
Molson Foundation
Ministère de la Recherche, de la Science et de la Technologie (MRST) par le biais du programme Valorisation recherche Québec (VRQ) / Ministry of Research, Science and Technology
Human Resources Development Canada (HRDC)
Canadian Institute for Advanced Research (CIAR)
Health Canada
National Science Foundation (NSF of USA)
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Website: www.stat.gouv.qc.ca

Suggested citations:

SÉGUIN, L., Q. XU, L. POTVIN, M.-V. ZUNZUNEGUI, C. DUMAS and K. FROHLICH (2003). "Socioeconomic Conditions and Health, Part I – Poverty and Health in Quebecois Children", in *Québec Longitudinal Study of Child Development (QLSCD 1998-2002) – From Birth to 29 Months*, Québec, Institut de la statistique du Québec, Vol. 2, No. 3.

PAQUET, G., and D. HAMEL (2003). "Socioeconomic Conditions and Health, Part II – Social and Health Inequalities in Young Children: In Search of Protective Factors", in *Québec Longitudinal Study of Child Development (QLSCD 1998-2002) – From Birth to 29 Months*, Québec, Institut de la statistique du Québec, Vol. 2, No. 3.

This analytical paper is also available in French. Ce numéro est aussi disponible en version française sous le titre :

SÉGUIN, L., Q. XU, L. POTVIN, M.-V. ZUNZUNEGUI, C. DUMAS et K. FROHLICH (2003). « Conditions socioéconomiques et santé, section I – Pauvreté et santé des enfants québécois » dans *Étude longitudinale du développement des enfants du Québec (ÉLDEQ 1998-2002) – De la naissance à 29 mois*, Québec, Institut de la statistique du Québec, vol. 2, n° 3.

PAQUET, G., et D. HAMEL (2003). « Conditions socioéconomiques et santé, section II – Inégalités sociales et santé des tout-petits : à la recherche de facteurs protecteurs » dans *Étude longitudinale du développement des enfants du Québec (ÉLDEQ 1998-2002) – De la naissance à 29 mois*, Québec, Institut de la statistique du Québec, vol. 2, n° 3.

**A Word of Caution, Symbols and Abbreviations can be found in Section
"Review of Methodology and Caution"**

Acknowledgements

Given that the QLSCD 1998-2002 has been in existence for more than six years, the task of thanking each person who has collaborated on the project seems daunting, and frankly, nearly impossible. Each year new colleagues join those who have been with us from the very beginning, and they in turn have faced innumerable logistical and methodological challenges, whether in terms of the contents of the survey or navigating their way through a world of knowledge which is in a state of constant progress.

Indeed, the network of university researchers associated with the QLSCD now stretches across Québec to include the rest of Canada and beyond our nation's borders. Hence the wealth of data from this survey is being disseminated through a variety of channels, whether in post-doctoral work being pursued by young researchers outside of Québec, or the multiplier effect of seasoned veterans constantly establishing new international working relationships in this era of the globalization of knowledge. This multiplication of partnerships is closely linked to the exceptional leadership shown by the scientific director of the QLSCD. In addition to contributing to the advance of knowledge, our "conglomerate" of research teams has resulted in the injection of significant funds devoted to analyzing the wealth of data being generated. Indeed, the pooling of research funds obtained through the excellence of the scholars involved has maximized the investment in the QLSCD 1998-2002 by the *ministère de la Santé et des Services sociaux*, sole sponsor of the project's 10 data collections, surveys and pretests.

New partners in our public health network are constantly joining this ever-expanding group of researchers. Increasing numbers of health professionals are becoming actively involved in the QLSCD, coming from the *ministère de la Famille et de l'Enfance* (Ministry of Child and Family Welfare), the education network, etc.

The increase in the number of external experts and growing complexity of this first provincial longitudinal study has led to more ISQ staff devoting their time, in whole or in part, to the QLSCD. New statisticians from

the *Direction de la méthodologie, de la démographie et des enquêtes spéciales – DMDES* (Methodology, Demography and Special Surveys Division) are now associated with the survey. Their tasks include addressing all questions related to the sample design, analyzing the results of the annual data collections in terms of response rates, and producing the weights required to infer the results to the population of children targeted by this large-scale survey. They also provided support to QLSCD researchers in conducting statistical analyses published in this report. With regards to the *Direction Santé Québec (DSQ)*, chief architect of the QLSCD, it was necessary to hire two people experienced in longitudinal analyses to consolidate the rather small team who have been overseeing the surveys year after year, with all the intense concentration of energy this implies. By coordinating the work of numerous partners, developing new tools and instruments to understand the real world of the growing child, closely collaborating with the survey firm collecting the data, and participating in the dissemination of knowledge by publishing original analyses, the seven members of the *Direction Santé Québec* QLSCD team have accomplished their mission with remarkable success.

Over the years, another partnership that continues to flourish is the one we have with the coordinators of the National Longitudinal Study of Children and Youth (NLSCY, Canada). The fact that these pioneers allowed the QLSCD to use certain instruments administered by the CAPI (Computer Assisted Personal Interview) has meant that our Québec longitudinal study is complementary and comparable to this large-scale Canadian study, and at a reasonable cost.

Québec hospitals, who continually face many challenges because of increasing demands for efficiency, are also important partners in our study, as are birthing centres. They manage to weather whatever storms they face by continuing each year to provide certain data from the medical records of the mothers and children. These data are sent to us with the strict proviso that the mothers have furnished prior written consent.

The *Bureau d'interviewers professionnels (BIP)*, the survey firm, continues to be an indispensable partner in arranging and conducting this first large-scale survey of a cohort of Québec children. BIP, masterfully managed with a hands-on approach by its president, is responsible for organizing and ensuring the smooth functioning of the annual data collections in both the pretests and surveys. Their data is of invariably high quality, and the data banks they produce biannually retain a high degree of reliability. BIP's team of interviewers¹ and recruiters, skilfully supervised by a seasoned veteran of field work, has become expert in winning and maintaining the loyalty of the some 2,000 families who annually participate.

Finally, we would like to single out the exceptional participation of Québec families. We truly believe that the success of the QLSCD comes first and foremost from the hours of precious time they grant us every year, during which we feel privileged to share moments in the lives of their little munchkins who, in 2000, were 2½ years of age.

Acknowledging how difficult it is to truly thank everyone who contributed to the day-to-day accomplishment of this Québec first, we would like to cite the words of Serge Bouchard:

Progress is a totally collective process in both time and space. We owe so much to others... We desire a society of good people..., because there is a link between individual and collective excellence.²

A heartfelt thank-you!



Mireille Jetté
Coordinator
*Direction Santé Québec,
Institut de la statistique du Québec*

1. All the interviewers in this survey were women.

2. BOUCHARD, Serge (2001). "Je ne suis pas seul sur terre", *Le Devoir Édition Internet*, 23 juillet. (Unofficial translation).

Introduction to QLSCD 1998-2002

When this second report is published, the children in the QLSCD study will have begun their fifth year on this planet. Despite the use of extraordinary tools to closely monitor their development, it is obvious that, in early childhood, development is too fast for science to keep up with.

In our first report, we described our observations concerning the data collected five months after birth. Because of the cross-sectional nature of these observations, our study was limited to describing the characteristics of the children and their families. We mainly wanted to describe the situation of babies born in Québec in 1997 and 1998. Bursting with enthusiasm and eager to understand things, the researchers who, at the time, provided the broad strokes of analyses to explain the observed characteristics were fully aware those were just the first in a long series of analyses designed to provide a deeper understanding of children's development.

This second report, however, is based on the collective data gathered when the children were respectively 5, 17 and 29 months old. At last, we can now describe the changes that occur in the lives of children and their families from birth to the third year. This is the first time that such a large sample of Québec newborns has been studied as intensively during early childhood. As far as we know, this is the very first time since science began studying children's developmental that researchers have tried to understand the factors leading to academic success or failure by collecting data as frequently as this from such a large sample of such young children.

Researchers now have available more data than ever before about this stage of life. But this abundance of data has a perverse effect. If cross-sectional studies allow us to draw conclusions on the causes of problems observed, why shouldn't we go ahead and indulge in longitudinal data as well? When one has access to data available to no one else, it is easy to forget the limitations of such data. However, while the researchers involved in drafting this report tried to obtain the maximum benefit from prospective longitudinal data collected at three different stages

during early childhood (at 12-month intervals), they also accepted to respect the limitations of this data.

This prospective longitudinal study allows us to describe the changes over time for each measured variable concerning each individual. The researchers thus recorded the changes during the first three years of the children's lives. Profiles of children, parents and families as well as some developmental trajectories were drawn based on the data collected during these three stages. These original results should facilitate discerning the beginning of the course taken by the children and their families. However, it is important to remember that these results only described the first three points of a curve that ideally should comprise fifteen points of time. Since in most cases, it is not very likely that behaviour is consolidated at 2½ years, we asked the authors to primarily limit themselves to describing the development of observable changes. It is obviously too early in the child's life for us to attempt causal analyses in order to identify determinants, especially since these would only be associations. Finally, whenever we approach a problem, our questions are generally much too simplistic. Longitudinal studies such as the QLSCD indicate that there are many ways to observe a problem and that it is dangerous to draw definitive conclusions after the first analyses, no matter how brilliant these appear to be.

It is important to remember that the main objective of the QLSCD is to understand the paths during early childhood that lead to success or failure once the child enters the school system. In order to successfully reach this objective, we must obviously wait for information collected once the child begins school. The QLSCD children will complete their first school year in the spring of 2005. At the time when this report will be published, they will be old enough to enter Junior Kindergarten, which some of them have done in September 2002. Data collection is also planned for the end of Junior Kindergarten year (spring 2003) and at the end of Senior Kindergarten (spring 2004). If, as desired, these significant data collections are funded, the information generated will allow us to check the level of preparation for school at the entry into the first cycle of elementary school.

Later during this longitudinal study, description of the developmental trajectories of these children is planned throughout their school years. If, following the example of many researchers in Québec, the Québec Government confirms its financial involvement in pursuing QLSCD throughout the children's elementary and secondary school, we can increase our understanding of the factors that lead to academic success and therefore be in the best possible position to improve support to the all-too-many children for whom school is an endless succession of failures.

Through recent discoveries about the development of the human brain, we have come to see the importance of investing early in children's development, just as it is important to invest early in our pension plans. Longitudinal studies on the development of children must obviously be based on the same principle. They must begin as soon as possible, and this is what the *ministère de la Santé et des Services sociaux* did as early as 1997, by investing nearly \$5 million in a study on Québec children aged 5 to 54 months old. And obviously, just like for a pension plan, in order for these investments to bear fruit and provide the best possible returns, they must be maintained and even increased.



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Review of Methodology and Caution

The Québec Longitudinal Study of Child Development (QLSCD 1998-2002), launched in 1998, is being conducted on a cohort of nearly 2,000 children surveyed annually from the age of 5 months to approximately 4 years. This second volume covers longitudinal data from the first three rounds when the children were approximately 5, 17 and 29 months.

The longitudinal analyses of data collected in the 1998, 1999 and 2000 rounds allow inferences to be made to the population of children born in Québec in 1997 and 1998 (singleton births) who in 2000 were still living in Québec or who had only left the province temporarily. Therefore, in terms of the methodological approach, choosing not to sample children from those who arrived in Québec after birth limits inferences to this population.

Participation of families in the 1999 and 2000 rounds of QLSCD was excellent. Indeed, 94% of families who participated in the 1998 round continued to participate in the second and third rounds, for a 71%¹ longitudinal response rate for the two main questionnaires, the Interviewer Completed Computerized Questionnaire (ICCQ) and the Interviewer Completed Paper Questionnaire (ICPQ). Response rates for the Self-Administered Questionnaire for the Mother (SAQM) and Self-Administered Questionnaire for the Father (SAQF) remained stable from 1998 to 2000, namely 96% for the former and 90% for the latter, among annual respondents to the ICCQ. However, since respondent families were not necessarily the same from one round to the next, the weighted proportion of families who participated in all the rounds was lower, namely 92% for the SAQM and 83% for the SAQF, among respondents to the ICCQ in all three rounds (n = 1,985). The longitudinal response rates of these instruments, obtained by multiplying the weighted proportion of longitudinal respondents to the SAQM or SAQF by the longitudinal response rate of the ICCQ, were 65% and 59% respectively.

It was decided to minimize potential biases induced by non-response by adjusting the weights based on characteristics differentiating respondents from non-

respondents for the five major instruments of QLSCD – the ICCQ, ICPQ, SAQM, SAQF and the IST (Imitation Sorting Task testing cognitive development). Since only respondents to the 1998 round were eligible for longitudinal study, longitudinal weights were based on the cross-sectional weights of the ICCQ calculated in 1998. In addition, for longitudinal analyses involving data from the SAQM, SAQF or IST, an additional adjustment to the weights was required to compensate for overall longitudinal non-response in each of these instruments. Unfortunately, in the third round as in the first, even though the response rates of non-resident fathers improved, it was impossible to weight their data since response rates to the SAQFABS were still too low.

Moreover, given QLSCD's complex sample design, it was important that the variance associated with the estimates was correctly identified. This required using a software program that could take into account the complex sample design, otherwise the variance would tend to be underestimated, thereby resulting in a threshold of statistical significance that would be too low. SUDAAN (Survey Data Analysis; Shah *et al.*, 1997) was therefore used for prevalence estimates, chi-square tests, repeated measures analyses of variance, linear regressions, logistic regressions and Cox regressions. The threshold of significance for these statistical tests was set at 0.05. With regards to other tests not supported by SUDAAN such as the McNemar, the threshold was lowered to 0.01 to prevent identifying results as significant that might not be, given the complex sample design.

All the data presented that have a coefficient of variation (CV) higher than 15% are accompanied by one or two asterisks to clearly indicate their variability.

N.B. For further information on the survey's methodology, please read Number 1 of both Volume 1 and Volume 2. For more detailed information on the sources and justifications of questions used in the first three rounds of QLSCD as well as the components of the scales and indexes, please read Number 12 of both Volume 1 and Volume 2.

1. The unweighted number of families who responded to QLSCD went from 2,120 in 1998 to 2,045 in 1999, to 1,997 in 2000. The number of families who participated in the three rounds of the survey was 1,985 (namely 94% of the 2,120 families in the first round).

Caution

Unless indicated otherwise, “n” in the tables represents the sum of the individual weights reset to the size of the initial sample. This quantity is used to estimate the prevalences, and is slightly different from the real sample, namely the number of children in a given sub-group. In the body of the text, the number presented to describe the sample size also represents the sum of the individual weights reset to the size of the initial sample. This occurs when an analysis concerns a particular sub-group. The weighted frequency in these cases serves only as a link with the tables. The real sample size, and coefficient of variation remain the quantity to interpret as far as the precision of the estimates is concerned.

Because the data were rounded off, totals do not necessarily correspond to the sum of the parts.

Unless explicitly stated otherwise, all the differences presented in this report are statistically significant to a confidence level of 95%.

To facilitate readability, proportions higher than 5% were rounded off to the nearest whole unit in the text, and to the nearest decimal in the tables and figures.

Symbols

- .. Data not available
- ... Not applicable (N/A)
- Nil or zero
- $p <$ Refers to the threshold of significance

Abbreviations

- CV Coefficient of variation
- Not signif. Not significant

Socioeconomic Conditions and Health

Part I

Poverty and Health in Quebecois Children

In
2002...
I'll be 5 years old!

Introduction

Although the Canadian economy has improved over the last few years, a significant proportion of young children are still living in poverty (CCSD, 2000; NCW, 1998; NCW, 1999; Desrosiers *et al.*, 2002; Séguin *et al.*, 2001). In fact, as of 1999, one in five Canadian children was living in a family whose income was below the low income cutoff (Ross & Roberts, 1999). Moreover, in 2000, 21% of Quebec children who were approximately 2½ years old were living in low-income families, and 16% had been living in chronic poverty since birth (Desrosiers *et al.*, 2002). Studies based on comparable measures have shown that higher percentages of young Canadian children live in poverty than children in several European countries, including France, Great Britain and Sweden. Adjusted for fiscal redistribution, rates of child poverty in these countries are not higher than those for adults or the elderly, but in Canada the reverse is true (ICSI, 2000).

Many studies have shown that children growing up in poverty present more health problems than those living with an adequate income (Aber *et al.*, 1997; Brooks-Gunn & Duncan, 1997; Reading, 1997; Roberts, 1997; Séguin *et al.*, 2001). Hence we know that poverty has an effect on children from the beginning of their lives. One study, based on QLSCD data for five-month-old infants, clearly demonstrated this relationship even though the analysis controlled for the mother's level of education as well as neonatal health problems (Séguin *et al.*, 2001).

The central issue addressed in this study is whether this link between poverty and health persists as the child matures.¹ Following up on results published in Volume 1, we began by examining changes in the health of Quebec infants during their first 29 months of life, then we studied how changes in family economic status since the child's birth were related to the child's health at 29 months.

1. This part of the study has been made possible by a research grant from the Canadian Institutes of Health Research. In addition, Louise Potvin hold a scientific fellowship from the Medical Research Council of Canada, and Katherine L. Frohlich hold a post-doctoral fellowship from the Canadian Institutes of Health Research.

1. Poverty and Children's Health

Poverty is a complex phenomenon with multiple dimensions. It implies above all a lack of material resources, and for this reason it is often measured by annual income. Absolute poverty, or a level of income that is inadequate for meeting basic needs such as food, lodging and clothing (Aber *et al.*, 1997; Dixon and Macarov, 1998; Najman, 1993), is generally distinguished from poverty that results when an individual's income falls short of what is considered sufficient for living and functioning in society in an acceptable manner (Dixon & Macarov, 1998; House and Williams, 2000; Séguin *et al.*, 2002). Based on this relative approach, low income cut-offs set by Statistics Canada provide thresholds under which inadequate levels of income can be identified.

Poverty affects health from the very beginning of life. The first analyses of QLSCD data suggested that, when compared with infants living in Quebec families with adequate income, children from families with inadequate income were more likely to have been hospitalized and to have been perceived by their mothers to be less healthy. The analyses controlled for the mother's level of education and the baby's health at birth. In addition, babies in poor families had had a greater number of health problems than those born to wealthier families (Séguin *et al.*, 2001).

Since adult health is largely the result of health during childhood, childhood poverty compromises an individual's health later in life. Adult health could also be related to the health of the foetus before birth, even though some authors disagree with this hypothesis (Barker *et al.*, 2001; Gillman, 2002; Lucas *et al.*, 1999; Robinson, 2001). In fact, longitudinal studies have shown that health problems in young children and the socio-economic conditions in which they are raised are determinant of their health when reaching adulthood (Kuh *et al.*, 1997; Van de Mheen *et al.*, 1998b; Wadsworth, 1999; Wamala *et al.*, 2001). For example, cardiovascular problems in adults have been linked to health problems in childhood, particularly when the child's family had financial difficulties (Van de Mheen *et al.*, 1998a; Wamala *et al.*, 2001). The associated mechanisms are not well understood; we also do not know at what

age these processes become established (Hall *et al.*, 2002; Power *et al.*, 1996).

In this context, one could well wonder what influence health problems during infancy and changes in the family financial situation have on health later in life. Answers to this type of question can only be found in prospective longitudinal studies. Few such studies have examined this issue among young children (Spencer and Coe, 2000), so we do not have a good understanding of what the future holds for babies who present health problems in the first year of life. Moreover, we are not certain to what extent changes in the health status of young children are tied to economic problems in the child's first years of life. Finding answers to these questions is a complex task, because the context is constantly changing; both illness and poverty can evolve in a variety of ways. The health of young children is much more variable than that of adults or the elderly because children are growing rapidly, their health is particularly vulnerable, and they have a much greater capacity for recovery. Sick children usually recover, while those who were in good health can develop new problems as they age and are exposed to new environments. The financial situation of young families is often not well established and may vary considerably from one year to the next. Desrosiers *et al.* (2002) conducted a study that dealt specifically with changes to the financial position of Quebec families that had children born at the end of the 1990s. They demonstrated the complexity of this issue by showing how families moved in and out of low-income status during the time their children were between 5 and 29 months of age. If approximately 25% of the children were living in low-income families at any time, a third of them lived in families that were considered low income at some time in the first 2½ years of the child's life. In addition, 16% of children lived in a family that had a low income throughout this period.

Changes in parental employment and relationships influence changes in a family's financial status (Desrosiers *et al.*, 2002). In families with a young child, income usually depends on opportunities for employment, and young adults, who are often young parents, are more likely to be affected by uncertainty

in employment markets (Corcoran & Chaudry, 1997). Changes in employment can have an effect on income levels among young families. For example, if the mother can return to her job or find another job after maternity leave, the period of reduced income will be temporary. Moreover, if the parents separate, the family is more likely to slip into poverty, particularly if the mother is the head of the family (Desrosiers *et al.*, 2002). On the other hand, if the head of a single-parent family enters into a new relationship, the financial situation may improve.

An examination of changes to a family's financial status and the health of young children must consider issues other than those factors that explain movements in and out of poverty. How important is the timing of poverty or its duration in a child's life (Duncan & Brooks-Gunn, 1997)? In other words, does temporary poverty have as great an impact on the health of a young child as chronic poverty? What can be said of children from families that have only recently become poor, as compared to those in families that were poor during the child's first years of life? Is the first year of life a particularly vulnerable time, whereas the health of an older child is less affected by the family's financial problems? Does the child need to be exposed to poverty for a certain length of time before his or her health is affected, or does exposure to poverty have an immediate effect on health?

According to some authors, maternal factors could be critical to links between poverty and the health of young children. Several studies have shown that the mother's age and level of education has an important effect on the health of her child (Chen *et al.*, 1998; Cooper *et al.*, 1998; Gazmararian *et al.*, 1996; Montgomery *et al.*, 1996). If the mother has a higher level of education, can this compensate for the effect poverty has on a child? An older or better-educated mother is more likely to make better choices for her baby and have a healthier lifestyle, independent of her financial situation (Meara, 1999). If the parents are non-smokers and the baby is breastfed for a longer period of time and fed food that is more nutritional, he or she may stay in better health and be less affected by the parents' financial problems. Conversely, a mother in her teens or one with less education may be more likely to make choices that are not as good for the baby's health. This could

affect the child directly or make him or her more vulnerable to other factors in the immediate environment.

There would seem to be a variety of environmental factors that also link living in poverty to a child's health. The presence of smokers or pets in the home can create respiratory problems (Celedon *et al.*, 2002; Lanphear *et al.*, 2001a; Lanphear *et al.*, 2001b; Mannino *et al.*, 2002; Ownby *et al.*, 2002). Several other characteristics of the home can also affect the likelihood that a child becomes asthmatic (Bashir, 2002; Lanphear *et al.*, 2001a; Rijssenbeek-Nouwens *et al.*, 2002). Moreover, when the mother works and the child is regularly cared for outside the home, he or she could be exposed to a variety of infectious agents, increasing the probability of infection (Nafstad *et al.*, 1999). This occurs more often in families with adequate income since the mother is employed. On the other hand, children from poor families who regularly attend daycare could profit from the better quality environment found in that setting and therefore suffer from fewer infections (Margolis *et al.*, 1992). Will poverty or low family income be found to affect the health of children once we control for characteristics of the mother and the child's environment?

This report will describe how the main health problems of Quebec children change in the first 29 months of life. Various health indicators allow us to follow these changes: acute health problems, asthma, injuries, hospitalization and the mother's perception of her child's health. Then we will analyze relationships between changes in family poverty since birth and children's health status at the age of 29 months, taking into account specific characteristics of children, neonatal health problems and characteristics of mothers and immediate environments. These analyses will show if poverty, defined as income below a low income cut-off point, has an impact on the health of children that is independent of characteristics of the mother and the environment in which the child is being raised.

2. Methods

2.1 Data and the Sample

The data comes from the 1998, 1999 and 2000 rounds of the QLSCD at which time the children in the sample were aged about 5, 17 and 29 months, respectively. More specifically, it comes from two sections of the Interviewer Completed Computerized Questionnaire (ICCQ) on the health of the child and family income and the section of the Interviewer Completed Paper Questionnaire (ICPQ) on acute health problems. The person with the best knowledge of the child (the "PMK") answered these questions. In almost all cases (99.7% at 5 months, 96.5% at 17 months and 98.0% at 29 months) the PMK was the mother. Several studies have already shown that the mother is a reliable respondent on questions concerning the health of her child (Bruijnzeels *et al.*, 1998; Fields *et al.*, 2001; McCormick & Brooks-Gunn, 1999; Walton *et al.*, 2000).

The sample used in the analysis consisted of 1,985 children, the subjects of the first three rounds of the QLSCD. We wanted to know if some of the specific health variables could have an effect on a family's ability to stay in the study. Data gathered when the children were 5 months old did not reveal any links between participation and the presence of chronic health problems or the mother's perception of her child's health. On the other hand, children who were hospitalized in the first 5 months of life were more likely to stay in the study.

2.2 Variables

2.2.1 Health indicators

The Santé Québec team chose all the measurement instruments after consulting with researchers. The child health issues investigated were, by and large, the same as those of Statistics Canada's National Longitudinal Study of Children and Youth (NLSCY), which were in turn taken from large-scale American surveys such as the National Health Interview Survey (NHIS), the National Longitudinal Survey of Youths (NLSY) and the National Health and Nutrition Examination Survey (NHANES). Questions related to

acute health problems were developed specifically for the QLSCD.

The child health indicators, identified as dependent variables, included acute health problems, asthma attacks, injuries, hospitalizations and the mother's perception of the child's health. This last variable could be said to summarize information on the child's overall state of health.

Acute health problems

In this study, "acute health problems" refers to the presence of the types of infections often seen in young children; these include respiratory tract infections accompanied by fever, otitis media, and gastrointestinal or other types of infections, including urinary infections. Even though we documented the number of times the child had an acute health problem in the three months preceding the interview, the variable only indicates the presence or absence of an infection.² Information on this health indicator was not, however, collected in the 1998 round, when children were 5 months old.

Asthma attacks

In the 1999 round, information was obtained about the presence of diagnosed asthma and the number of asthma attacks since birth. In the 2000 round, however, the question only referred to the 12 months preceding the interview. This study breaks the data down into two categories: the presence or absence of an asthma attack in the period in question.

2. The principal types of infection found in children 29 months old are listed in Annex 1 (table A.1).

Hospitalization

The information collected indicates whether the child was hospitalized for one or more nights in the 12-month period preceding the interview. The data were sorted into two categories; a “yes” category and a “no” category.³

Injuries

At each round of the study, information was gathered on the presence and nature of injuries sustained in the year preceding the interview.⁴ Only the relationship between changes in poverty status and the presence of injuries at 29 months will be presented, however, because the number of children having sustained injuries was too low in the previous rounds to establish any trends.

The mother’s perception of the child’s health

There were five categories for responses to the question on perception of the child’s health: excellent, very good, good, fair or poor. After examining the data for each category, we reorganized it into two new categories: excellent or very good versus good, fair or poor. Data on this variable were collected in the 1998, 1999 and 2000 rounds. The variable could be considered a good indicator of overall health, even for disadvantaged children (McCormick *et al.*, 1989). Analysis of the data revealed a strong correlation between the mother’s perception of the child’s health and the presence of a variety of health problems (data not provided).

2.2.2 Poverty indicators

Indicators of poverty were defined using pre-tax low income cut-offs set by Statistics Canada. A household was classified as poor or having inadequate income if its gross annual income from all sources was below a pre-tax low income cut-off set according to the size of the family unit and the size of the region the family lived in (Desrosiers *et al.*, 2002). The low income cut-off (LIC) compares how much pre-tax income

families spend on food, lodging and clothing; it is set where these expenses attain a level 20% above the average.⁵

*Duration of and changes in poverty status*⁶

For the purposes of this analysis, we defined the duration of poverty status in the child’s first 29 months of life as follows:

• Duration of poverty as the number of periods of poverty:

- *Never poor*: families that had an adequate income (equal to or exceeding the low income cut-off) in the 1998, 1999 and 2000 rounds;
- *Chronic poverty*: families whose income was inadequate (below the low income cut-off) in the 1998, 1999 and 2000 rounds;
- *Two periods of poverty*: families whose income was inadequate (below the low income cut-off) in the twelve-month period preceding two of the three rounds: 1998 and 1999; or 1998 and 2000; or 1999 and 2000;
- *One period of poverty*: families whose income was inadequate (below the low income cut-off) in the twelve-month period preceding only one of the three rounds.

• Changes in poverty status according to the timing of a period of poverty:

- *Never poor*: families with adequate income (equal to or exceeding the low income cut-off) in the 1998, 1999 and 2000 rounds;
- *Early poverty*: families whose income was inadequate (below the low income cut-off) **only** during the twelve-month period preceding the first round (1998);

3. The principal reasons for hospitalization of 29-month-old children are provided in Annex 1 (Table A.2).

4. The distribution of children according to the type of injury sustained for 2000 round data is presented in Annex 1 (Table A.2).

5. For example, for a Montreal household of two, the low income cutoff (1992 base) established by Statistics Canada was \$22,357.

6. Changes in the family’s financial situation in the first 29 months of the child’s life were more fully described by Desrosiers *et al.*, (2002).

- *Temporarily poor*: families whose income was inadequate (below the low income cut-off) **only** during the twelve-month period preceding the second round (1999);
- *Currently poor*: families whose income was inadequate (below the low income cut-off) **only** during the twelve-month period preceding the third round (2000);
- *Persistent poverty*: families whose income was inadequate (below the low income cut-off) during the twelve months preceding two or three rounds.

2.2.3 Health indicators at birth

Information on health indicators at birth was obtained from hospital records. Neonatal complications considered as confounding include congenital abnormalities, prematurity and intrauterine growth retardation (IUGR), also called low birth weight for gestational age. Congenital abnormalities are defined according to the International Classification of Diseases (ICD). Since births following gestation periods under 24 weeks were excluded from the initial sample, births with a 24- to 37-week gestation period have been considered premature. Low birth weight for gestational age is determined from data on birth weight and the length of gestation, adjusted for gender. This is according to the most recent Canadian curve, which was based on births between 1994 and 1996 (Kramer *et al.*, 2001). The tenth percentile was defined as the threshold below which a newborn is considered of low birth weight for gestational age.

2.2.4 Sociodemographic characteristics of mothers⁷, characteristics of the child's environment

In addition to the mother's age at delivery and her level of education, the analysis took her immigrant status into account. The data was collected in the first round of the survey when the children were approximately five months old. The variable for "mother's age at delivery" was broken down into three categories: below the age of 20, 20-34 years and 35 years or older. Mothers were classified according to their level of schooling: no high school diploma, high school diploma or trade school diploma,

and postsecondary studies (college or university) either begun or completed. The variable for immigration status classifies mothers according to whether they are non-immigrants (Canadian born) or European-born immigrants or immigrants of non-European origin.

Variables concerning the parent's union status (living alone or with a partner), smoking habits (number of parents who smoke in the home) and the family's child care arrangements were constructed from data from the 2000 round when the children were approximately 2½ years old. Childcare arrangements included the following categories: in the home, in a family setting or in a daycare centre. The "presence of a pet" variable was based on data collected in the 1998 round (this information was not collected during the other rounds). Finally, "exclusive breastfeeding" was defined as feeding the child with his or her mother's milk only; no other liquid (not even water) nor any solid food would have been provided. The length of time the child is exclusively breastfed was calculated for the first year and a half of life. The variable was given six categories: never breastfed, breastfed since birth but not exclusively, and four separate categories of exclusive breastfeeding; at least five weeks, five to nine weeks, 10 to 14 weeks and more than 14 weeks.

2.3 Analysis

Through an initial series of descriptive analyses, we examined the distribution of health indicators when the children were about 5, 17 and 29 months old. Trends in the children's health problems are then described, based on whether or not they had the problem in the previous round. The proportion of children having one or another of the health problems is presented for one, two or three periods of observation. Then relationships are investigated between the children's health indicators at 29 months of age and both the duration and the timing of poverty (i.e. the year during which the child was exposed to poverty).

7. Only data on mothers was used because there were too many missing data for fathers.

Logistic regression was used to develop two models for data analysis. The first model looks at the long-term effect of the length of time the family is poor or the timing at which poverty occurs in the child's life. What are the long-term effects on the health status of 2½-year old children (while controlling for confounding factors)? In the second model, we control for the earlier presence of the specific health problem. This model therefore examines changes in the child's health status between the ages of 17 and 29 months.

3. Results

3.1 Changes in children's health from birth to the age of about 29 months

Table 3.1 presents the prevalence of the different health problems in each observation period. We see that the percentage of children presenting an acute health problem decreases slightly between 17 and 29 months (66% and 61%) while the proportion of those who had asthma attacks remains stable (approximately 7%). We also note a substantial increase in the proportion of children injured accidentally during the period studied: the rate rises from 1.5% to 8% between 5 and 17 months, then to 10% at 29 months. On the other hand, we see a decrease in the rate of admission to hospital (from 12% to 8%) between 17 and 29 months. The mother's perception of the child's health fluctuates as well: after an increase from 8% to 11% between 5 and 17 months, towards 29 months there are still 10% of children who are perceived to be in less than very good health as reported by their mother.⁸

Figures 3.1 to 3.4 present the tracking or the changes in the different health problems of the children who participated in the first three rounds of the QLSCD. Generally speaking, we note that children are more vulnerable when they started life with health problems. Thus, for each of the indicators, a greater proportion of children continue to present the same health problem as that of children who present new cases. However, with the noteworthy exception of acute health problems, we note that a majority of the children recover and do not experience recurrences.

Table 3.1
Distribution of children by some indicators of health at the ages of about 5, 17 and 29 months, Québec, 1998, 1999 and 2000

	5 months	17 months	29 months
	%		
Acute health problem ¹	...	66.0	61.3
Asthma attack ²	...	7.5	7.3
Injury ³	1.5 *	7.5	9.8
Hospitalization ³	13.3	12.1	7.6
Child's health perceived to be less than very good by the mother	8.1	11.0	9.7

1. Questions about acute health problems were asked in the 1999 and 2000 rounds and covered the three months preceding the survey.
 2. In the 1999 round, the reference period goes from birth to the age of about 17 months while, in the 2000 round, it covers the last 12 months.
 3. Questions about injuries and hospitalization in the 1998 round cover the period from birth to the age of about 5 months while in the 1999 and 2000 rounds, they deal with the last 12 months.
- * Coefficient of variation between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Change in acute health problems

Among the children who were not affected by an acute health problem during the three months prior to the 1999 round (17 months), close to half (48%) were affected during the three months prior to the 2000 round (29 months) (Figure 3.1). Moreover, among those who had presented at least one episode of an acute health problem around the age of 17 months, approximately two out of three children (68%) were affected again around the age of 29 months.

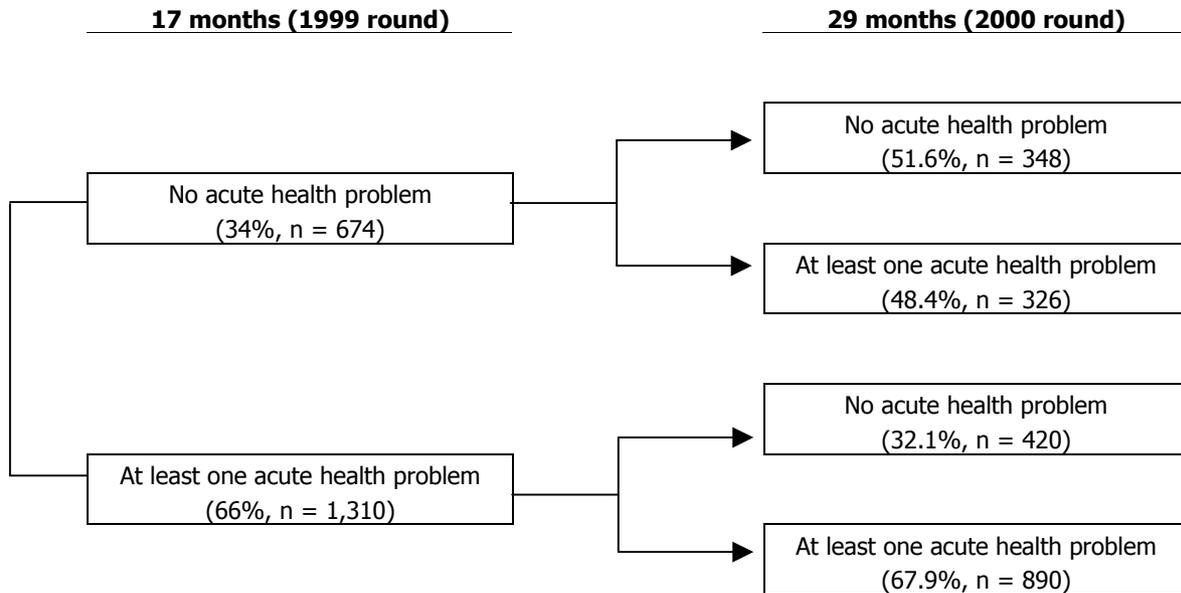
Change in asthma attacks

The large majority of children did not have any asthma attack between birth and the age of about 17 months. Among those not experiencing an asthma attack, only 4% had one or more asthma attack the following year (Figure 3.2). On the other hand, among those who had already had an asthma attack between birth and 17 months, 45% had recurrences.

8. In Annex 1 we see the distribution of the children at about the age of 29 months by the main types of infections (Table A.1), the principal reasons for hospitalization and the nature of the injuries sustained (Table A.2).

Figure 3.1

Change in children by the presence of acute health problems¹ at the ages of about 17 months and 29 months, Québec, 1999 and 2000

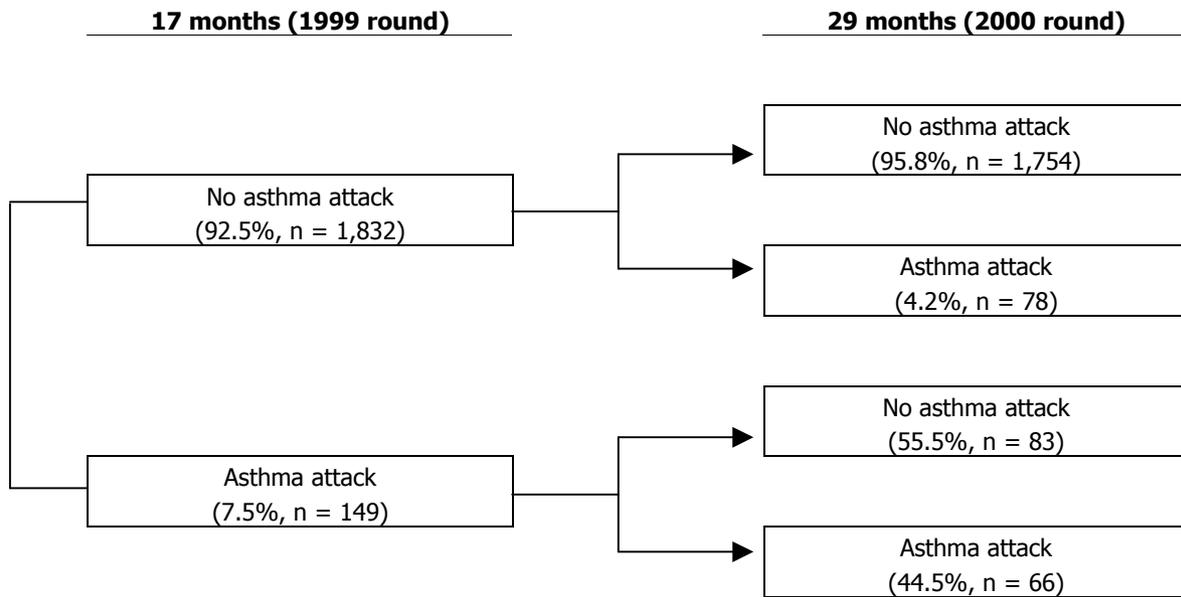


1. Questions on acute health problems were asked in the 1999 and 2000 rounds and covered the three months preceding the survey.

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 3.2

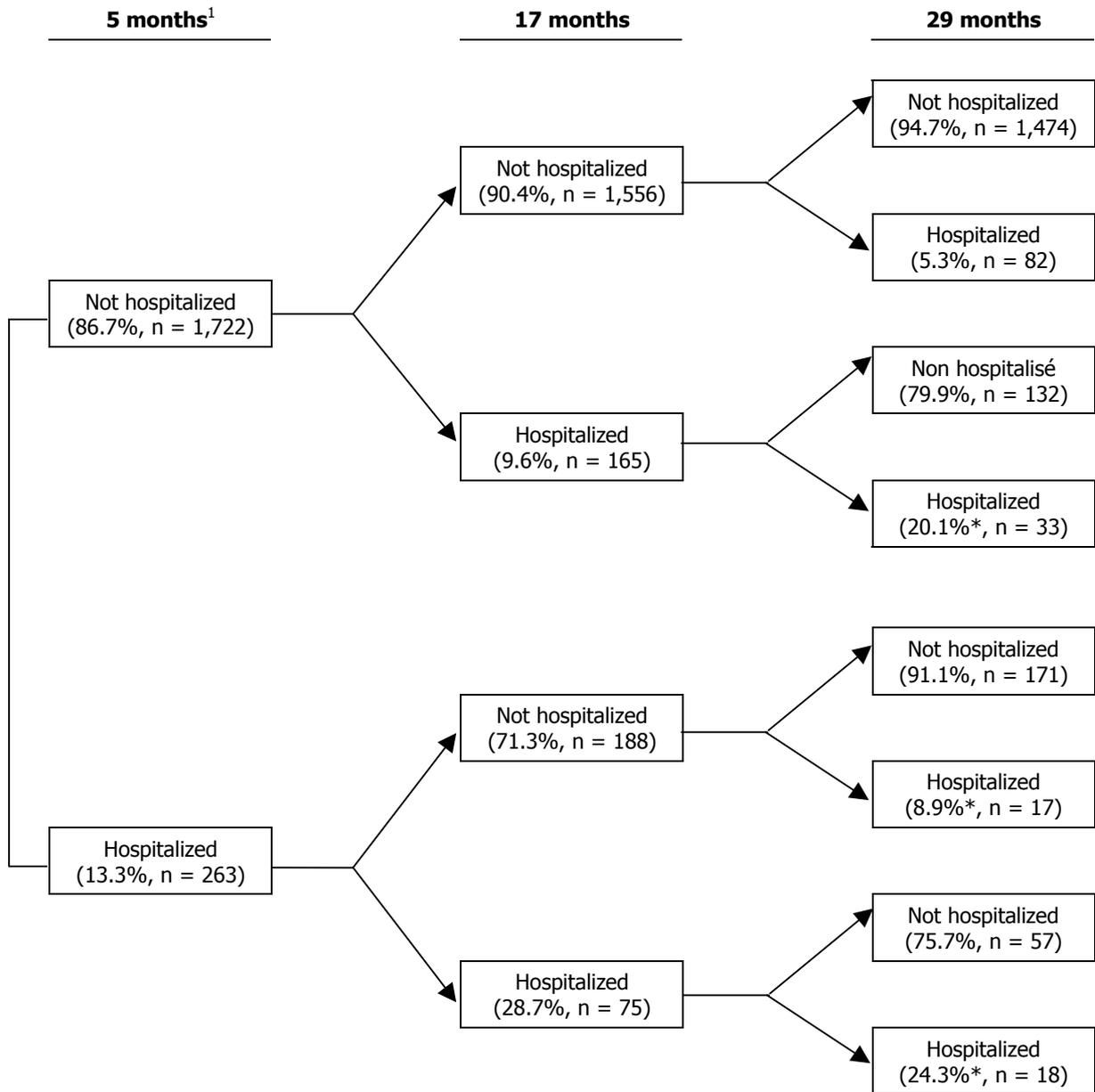
Change in children by the presence of asthma attacks¹ between birth and the age of about 29 months, Québec, 1999 and 2000



1. The period covered by the questions on asthma in the 1999 round go from birth to the age of 17 months while the questions asked in the 2000 round deal with the 12 months preceding the survey.

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 3.3
Change in children by hospital admissions at the ages of about 5, 17 and 29 months, Québec, 1998, 1999 and 2000



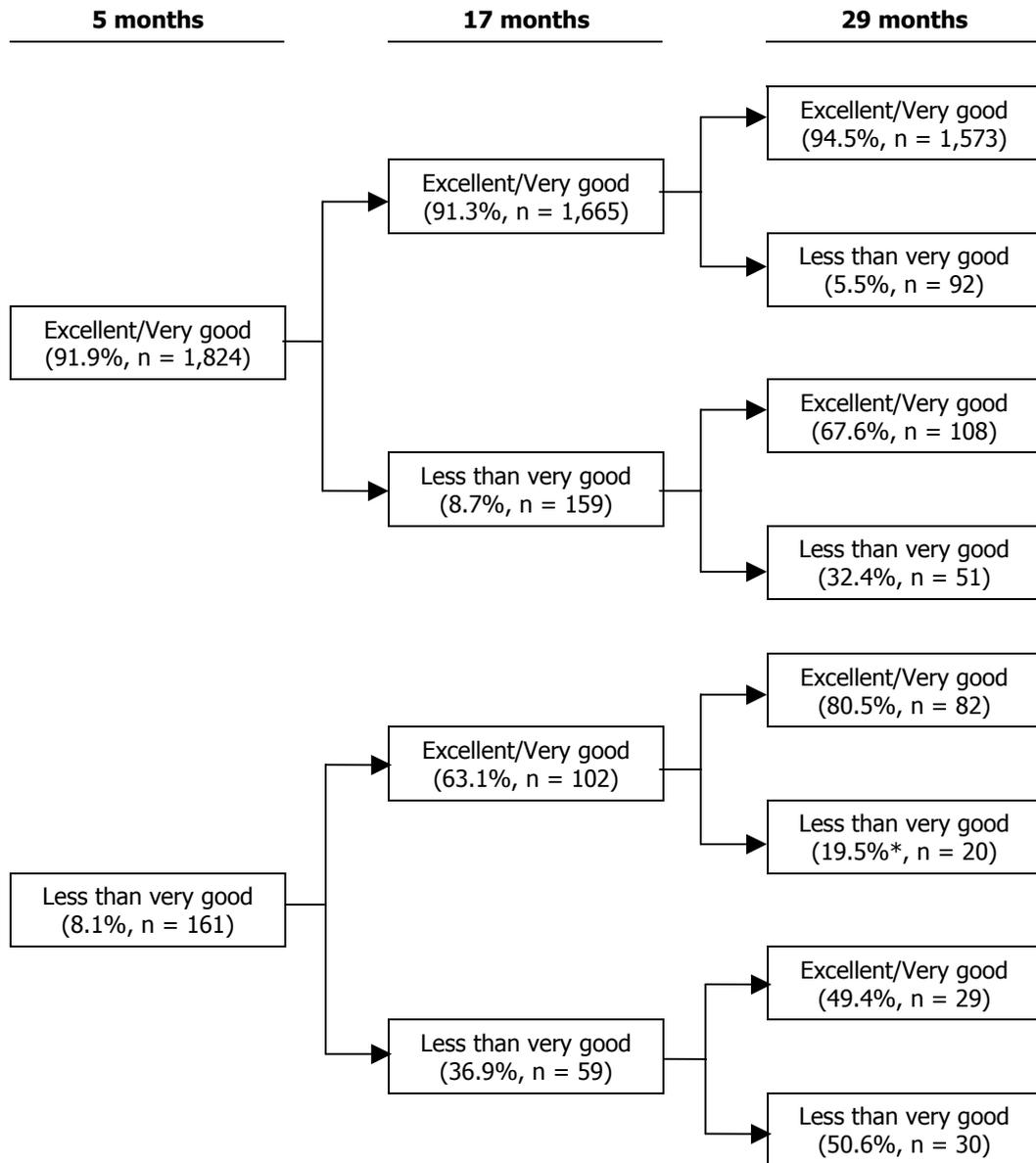
1. The period covered by the question dealing with hospitalization in the 1998 round goes from birth to the age of 5 months.

* Coefficient of variation between 15% and 25%; interpret with caution.

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 3.4

Change in children by the mother's perception of the child's health at the ages of about 5, 17 and 29 months, Québec, 1998, 1999 and 2000



* Coefficient of variation between 15% and 25%; interpret with caution.

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Change in hospitalizations

Among the children who had never been hospitalized, only 5% were hospitalized for the first time between 17 and 29 months (Figure 3.3). For those who had been hospitalized for the first time between 5 and 17 months, 20% were admitted to hospital again between 17 and 29 months.

Among the children who had been hospitalized only before the age of 5 months, 9% were hospitalized between 17 and 29 months. On the other hand, among those who had been hospitalized before the age of 5 months and who were also hospitalized between 5 and 17 months, 24% were hospitalized again between the ages of 17 and 29 months.

Change in the mother's perception of the child's health

Around the age of 29 months, only 6% of the children who, up until then, had been perceived to be in excellent or very good health are reported as being in less than very good health (Figure 3.4). However, close to one-third (32%) of the children whose health was considered less than very good for the first time around 17 months, are still perceived as such around 29 months.

Among those who were perceived in less than very good health around 5 months, but who were reported to be in excellent or very good health around 17 months, approximately 20% were once again perceived to be in less than very good health around 29 months. Yet, the percentage of children perceived as such around 29 months is higher (51%) among those who had been reported to be in less than very good health both around 5 and 17 months.

3.2 Recurrence of health problems between birth and the age of about 29 months

To illustrate the change in children's health problems between birth and the age of approximately 2½ in another way, we can also examine the number of periods during which the various health problems were reported in order to know how many children were affected by one or another health problem during just one or two or three of the observation periods. In this way, we could determine how many

experienced recurrences from one year to the next (Table 3.2). It should be remembered that acute health problems were documented during the 1999 (17 months) and 2000 (29 months) rounds and that the reference period for questions about asthma attacks in the 1999 round began at birth. Other health problems were documented at each of the three rounds of the study.

During their first years of life, the health of the majority of Quebecois children changes for the better since most of them will not be affected by the health problems under study or will be affected only during a single period. Thus, 38% of the children suffered from acute health problems in a single round, 8% had at least one asthma attack, 16% had at least one injury and 20% were hospitalized at least once during one of the observation periods since their birth. Finally, for 14% of the children, their overall health was perceived as being less than very good in one of the three rounds.

Aside from acute health problems which are the most frequent, only 5% or less of the children experienced one of the health problems monitored in two of the three rounds: 3.3% had asthma attacks, 1.5% suffered injuries, 5% were hospitalized and 5% were perceived by their mother to be in less than very good health. On the other hand, acute health problems were reported for 45% of the children on two occasions.

In total, less than 2% of the children were perceived in each of the rounds as being in less than very good health or were admitted to the hospital during each of the periods under study.

Table 3.2

Distribution of children by number of periods spent living with health problems at the ages of about 5, 17 and 29 months, Québec, 1998, 1999 and 2000

Period of study	Acute health problem ¹	Asthma attack ²	Injury ³	Hospitalization ³	Health perceived as less than very good
None	17.5	88.6	83.0	74.2	79.2
A single period in which the child was affected	37.6	8.1	15.5	19.4	14.2
Only 1998			1.1*	8.6	4.1
Only 1999	21.2	4.2	6.1	6.7	5.4
Only 2000	16.4	3.9	8.4	4.2	4.6
Two periods in which the child was affected	44.9	3.3	1.5*	5.4	5.1
1998 and 1999			...	2.9*	1.5*
1999 and 2000	44.9	3.3	1.3*	1.7*	2.6
1998 and 2000			...	0.8**	1.0*
Three periods in which the child was affected	0.9*	1.5*

1. Questions about acute health problems were asked only in the 1999 and 2000 rounds and covered the three months preceding the survey.

2. The period covered by the questions dealing with asthma in the 1999 round go from birth to the age of 17 months while the questions asked in the 2000 round cover the 12 months preceding the survey.

3. Questions about injuries and hospitalization in the 1998 round cover the period from birth to the age of about 5 months.

* Coefficient of variation between 15% and 25%; to be interpreted with caution.

** Coefficient of variation greater than 25%; rough estimate provided only as a guide.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

With the exception of acute health problems, the majority of the children aged approximately 2½ were never affected by the health problems monitored. This being said, between birth and the age of about 29 months, 11% had at least one asthma attack, 17% had at least one injury, 26% were hospitalized for at least one night and 21% were perceived to be in less than very good health at least once.

3.3 Changes in toddlers' families poverty status

The results presented in Table 3.3 allow us to evaluate the changes in the economic situation of the families of Quebecois toddlers from birth to the age of about 29 months, as well as the length of time spent living in poverty. As reported in Number 2 of this volume (Desrosiers et al., 2002), one-third of the children (33%) experienced at least one episode of poverty since their birth, while 16% of them had lived in a family whose income was continually below the low-income cut-off. One out of ten children had experienced poverty once during the course of the

period studied and among these, 5% had experienced this situation during their first months of life (early poverty).

Table 3.3

Distribution of children at the age of about 29 months by family's economic condition since birth, Québec, 1998, 1999 and 2000

	%
Never poor (1998, 1999 and 2000)	67.3
Chronic poverty (1998, 1999 and 2000)	15.5
Poverty over two periods	7.2
Poverty in one period	10.0
Early poverty (1998)	5.1
Temporary poverty (1999)	2.2 *
Current poverty (2000)	2.7 *
Total %	100,0
n	1 905

* Coefficient of variation between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

3.4 Duration of poverty and health of children at the age of about 29 months

The results of the multivariate analyses (Table 3.4) show that the children living in a family that had experienced poverty conditions during their first years of life are more likely to present some of the health problems monitored such as acute health problems or asthma attacks around the age of 29 months. This holds true even if we adjust for the principal confounding factors (Model 1).⁹ This relationship is not modified by taking into account prior acute health problems or asthma attacks (Model 2).

The results (Table 3.4) show that the probability of presenting an acute health problem around the age of 2½ years is greater for children whose family had a chronically inadequate income than for those whose family had an adequate income since their birth (adjusted OR = 1.8; CI at 95% = 1,2-2,6) while adjusting for the child's age and sex, health conditions at birth (prematurity, IUGR, congenital abnormalities) as well as for the mother's sociodemographic characteristics (age, education, union status and immigration status) and the other environmental factors such as parents' smoking and method of child care (Model 1). This probability remains higher even when we take into account acute health problems reported around 17 months (model 2). On the other hand, when the child's exposure to poverty is not constant (1 or 2 periods), the probability of presenting an acute health problems does not appear to be greater than for those whose family enjoyed an adequate income level since their birth.

Independent of the number of periods of poverty, the children exposed to poverty are always more susceptible to having had asthma attacks between 17 and 29 months than those whose family maintained an income level above the low-income cut-off since their birth (Table 3.4 – Model 1). In fact, whether they had experienced one period (adjusted OR = 3.3; CI at 95% = 1.7-6.2), two periods (adjusted OR = 3.3; CI at 95% = 1.7-6.3) or three periods (adjusted OR = 2.9; CI at 95% = 1.5-5.6) of poverty, the children run a greater risk of having had

asthma attacks, and this holds true even when adjusting for their own characteristics, those of their mother and those of their environment (Model 1). This relationship persists when we adjust for the presence of asthma attacks between birth and 17 months (Model 2).

The probability of having sustained injuries between 17 and 29 months is not greater for children whose family was poor during one, two or three periods since their birth than for others, and this holds true even when the other variables and the fact of having been injured around the age of 5 months are taken into account. Similarly, the probability that the children would be hospitalized does not differ according to the number of periods of poverty. This relationship does not change when we take into account the fact that the child had been hospitalized between birth and 5 months. As for health being perceived as less than very good, no statistically significant relationship is evident in either the first or the second model.

3.5 Timing of family's poverty and health of children at the age of about 29 months

The results presented in Table 3.5 focus on the timing of poverty in the life of the children in order to see to what extent early poverty, for example, plays a specific role in terms of certain health problems. Compared to children who have never experienced an episode of low income, those who have experienced conditions of poverty before 5 months (early poverty) are more likely to have asthma attacks or to sustain injuries between the ages of 17 and 29 months. Moreover, persistent poverty, defined by exposure to two or three periods of low income, remains significantly associated with a greater propensity of children to suffer acute health problems or to have asthma attacks¹⁰. On the other hand, the analyses do not reveal any statistically significant link between the other indicators of children's health and early poverty.

9. It should be noted that exclusive breastfeeding was controlled for each of the health problems monitored, but did not prove to be significant. The detailed results of the logistic regressions are presented in Annex 1 (Tables A.3 to A.7/9)

10. The detailed results of the logistic regressions are presented in Annex 1 (Tables A.8 to A.12).

Table 3.4

Adjusted odds ratio (OR) and 95% confidence interval (CI) of the occurrence of health problems in children at the age of about 29 months by the number of periods spent living in poverty since birth, Québec, 1998, 1999 and 2000

	Acute health problem ¹		Asthma attack ²		Injury ³		Hospitalization ³		Health perceived as less than very good	
	Model 1 ⁵	Model 2 ⁶	Model 1	Model 2	Model 1 ⁷	Model 2 ⁷	Model 1 ⁷	Model 2 ⁷	Model 1 ⁷	Model 2 ⁷
	RC (IC 95%)									
Prior health problem ⁴		2.2 ⁺⁺⁺ (1.8-2.7)		20.9 ⁺⁺⁺ (12.4-35.1)		1.9 (0.6-6.2)		2.0 ⁺⁺ (1.2-3.2)		4.6 ⁺⁺ (3.0-7.2) [†]
Number of periods in poverty										
Never poor	1	1	1	1	1	1	1	1	1	1
Poverty in one period	1.2 (0.8-1.6)	1.1 (0.8-1.6)	3.3 ⁺⁺⁺ (1.7-6.2)	2.9 ⁺⁺ (1.3-6.2)	1.3 (0.7-2.2)	1.3 (0.8-2.2)	1.2 (0.6-2.4)	1.2 (0.6-2.4)	1.3 (0.8-2.3)	1.3 (0.7-2.2)
Poverty in two periods	1.2 (0.8-1.8)	1.2 (0.8-1.9)	3.3 ⁺⁺⁺ (1.7-6.3)	3.4 ⁺⁺⁺ (1.7-6.8)	0.8 (0.4-1.6)	0.8 (0.4-1.6)	2.0 (1.0-3.9)	2.0 (1.0-3.9)	1.0 (0.5-1.8)	1.0 (0.5-1.8)
Poverty in three periods (chronic)	1.8 ⁺⁺ (1.2-2.6)	1.8 ⁺⁺ (1.2-2.6)	2.9 ⁺⁺ (1.5-5.6)	3.5 ⁺⁺⁺ (1.7-7.4)	1.2 (0.7-2.1)	1.2 (0.7-2.1)	1.5 (0.7-3.1)	1.5 (0.7-3.2)	1.2 (0.7-2.2)	1.1 (0.6-1.9)

1. Questions about acute health problems were asked only in the 1999 and 2000 rounds and covered the three months preceding the survey.

2. The period covered by the questions dealing with asthma in the 1999 round go from birth to the age of 17 months while the questions asked in the 2000 round cover the 12 months preceding the survey.

3. Questions about injuries and hospitalization in the 1998 round cover the period from birth to the age of about 5 months.

4. Prior health problem corresponds to the problem studied in the model.

5. Model 1: adjusted for the following factors: a) child's age and sex; condition at birth: prematurity, intrauterine growth retardation and congenital abnormality; b) mother's characteristic: age, education, immigration status, union status; c) child's environment: parents' smoking, method of child care. Adjustment also made for the presence of a pet in the home at 5 months for the model on asthma attacks.

6. Model 2: adjusted not only for the factors mentioned in model 1 but also for prior health problem.

7. In these models, the variable poverty taken as a whole is not significant for the Wald test.

†: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table 3.5

Adjusted odds ratio (OR) and 95% confidence interval (CI) of the occurrence of health problems in children at the age of about 29 months by the timing when the poverty occurred since birth, 1998, 1999 and 2000

	Acute health problem ¹		Asthma attack ²		Injury ³		Hospitalization ³		Health perceived as less than very good	
	Model 1 ⁵	Model 2 ⁶	Model 1	Model 2	Model 1 ⁷	Model 2 ⁷	Model 1 ⁷	Model 2 ⁷	Model 1 ⁷	Model 2 ⁷
	RC (IC 95%)									
Prior health problem ⁴		2.2 +++ (1.8-2.7)		21.1 +++ (12.5-35.4)		1.9 (0.6-6.3)		2.0 ++ (1.2-3.3)		4.6 +++ (3.0-7.2)
Timing when the poverty occurred										
Never poor	1	1	1	1	1	1	1	1	1	1
Early poverty (1998)	0.9 (0.5-1.4)	0.9 (0.5-1.4)	5.0 +++ (2.4-10.6)	4.2 +++ (1.8-9.7)	2.4 ++ (1.3-4.7)	2.5 ++ (1.3-4.8)	1.4 (0.6-3.1)	1.3 (0.6-3.0)	1.6 (0.8-3.2)	1.4 (0.6-2.9)
Temporary poverty (1999)	1.6 (0.8-3.2)	1.5 (0.7-3.1)	2.4 (0.7-8.6)	2.7 (0.5-13.7)	0.3 (0.1-1.2)	0.3 (0.1-1.2)	0.4 (0.1-3.2)	0.4 (0.1-3.3)	1.1 (0.4-3.1)	1.1 (0.4-3.1)
Current poverty (2000)	1.6 (0.9-2.8)	1.4 (0.8-2.6)	0.6 (0.1-4.4)	0.4 (0.1-6.1)	0.6 (0.2-1.8)	0.6 (0.2-1.8)	1.8 (0.7-4.6)	1.9 (0.7-5.1)	1.0 (0.4-2.9)	1.3 (0.5-3.6)
Persistent poverty (2 or 3 periods)	1.5 † (1.1-2.1)	1.5 † (1.1-2.1)	3.1 +++ (1.8-5.1)	3.4 +++ (1.9-6.1)	1.0 (0.6-1.7)	1.0 (0.6-1.7)	1.7 (1.0-2.9)	1.7 (1.0-3.0)	1.1 (0.7-1.8)	1.0 (0.6-1.7)

1. Questions about acute health problems were asked only in the 1999 and 2000 rounds and covered the three months preceding the survey.

2. The period covered by the questions dealing with asthma in the 1999 round go from birth to the age of 17 months while the questions asked in the 2000 round cover the 12 months preceding the survey.

3. Questions about injuries and hospitalization in the 1998 round cover the period from birth to the age of about 5 months.

4. Prior health problem corresponds to the problem studied in the model.

5. Model 1: adjusted for the following factors: a) child's age and sex; condition at birth: prematurity, intrauterine growth retardation and congenital abnormality; b) mother's characteristic: age, education, immigration status, union status; c) child's environment: parents' smoking, method of child care. Adjustment also made for the presence of a pet in the home at 5 months for the model on asthma attacks.

6. Model 2: adjusted not only for the factors mentioned in model 1 but also for prior health problem.

7. In these models, the variable poverty taken as a whole is not significant for the Wald test.

†: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

To summarize, chronic poverty is associated with an increase in the probability of presenting acute health problems and of having asthma attacks in children aged 2½. If we define poverty by the number of episodes below the low-income cut-off, the fact of having experienced one or two such episodes is also associated with a greater probability of having asthma attacks. If the timing of the poverty in the life of the child is considered, temporary poverty (1999 round) or current poverty (2000 round) does not significantly affect the propensity of children to experience the health problems under study. On the other hand, early poverty, that is during the first months of life, seems to come into play in so far as asthma attacks and injuries are concerned.

4. Discussion and conclusions

The data presented in this section indicate that health problems fortunately remain infrequent among toddlers. We note that the proportion of children hospitalized tends to decrease over the first three years of life, while the proportion of children affected by an acute health problem or by an asthma attack seems stable from one year to the next; on the other hand, the frequency of injuries increases as the child becomes more mobile and more independent.

A review of the tracking of health problems reveals a more complex picture. On the one hand, as soon as a health problem appears, at any point in time, the child seems more susceptible to present this type of problem again. On the other hand, in the majority of cases, the children were affected only once. This means that they recovered well or that the treatment was effective to prevent the recurrence of other episodes of an asthma attack, for example. It is only a small proportion of children who present the same health problem at the time of the second observation period (2% to 5%) and an even smaller proportion that is affected in all three rounds of the study (1% to 1.5%).

The persistence of the families' poverty, as established based on the Statistics Canada low-income cut-offs, is associated with certain health problems in children, in particular with acute health problems and with asthma attacks. This is a direct effect of chronic poverty on the health of children once we have taken into account the mother's level of education, her age, the presence or absence of a partner, and her immigration status, as well as the characteristics of the children's environment, although each of these elements is involved in the experience of poverty of the families (Desrosier *et al.*, 2002). Moreover, neither temporary or episodic poverty nor the family's current poverty seems to have an effect on the child's health, which implies that a cross-sectional analysis of the data cannot underestimate the role of persistent low income for the health of children.

These results confirm what other authors have observed (Alaimo *et al.*, 2001; Brooks-Gunn and Duncan, 1997; Duncan and Brooks-Gunn, 1997;

Korenman and Miller, 1997; Newacheck, 1994); chronic poverty is the most harmful to children's health. Several American studies have reported the major impact of poverty on children's health problems such as asthma, growth delays, chronic health problems, limits on activities and hospitalizations (Aber *et al.*, 1997; Brooks-Gunn and Duncan, 1997; Crain *et al.*, 1994; Duncan and Brooks-Gunn, 1997; McGill *et al.*, 1998). However, few of these studies are longitudinal and they deal most often with groups of children aged 2 to 17, rather than a cohort of children of the same age (Newacheck, 1994). On the other hand, results of the Ontario study (Lipman & Offord, 1997) of 3,294 children from 4 to 17 did not show a relationship between poverty and the number of chronic problems in these children.

Insufficient income, especially if it is a long-lasting situation, seems to have, as we have seen, an impact on the occurrence of certain health problems in children, in particular acute health problems and asthma attacks. The living conditions associated with chronic poverty could affect the child's immune defense mechanism, making him or her more vulnerable to infectious agents and more susceptible to developing asthma. Among the possible underlying mechanisms one might believe that poor diet (Alaimo *et al.*, 2001; Casey *et al.*, 2001; Weinreb *et al.*, 2002), poor housing, (Lanphear *et al.*, 2001a; Rijssenbeek-Nouwens *et al.*, 2002) and poor environment (Wright and Steinback, 2001) not taken into account here could be responsible for the more frequent health problems among poor children. In addition, chronic stress and the resulting allostatic overload¹¹ are gaining increased prominence as an explanatory elements of the impact of poverty on health (Brunner, 2000; Goldstein & McEwen, 2002; House, 2002; Washwa *et al.*, 2001). However, if we recognize in adults that the chronic stress associated with poverty has an impact on their health and indirectly on that of their children (Coffman *et al.*, 1993; Culhane *et al.*, 2001; Hoffman and Hatch, 1996; McDonough *et al.*, 2002), we may

11. Adaptation to chronic stressors affects the body by chronically over activating the allostatic systems that maintain or re-establish the body's stability through changes; produces an allostatic overload (Brunner, 2000).

wonder if this mechanism could be triggered in such young children. Yet, higher levels of salivary cortisol, indicative of chronic stress, have already been observed in children whose family was poor in comparison to levels observed in children whose family was not poor (Lupien *et al.*, 2000).

Furthermore, our analyses show that early poverty is also involved in asthma attacks that occur even later, i.e. between 17 and 29 months, as well as in injuries. Moreover, as soon as the family has experienced a single episode of poverty, the child is more likely to have had at least one asthma attack between the age of 17 and 29 months. Early poverty would appear to play a role. Conditions of poverty during the first months of life could act as a trigger of the processes involved in asthma, since it is an illness that is particularly sensitive to environmental conditions that we observe more often in poor families. It is too early to know if this effect of exposure to early poverty will still be present as the child grows older. We will have to pursue the analyses to establish if it will still be associated with asthma attack in older children. As for the link between early poverty and risk of injury between 17 and 29 months, it is difficult to come up with a plausible explanatory hypothesis. Other studies are needed to confirm this result which may be a chance finding. It should be noted that the majority of injuries are minor such as cuts and scrapes.

At first glance, the health of Quebecois children would seem to be relatively better protected from the effects of poverty in comparison to that of American children. Contrary to what is observed in the United States, the frequency of hospitalizations of Quebecois children does not vary in relation to the family's economic situation. One might be tempted to attribute this finding to universal accessibility to health care and a better social safety net. Yet, since a greater number of poor children present asthma attacks, we would also expect more hospitalizations among these children. Unfortunately, we did not gather information concerning the severity of the asthma attacks and therefore the viability of this explanation can not be ascertained.

It should be emphasized that a lack of power linked to insufficient sample sizes could affect some of the results in this section. In spite of very good

participation rates among the families in the study, the fact that the attrition is greater among the poorest may introduce a bias that the weighting does not succeed in completely eliminating. This bias could be particularly complex given the greater participation of families whose baby was hospitalized before the age of 5 months. Moreover, as we have stated, there were no measures of the severity of children's health problems nor of the asthma antecedents of parents. The measure of poverty may not be sufficiently discriminating since annual family income does not provide information about other resources to which a family may have access through family and social network. Finally, we must bear in mind that the data presented are limited to the links between the changes and the duration of poverty and some health problems of children aged about 29 months.

In conclusion, chronic poverty appears to be linked to the presence of acute health problems or infections and asthma attacks in children 29 month olds, regardless of their mother's age or level of education. Moreover, early poverty could result in more asthma attacks and subsequent injuries. These results lead us to believe that policies aiming to improve the financial situation of parents with young children could have beneficial consequences for children's health (Costello and White, 2001; Dearing *et al.*, 2001). With respect to this, guaranteed minimum income programs have already shown favourable results for the health of newborns in Great Britain (Roberts, 1997). Advantageous tax measures for parents of young children could be envisioned and family allowances could be increased. Measures favouring employment among all young adults could also be considered. While society works towards the goal of eliminating poverty, a minimum realistic objective could be to ensure that the poverty levels of young children and their parents do not exceed those of all adults. This would be a good investment in the long term. Finally, it is imperative to position children's well-being as a priority if decision-makers are to be encouraged to change social policies in this direction.

Socioeconomic Conditions and Health

Part II

Social and Health Inequalities in Young Children:
In Search of Protective Factors

In
2002...
I'll be 5 years old!

Introduction

The success of some early academic intervention and pre-school programs in underprivileged areas throughout the world indicates that the effects of having lived one's first years of childhood in a family with a low socioeconomic level are not irreversible or immutable. However, the success of these programs lies in the rigorous identification of so-called protective factors, favouring resilience, and by definition, the equality of the chances for success (Paquet, 1998; Eming Young 2002). The analyses presented here fit into this perspective; their goal is to identify protective factors that will lead to the development of promising avenues for preventive intervention in Québec.

Indeed, the *Policy on Health and Well-Being* (PHWB) published by the government of Québec states that in terms of development of knowledge "some fields still remain unexplored or under-developed. This is the case notably with research dealing with the determinants of health and well-being and with vulnerable groups" (Government of Québec, 1992: 181). To overcome these shortcomings, the policy included the following commitments:

- *"To develop research on the factors for the protection and promotion of health and well-being, as well as on the situation of vulnerable groups (Government of Québec, 1992: p. 181).*
- *To intensify and disseminate research allowing for improved understanding of the issues confronting vulnerable groups, of their social and health problems (Government of Québec, 1992: p. 167).*
- *To develop reliable indicators of the state of health and well-being of the population and its communities, particularly in the social field (Government of Québec, 1992: p. 180)".*

This text intends to respond in some measure to these research and planning priorities. Its goal is to enhance comprehension of the influence of the family's social position on the health of very young children.

It should be remembered that in earlier studies (Paquet *et al.*, 2001) the following question was answered affirmatively: in Québec, with our universal health and social service system, can the health of 5-month-olds be linked to their family's social position? Moreover, there was a factor that seemed capable of attenuating this association: breastfeeding for at least 4 months. And, surprisingly, social position did not seem to play a role in dysfunctional families. These results, however, included several limits inherent to cross-sectional analyses.

Now that we have three sets of data in Québec on the same children, we can move forward with the analysis of the influence of the family's socioeconomic status (SES) on the health of very young children. It should be remembered that in the 1998 round, the children were 5 months old, whereas in the subsequent rounds (1999 and 2000) they were between 17 and 29 months. In the present study, after having verified if the positive relationship between the family's SES and the health of very young children is maintained over time, we will attempt to identify the factors that can attenuate or exacerbate the influence of SES on children's health.

In the first part of this text, we present a brief overview of the findings coming from the longitudinal studies carried out throughout the world on the links between SES and health. In the second part, we will examine the changes in the families' SES over the course of the first three rounds of the study. In the third section, we will use the indicators of health available in the QLSCD study, with bivariate analyses, to paint a portrait of the health status of the children according to their family's social position. In the fourth section, we present some protective or risk factors likely to explain the links observed between a family's SES and the health of their children. Finally, in the fifth section, the results of the multivariate analyses allow for exposing the factors that are capable of protecting the health of toddlers from the adversity linked to their family's low SES.

1. Socioeconomic and health status in a longitudinal perspective

While there is growing interest throughout the world in longitudinal studies dealing with the relationship between health status and SES, the methods and measures used in each of them varies considerably. Among these differences, we would like to point out that the European studies tend to carry out their analyses most often from the angle of social class, employment status or level of education, whereas in the North American studies it is clearly income that defines an individual's SES in the majority of the cases (Paquet *et al.*, 2002).

The use of income as the sole indicator of socioeconomic position poses a problem from an analytic point of view, as does the absence of information on income in the many European studies. In social science, many authors characterize a household's social position by a level of resources corresponding to a set of deprivations or material, social and cultural options (Bertaux, 1977; Bourdieu, 1980; Paquet, 1990). Social position should not be defined by a simple criterion, but rather by the overlap of a multitude of accumulated resources and handicaps. The observation of income alone does not allow for adequate identification of categories that have been weakened, accumulating numerous handicaps. Income alone is also not enough to define the social strength of certain individuals or families in the social organization. It would thus be essential to establish the social position of individuals not according to a single scale, but in multi-dimensional space (Chauvel, 2000).

Income seems to represent an inadequate means of capturing the living conditions that determine differences in health. Education, as well as occupation are often better indicators of the social factors linked to social position that affect health. Nevertheless, income may be used as a measure of social position, on the condition that one uses relative rather than absolute measurements of income. In fact, above the poverty threshold, income remains a predictor of health or illness because it measures the place that a person occupies in the social hierarchy rather than the money that he possesses; at the bottom of the

social scale, however, individual incomes affect health through material deprivations and restrictions in social participation, as well as the possibilities of exerting control over one's life.

Longitudinal studies like the QLSCD have this in common: they draw attention to the dynamic of income, education, and employment over several years rather than to a measurement and a static understanding of them. Longitudinal studies allow us to gain a deeper understanding of the relationships between socioeconomic dynamics and health. For example, several British longitudinal studies have now become classics in the comprehension of the social inequalities in health. One of the more prominent of these studies is that conducted by Marmot *et al.* on cohorts of British civil servants, better known as the Whitehall study. Starting in 1967, the researchers followed a cohort of approximately 17,000 British, male, white-collar workers. The main result is certainly the discovery of a clear and linear social gradient between the employees in relation to their position in the occupational hierarchy. The health differences between the employment status have proven to be progressive and unbroken: those belonging to the higher social ranks were, overall, in better health than those who were in the next lower echelon. As well, the latter presented a better health profile than the rest of the population under study who were less well off in terms of income and social rank (Marmot *et al.*, 1997).

This gradient was established by taking into account smoking, obesity, practice of a physical leisure activity, blood pressure and cholesterol level. Taking these factors into account explained less than 25% of the variation in health status according to SES. The Whitehall researchers were the first to show that differences in health according to SES were not explained first by the lifestyle habits related to health. The gradient could not be explained either by the poverty of a part of the sample, since all the members of the cohort were white-collar workers, for the most part with job security and a relatively high salary. In other words, not one respondent had

experienced a situation of absolute poverty. These researchers were thus coming to the realization that they would be taking into account a series of variables that could explain the mechanisms through which the production of the social inequalities in health are produced such as the feeling of having control over one's work, social support and self-esteem. Since this is a longitudinal study, the Whitehall researchers were also able to show that the causal relation implied went largely from SES to health. In other words, it is more social position that tends to determine health and not the inverse. A follow-up of the cohort at retirement age was also able to show that SES participated in the explanation of deviations in the degradation of functional physical and mental health that sometimes accompanies aging (Martikainen *et al.*, 1999). Very similar results have been obtained from the Wisconsin Longitudinal Study (WLS), a survey of an American cohort composed of men and women who had earned a high school diploma in Wisconsin in 1957 (questioned for the first time in 1957 and followed from the age of 18 to 54) (Marks, 1996). We would also like to point out that Swedish, Finnish, Scotch and three British cohorts each contributed to deciphering similar social inequalities in health. To summarize, the principal longitudinal studies on the subject draw our attention to the following elements:

- There is a social gradient for health and mortality in many societies and, this holds true independent of the definition of SES (level of education, income, employment);
- Lifestyle habits linked to health generally explain a modest portion of the variance observed;
- Causality points largely from social status to health; the inverse causality is a much less important phenomenon;
- The different profiles of poverty (temporary or persistent), decreases in income and changes in employment status are major and widespread phenomena that have an effect on the relationship between SES and health status;
- And, as we will see in the following section, SES during childhood has long-term effects on health.

1.1 The importance of early childhood

We are beginning to know more about the fundamental relations between living conditions during childhood and learning impairments or difficulties in social adaptation, then vulnerability to health problems in adulthood. It seems that during a "critical period" of early childhood, the presence or absence of adequate support is determinant in the development of the central nervous system because, at this time of life, the brain is particularly malleable and the cerebral cortex develops more rapidly. This development is itself highly involved in the action of the immune and endocrine systems and, in particular, in terms of their capacity to react adequately to stress. In short, this period is the prime time for the constitution of the body's defense system against numerous attacks that form, to a variety of degrees, the common lot of a human life in a social environment (Eming Young, 2002; McCain *et al.*, 1999).

From a less "biological" point of view, inadequate social, cognitive and emotional development during early childhood also has a major influence on the educational, social and professional path of an individual. For example, the level of education attained is closely linked to the social and affective situation experienced in childhood and these two factors contribute to explaining a large part of the social and health problems experienced in adulthood (Eming Young, 2002; Keating *et al.*, 1993; McCain *et al.*, 1999; Paquet, 1998; Syme, 1998). Given that children are not born in households that have equal access to these resources (financial, educational, affective, social...) and since these disadvantages seem to be inter-related, we can easily recognize that early childhood is likely to contribute to the (re)production of the social inequalities in health. Several longitudinal studies have confirmed this effect of the family's SES on the health of children, but especially on the long-term health of individuals, and by definition, on the distribution of health and illness in a population.

For a long time, the only indicator of health of newborns was infant mortality, which was often used not only as an indicator of health, but also as an indicator of the development of a country, a region or a neighbourhood. Several studies have shown that

perinatal and infant mortality varied significantly in relation to the father's, the mother's or the couple's SES, often taking the form of a gradient. British, (Botting, 1997), French (Kaminski *et al.*, 2000), and Swedish (Leon *et al.*, 1992) data, among others, converge on this issue. When the information is available, it seems that differences in SES are notable for all the principal causes of death (abnormalities, premature births, infection) (Olsen *et al.*, 1993). This gradient appears in all the industrialized countries, in spite of a major and stable decrease in infant mortality. Let us take the example of Québec. According to data from the *Institut de la statistique du Québec*, perinatal, neonatal and infant mortality¹ has decreased considerably in the last 25 years. Nevertheless, fetal and infant mortality remain closely linked to the mother's level of education (Chen *et al.*, 1998). Any desire to intervene on this specific mortality should take into account social inequalities. In fact, as Chen and his colleagues (1998: 57) mention, "If all Québec mothers had been able to attain the same low rate of fetal and infant mortality achieved by those with the highest education, one-fifth of all fetal and infant deaths and nearly one-third of post-neonatal deaths could have been avoided."

More frequent are the situations where a child is born prematurely or with low birth weight. Data from various European countries point to the existence of a social gradient for premature birth and hypotrophy, regardless of whether SES is defined by the mother's level of education or by the parents' professional category (Berkowitz *et al.*, 1993). Thus, in a longitudinal study of pregnant women in London, it appeared that belonging to an underprivileged social class, low level of education and low income are all associated with an increase in the risk of premature birth (Peacock *et al.*, 1995). American researchers (Starfield *et al.*, 1991) have also shown that, for low-income families, taking into account the length of living in an underprivileged state (persistent or temporary) was particularly revealing in this regard. They were able to show major differences concerning the prevalence of low birth weight babies: there is a much higher percentage of low-weight babies when

poverty is measured over several years than when it is based only on the income during the year of pregnancy.

We would like to underscore the importance of the British studies conducted with the help of data from birth cohorts. Among others, Barker and colleagues (Barker *et al.*, 2001; Barker, 1997) first reaffirmed the existence of a relationship between birth weight and the risks of dying of cardiovascular disease much later in life as adults. Moreover, a finer multivariate analysis allows for illustration of the interaction between living conditions in childhood and adulthood, as well as between biological and socioeconomic variables. While birth weight is predictive of cardiovascular disease, men who were low birth weight babies will be more likely to have a disadvantaged SES as adults. The others tend to be more resilient as far as the negative effects of poor socioeconomic conditions are concerned. The analysis of these longitudinal data illustrates the interaction between the biological and the social, and it gives quite a nuanced vision of the predictive role of early childhood on health status in adulthood.

Finally, we must mention the American studies (Duncan *et al.*, 1994) using longitudinal data in the Infant Health and Development Program. They have shown that family income was also strongly linked to cognitive development and to the presence of behavioural problems in five year-olds. For instance, family income has proven to be highly correlated to results on IQ tests (five year-olds) as well as to the presence of behaviour problems. In addition, persistent poverty has been shown to be twice as influential on IQ results and 60 to 80% more influential on behaviour problems than transitory poverty.

1.2 Socioeconomic status in childhood and health in adulthood: An overview

In many countries studies have shown the influence of SES during childhood on health status in adulthood. For example, with the data of a cohort of Scottish men, aiming to show the respective role of disadvantageous socioeconomic conditions in childhood and those in adulthood as specific causes of mortality in adulthood, Smith *et al.* (1998) painted a

1. Fetal mortality: stillbirth. Perinatal mortality: stillbirths and deaths that occur in the 6 days following the birth. Neonatal mortality: death occurs between 0 and 27 days. Infant mortality: death occurs between 0 and 364 days after birth.

portrait of the determinants of mortality in adulthood. They conclude that there is a strong link between socioeconomic conditions in childhood and mortality through accidents and lung cancer and that they enter (along with socioeconomic conditions in adulthood) into the etiology of respiratory and cardiovascular disease. In another study, the authors emphasize the usefulness of knowing individuals' SES throughout their entire life, beginning with that of their family when they were children. After having analyzed the influence of SES during childhood, at the first job, and at the time of the last round of the survey (the Scottish respondents were then between 35 and 64 years old), Smith *et al.* (1997) concluded that each of these points in time had its importance in the explanation of premature mortality.

A final persuasive example, the Dutch longitudinal study (Longitudinal Study of Socioeconomic Health Differences) was designed and planned with the goal of gaining a clearer understanding of the influence of SES on health from the perspective of a lifetime, and according to the hypothesis that the disadvantages linked to a low SES accumulated throughout life (Van de Mheen *et al.*, 1998). The results of the study tend to confirm this hypothesis. Thus, SES during childhood explains approximately 10% of the inequalities in health in adulthood (perceived health and chronic illnesses), this effect being independent of economic conditions in adulthood. Among those who grow up in an economically disadvantaged family, those who will continue to be in a socioeconomically disadvantaged position as adults will be more heavily affected in terms of morbidity, mortality, and negative assessment of their health. This relation is only partially explained by the greater presence, among families with low SES, of behaviours that are harmful to health. On the other hand, a large part of the variance can be explained by certain psychosocial factors such as the feeling of controlling one's destiny or the strength of belonging to a local community. By taking these variables into account, the effect of SES in childhood on health status in adulthood is reduced by half. In other words, there is an effect independent of SES during childhood on health in adulthood, this relationship is partially the result of psychosocial mechanisms and, to a lesser extent, on the adoption of behaviours harmful to health.

1.3 Analysis sample

All the analyses presented in this text deal with data gathered on 1,985 children who participated in the first three rounds of the QLSCD, when they were approximately 5, 17 and 29 months old. The large majority of the variables come from the Interviewer Completed Computerized Questionnaire (ICCQ) and the Interviewer Completed Paper Questionnaire (ICPQ). The results can be inferred to the populations of children born in Québec in 1997-1998 and who had not left the province permanently by the age of 29 months.

Various statistical analysis methods were used to probe the data. They are presented briefly in the beginning of each of the following sections in order to make the best links with the results obtained.

2. Changes in family socioeconomic status

As emphasized in the first section, it is essential to qualify the length of time over which a family experiences a situation of socioeconomic disadvantage during this crucial period of the first years of a child's life. The present section examines the changes in the socioeconomic situation in which the children targeted by the QLSCD have lived from birth until the age of approximately 29 months.

In order to take into account many aspects of a family's social position, which constitutes the main independent variable of the study, an index of family SES was used. This index was developed by the *Direction Santé Québec* according to the method developed by Willms and Shields (1996) for the National Longitudinal Study of Children and Youth (NLSCY) (Willms *et al.*, 1996). The index combines five indicators: gross household income during the 12 months preceding the study; level of education of the person closest to the child (PMK)² and of his/her partner, where applicable, as well as the prestige associated with the profession of the PMK and his/her partner, where applicable. This index of household socioeconomic situation has been used successfully in several studies including those by Tremblay *et al.* (1996) on aggression in youths. The analyses conducted with the data from the 1998 round of QLSCD on the health of 5-month olds (Paquet *et al.*, 2001) also allowed for a productive use of this index.³

As Willms and Shields (1996) suggest, the SES was standardized in each of the three rounds of the study, so that the average of the sample is always close to 0. The results obtained using this index should thus be considered in relation to all the children or households that make up the sample. It is important to note that if a family sees its status improve from

one round to the next, it is always in relation to the average behaviour of the sample. Consequently, if all of the families see an increase in their SES, it may prove difficult to verify for a given household if its social position has improved, unless this progress is greater than the average improvement in the sample.

Since the SES is independently standardized at each of the rounds, we should expect to see as many families whose situation improves as families whose situation deteriorates. This is practically the case when we compare the results of the 1998 round with those of the 1999 round (Table 2.1). On the other hand, we note that close to two-thirds of the families saw their SES decrease between the 1999 and 2000 rounds. This phenomenon is explained primarily by the fact that among the families whose status improved, the difference in the gross SES standardized scores is significantly greater than that recorded (in absolute value) among the families who saw their situation deteriorate. In other words, the families who, as compared to everyone in the sample, improved their lot between the 1999 and 2000 rounds did so with much more vigour than the others. We note a similar trend, although still less marked, when we compare the data from the 1998 round with that from the 2000 round. We will see further on the characteristics of these families for whom low social position was only temporary and associated with the period surrounding the birth of the child.

2. In the first round of QLSCD, the person who knows the child best was the mother in over 99% of the cases. In the 3rd round, for a little over 98% of the children, the PMK remained unchanged (Jetté, 2002; Plante *et al.*, 2002).

3. In the 1998 round, the SES in continuous values varied from -2.8 (very weak) to 3.7 (very high) while in the 1999 and 2000 rounds, it went from -3.0 to 3.7.

Table 2.1

Change in the families' socioeconomic status (gross scores) when the children were 5, 17 and 29 months old, Québec, 1998, 1999 and 2000

Round	Deterioration		Improvement		T Test: comparison Deterioration-Improvement
	%	Average of differences	%	Average of differences	
1998 → 1999	51.1	-0.1860	48.9	0.1893	Not signif.
1999 → 2000	62.6	-0.1430	37.4	0.2318	< 0.0001
1998 → 2000	57.5	-0.2131	42.5	0.2755	< 0.0001

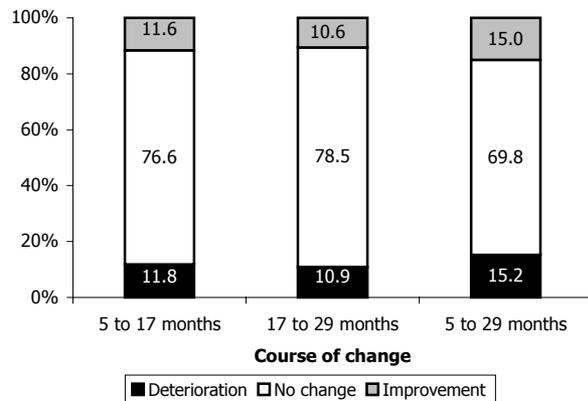
Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 2.1 shows the movements in the quintiles of SES from one round to the next. More than three-quarters of the families are classified in the same quintile for two consecutive rounds and seven out of 10 for the three rounds. There is thus some form of stability in the social position of the families between the 1998 and 2000 rounds. For the others, we observe as many families moving to a higher quintile as families who find themselves in a lower quintile⁴.

Over a period of approximately 2½ years, in which socioeconomic level do we observe the greatest change? The data in Table 2.2 enables us to identify the quintiles showing the greatest movement. The extreme quintiles are the most stable: 85% of the families in quintile 5 (the most privileged) in the 1998 round and 78% of those in quintile 1 remain at the same level two years later. The closer you get to the mean quintile (quintile 3), the more changes we see. It is normal to observe such behaviour since the standardization was done in such a way that the range of the extreme quintiles is the largest compared to that of the middle quintiles. It is thus more difficult for a family in an extreme quintile to move to another quintile in another round. It should be noted that there are relatively more positive changes in the lower quintile than negative changes in the upper quintile. Truly, this result bears witness to the fact that many families regained the social position that they occupied prior to the arrival of the newborn.

Figure 2.1

Change in the quintiles of the socioeconomic status of the families when the children were 5, 17 and 29 months old, Québec, 1998, 1999 and 2000



Source: Institut de la statistique du Québec, QLSCD 1998-2002.

4. These numbers are balanced, since at each round we must count approximately 20% (n weighted) of the families in each of the quintiles formed.

Table 2.2

Change in quintiles of socioeconomic status of the families, Québec, 1998 and 2000

Quintile in 1998 Round	Changes in 2000 Round			
	None	Positive	Negative	2 quintiles or more
	%			
1 (low)	77.7	22.3	...	4.4**
2	60.2	21.5	18.3	3.6**
3	59.1	18.5	22.4	4.1**
4	66.9	13.2	19.9	1.5**
5 (high)	85.4	...	14.6	1.2**

** Coefficient of variation greater than 25%; estimate provided for reference purposes only.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

What are the factors that could explain this increase in SES for many families? One of the factors that could be invoked is certainly the entrance into the workforce or return to work of the mothers and the additional income that this brings to the family. The data in Table 2.3 reveals in this regard that families whose SES rises from one round to another are more likely than others to be in a higher income bracket than that of the preceding year; approximately 60% of the families who saw their SES decrease, however, remained in the same income bracket, while only 6% of those whose SES rose found themselves in a lower

income bracket (vs. 29% having seen their SES decrease). Moreover, there is a very significant link between the mothers' return to work and a favourable change in social position. These results possibly illustrate the socioeconomic burden associated with taking paid or non-paid parental leave just as the pairing up of certain single mothers could contribute, inversely, to an ascending socioeconomic mobility (for a detailed analysis of income movements, see Desrosiers *et al.*, 2002).

Table 2.3

Change in socioeconomic status of the families in quintiles in relation to change in family income and mother's employment status, Québec, 1998, 1999 and 2000

Round	Families whose SES (in quintiles) changed		Total	
	Negative	Positive		
	%			
1998 → 1999	Family income			
	Decrease	28.7	5.9	17.6
	No change	57.9	39.6	49.0
	Increase	13.4	54.5	33.4
	Mother works after the birth	38.3	50.2	44.1
	Mother does not work in both rounds	46.5	29.6	38.3
1999 → 2000	Family income			
	Decrease	20.0	4.5*	14.2
	No change	61.4	31.5	50.2
	Increase	18.6	64.0	35.6
	Mother works after the birth	5.2	21.5	11.3
	Mother does not work in both rounds	34.7	20.2	29.3

* Coefficient of variation between 15% and 25%; to be interpreted with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

3. Children's health according to their family's social position: bivariate analyses

Does the health status of the children at 17 and 29 months vary according to their family's social position as observed when they were approximately 5 months old (Paquet *et al.*, 2001)? In this third section, we will attempt to answer this question. It should be noted that for the subsequent analyses, we will divide the SES index into three groups and no longer in quintiles.⁵ The index of the social position of the families will be divided in the following manner:

- The first group will include the 25 lower percentiles of the standardized SES index (low).
- The second group is formed of the middle percentiles from 25 to 75, thus approximately 50% of the population.
- The third group is made up of the 25 upper percentiles of the scale of standardized SES (high).

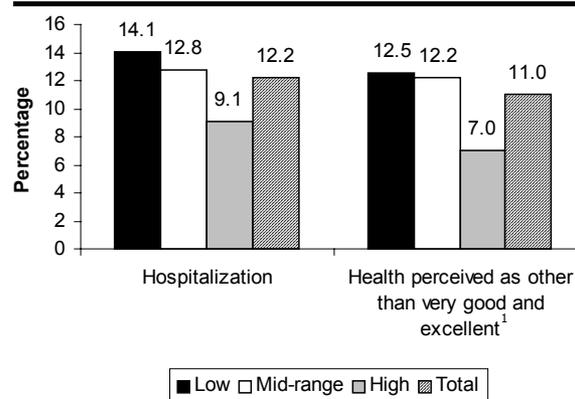
3.1 The children's health according to the family's social position in the 1999 and 2000 rounds

With these breakdowns in place, using bivariate analyses (Chi-Square test), let us now consider whether in the 1999 and 2000 rounds, the health status of the children varies according to their family's social position, as we observed in the 1998 round. The first three indicators of health problems used are those for which significant differences had been measured in the infants at 5 months, i.e.:

- Have spent at least one night in hospital during the past year;
- Have health perceived as being less than very good or excellent;
- Not have been in good health almost all the time over the last 12 months according to the PMK (2000 round only).

As the two figures below illustrate, while we note differences in the expected direction, that is to the advantage of the children living in privileged families, all the health indicators used at 5 months are not associated significantly with the families' social position when the child is 17 months and 29 months old.

Figure 3.1
Proportion of children aged approximately 17 months hospitalized and perceived as not being in very good health according to the family's social position, Québec, 1999

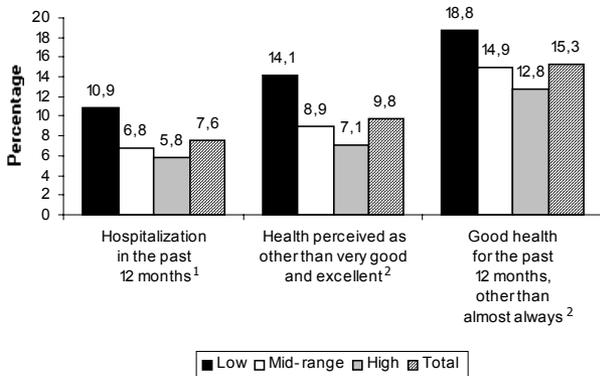


1. Chi-Square test significant (p < 0.05).
 Source: Institut de la statistique du Québec, QLSCD 1998-2002.

5. When the analyses were carried out in volume 1 (Paquet *et al.*, 2001), the average quintiles (two, three and four) had to be regrouped very frequently in order to obtain significant social differences in terms of health. This is attributable to insufficient numbers and to a weak prevalence of health problems among children, contrary to the elderly.

Figure 3.2

Proportion of children aged approximately 29 months hospitalized and perceived as not being in very good health according to the family's social position, Québec, 2000



1. Chi-Square test significant (p < 0.05).

2. Chi-Square test significant (p < 0.01).

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

3.2 The children's health according to the evolution of their family's social position since their birth

An indicator of the persistent presence of families in the lowest socioeconomic group in the three rounds of the study was created. This variable is defined as follows: the maximum social position achieved by a family in one of the three rounds of the study. For example, if a family is in the lower socioeconomic group (Group 1) in the 1998 and 1999 rounds, but in the average level (Group 2) in the 2000 round, it will be assigned to an average social position (Group 2) for the analyses. This being the case, henceforth, in the subsequent analyses, to be categorized in the low social position, a family will have to have been classified in Group 1 for the three rounds of the study, that is when the child was 5 months, 17 months and 29 months old.

This is how the families were broken down according to the highest social position attained since the birth of the target child:

- 20% of families are found in the category of low social position for the three rounds⁶;

6. It should be noted that this 20% is coming very close to the 16% of children who have lived in a household under the low-income threshold in the three rounds of the study (Desrosiers *et al.*, 2002).

- 51% of the families are in the category of average social position, having attained a maximum of Group 2 at least once in the three rounds;
- 29% of the families are in the category of high social position, having attained Group 3 at least once in one of the three rounds.

Theoretical considerations having to do with the field of social medicine, the previous research carried out with the babies at 5 months of age and the availability of the variables and indicators in QLSCD motivated the choice of the dependent variables for the following analyses. For example, many studies have already shown that declared health status (perceived health) represents a very good predictor of morbidity and mortality, in addition to being associated with the use of health care (Kaplan *et al.*, 1996; Idler *et al.*, 2000). This synthesized indicator of health status is also particularly sensitive to the social determinants of health. It should, however, be noted that qualitative and quantitative research indicate that people belonging to the least privileged social classes have a tendency to "over-evaluate" their health status or to have a more partial and fatalistic view that focuses on the directly functional aspects of the body (Sen, 2002; Girard *et al.*, 2000). Everything points to a belief that this distortion leads to underestimating the social differences in health already observed in Figures 3.1 and 3.2. Table 3.1 presents all of the indicators of health of the children for whom we verify the presence of an association with their family's social position during the first three rounds of the study.

Table 3.1

Prevalence of certain indicators of children's health according to the family's social position since their birth, Québec, 1998, 1999 and 2000

Indicators of health problems ¹	Social position since the birth			Total	X ²
	Low	Mid-range	High		
	%				
Hospitalizations (1, 2, 3)	32.9	27.0	18.3	25.7	p < 0.0001
Perceived health (less than very good) (1, 2, 3)	29.0	21.0	14.5	20.7	p < 0.0001
Asthma (2, 3)	15.8	11.2	8.7	11.4	p < 0.01
Infections (3)					
Gastro	22.7	20.2	22.9	21.5	Not signif.
Ears	22.1	18.5	19.2	19.4	Not signif.
Respiratory tract	44.9	42.2	37.5	41.4	p < 0.10
Other	6.5 *	7.1	9.2	7.6	Not signif.
At least one infection	65.9	60.0	60.2	61.2	Not signif.
Consultation of professionals (1, 2, 3)					
General practitioners	40.8	37.6	31.5	36.4	p < 0.05
Pediatricians	40.0	49.5	60.6	50.9	p < 0.0001
Injuries (1, 2, 3)	19.1	17.1	15.7	17.1	Not signif.
Physical activity (3)	64.5	65.5	61.5	64.1	Not signif.
Consumption of medications (3)	5.1 *	6.8	4.8 *	5.9	Not signif.
Chronic problems (1, 2)	15.6	12.6	10.5	12.6	Not signif.
Height below the 10 th percentile (3) ²	8.8 *	8.1	7.4	8.1	Not signif.
Weight below the 10 th percentile (3) ²	7.4 *	6.6	6.0 *	6.6	Not signif.

1. The figures between parentheses represent the rounds for which the variable is available (1998 round = 1; 1999 round = 2 and 2000 round = 3). Unless otherwise indicated, a health problem is observed if it is present in one or another of these rounds.

2. Partial non response of 6%: presence of possible biases.

* Coefficient of variation between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

As we can see, the more the families' social position moves up, the better the health of their very young children, as measured by many of the indicators analyzed. While we observe such a tendency for the majority of the indicators studies, the associations do not all prove to be statistically significant. The low prevalence of health problems among the children and insufficient numbers may explain these results. Nevertheless, significant associations were found for hospitalization, perceived health, asthma and, to a lesser extent, for respiratory tract infections. Even the consultation of general practitioners follows the SES of the families in the expected direction. As for consultation of children's medical specialists, pediatricians, it is linked to the family's social position, but curiously in the opposite direction.

Among children living in a family with a low social position since their birth, approximately 29% of them have their health, as perceived by the PMK as less than very good in at least one of the three rounds, as compared to 21% in families of average social position and only 15% in privileged families. There are also proportionally more children living in a socially and economically underprivileged family who have been hospitalized at least one night since they were born. This is the case of approximately 33% of them as compared to 18% of those belonging to a family of a higher social position. The same holds true for asthma (16% vs. 9%) and respiratory tract infections (45% vs. 38%).

When a child is sick more often than another, it is normal that he consults the doctor more frequently and it is just as natural that his parents resort to a specialist in children's diseases. Thus, it is not surprising to note that among very young children whose family is in a lower social position, there are 41% who have already consulted a general practitioner, as compared to 32% among the children from the higher socioeconomic rank. However, it is rather surprising to note the following: among the children living in very underprivileged families, 40% have consulted a pediatrician, whereas this percentage rises to 50% among those belonging to a family of average social position and 62% for families with a high social position. We will return to this point further on.

4. Social Distribution of Potentially Confounding Risk and Protective Factors

Because family social position is not the only determinant of a child's health, we conducted a second series of bivariate analyses. The goal was to find associations between family social position and recognized risk and protective factors, factors which could have a confounding effect on these associations.

4.1 Analysis of protective, demographic and risk factors

Potential explanatory or confounding variables were chosen based largely on conclusions reached in the main relevant longitudinal studies presented above. One of these observations was that adult health would be independently affected by SES in childhood, and that this relationship could be explained in part by psychosocial mechanisms and, to a lesser extent, by the adoption of health-damaging behaviour. Work by other QLSCD research teams has also provided potential variables.⁷ Other QLSCD researchers have observed statistically significant associations with the parents' level of education or various health status and child development indicators, and these proved useful in the selection of control variables for our analyses. All the factors associated with one or another of the components of socioeconomic status (parents' level of education, socioprofessional category or household income) have not necessarily been retained since several factors such as single parenting, home ownership and level of income are strongly correlated. Moreover, we chose the variables we considered the most interesting, given the study objectives and the literature on health and social services. It must be remembered that we are looking for protective factors that could influence links between the health of toddlers and their family's social position, control variables that may be confounding or explanatory. Unless otherwise stated, the majority of these variables come from the ICCQ

or ICPQ questionnaires. Table 4.1 provides a general description of these variables.⁸

4.2 Distribution of protective, risk and demographic variables according to the family's social position since birth

The following figures show associations between the family's social position since the child's birth and protective risk and demographic factors.

Results from a bivariate analysis of these factors show very unequal social distribution in all three rounds of the survey. Statistically significant associations were found that were consistent with findings in the literature. The majority of these risk or protective factors turned out to be associated with the family's social position, to the detriment of toddlers from disadvantaged families. The lower a family's social position, the more the risk factors are in evidence. Several of these factors appear to follow the family's socioeconomic level in a step-like manner, confirming the trend already observed among babies under the age of five months.

7. See previously published numbers of Volumes 1 and 2, already published as part of QLSCD 1998-2002: in particular, Bégin *et al.*, 2002; Dubois *et al.*, 2002; and Desrosiers *et al.*, 2002.

8. For more information on how they were constructed, see Annex 2.

Table 4.1

List of protective factors for bivariate and multivariate analyses

Factor ¹	Round ²	Questionnaire
Sex	1	ICCQ
Premature baby	1	ICCQ
Methods of feeding baby at birth (breastfeeding)	1, 2	ICCQ
Principal method of child care according to three categories	2, 3	ICCQ
Consumption of soft drinks or fruit drinks	3	ICPQ
Consumption of vegetables	3	ICPQ
Mother's immigration status	3	ICCQ
Smoking on the part of the mother	1, 2, 3	ICCQ
Mother's health perceived as less than very good	1, 2, 3	ICCQ
Single-parent family	1, 2, 3	ICCQ
Marital stress on the part of the father or mother	3	SAQM, SAQF
Father's or mother's job dissatisfaction	3	SAQM, SAQF
Number of children in the household according to three categories	3	ICCQ
Exposure to second-hand smoke at home	2, 3	ICCQ
Separation of the parents since the first interview	3	ICCQ
Mother or father having suffered from depression since the birth	3	ICCQ, SAQF
Support from maternal or paternal grandparents	3	ICPQ
Dangerous neighbourhood/neighbours do not help one another	3	ICCQ
Social support	3	ICCQ
Few social problems in the neighbourhood	3	ICCQ

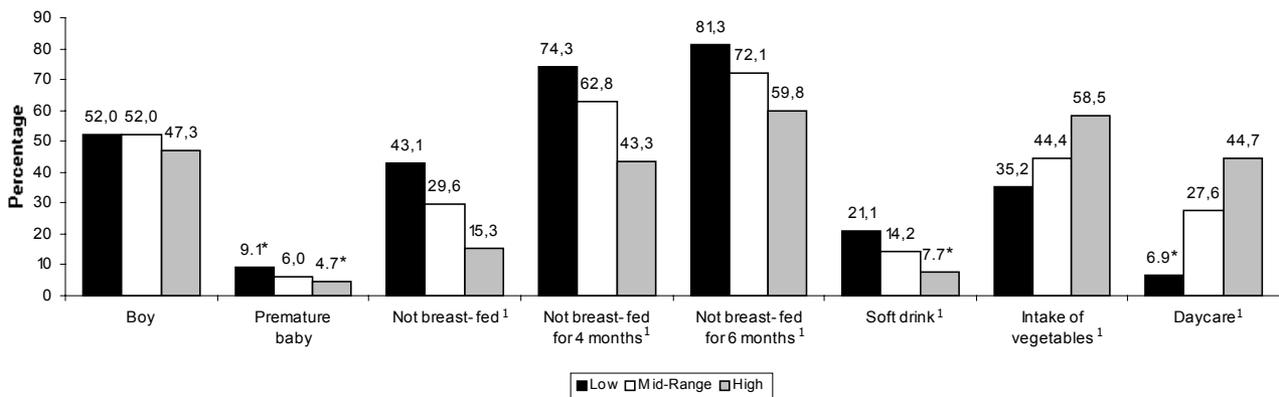
1. For a detailed list of these factors, see Appendix 1.

2. Round 1998 = 1; round 1999 = 2 and round 2000 = 3.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Figure 4.1

Links between certain characteristics of the child and the family's social position since birth, Québec, 1998, 1999 and 2000



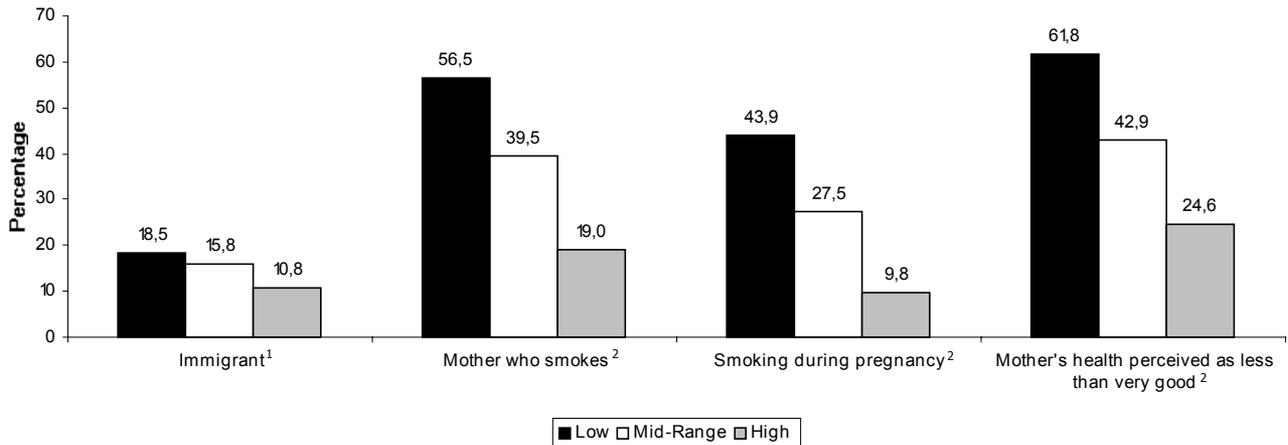
1. Significant chi-square test (p<0.001).

* Coefficient of variation between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Figure 4.2

Links between certain characteristics of the mother and the family's social position since birth, Québec, 1998, 1999 and 2000



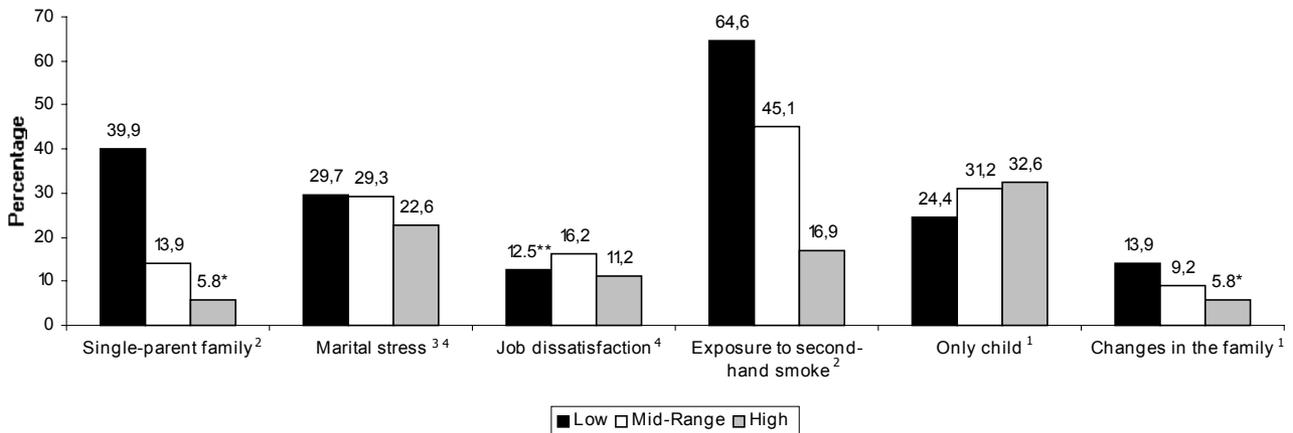
1. Significant chi-square test (p<0.05).

2. Significant chi-square test (p<0.001).

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 4.3

Links between certain characteristics of the household and the family's social position since birth, Québec, 1998, 1999 and 2000



1. Significant chi-square test (p<0.05).

2. Significant chi-square test (p<0.01).

3. Significant chi-square test (p<0.001).

4. Inference to all children born in Québec in 1997-1998 who have not definitively left the province at the age of 29 months and who have the same parents (father and mother) since birth.

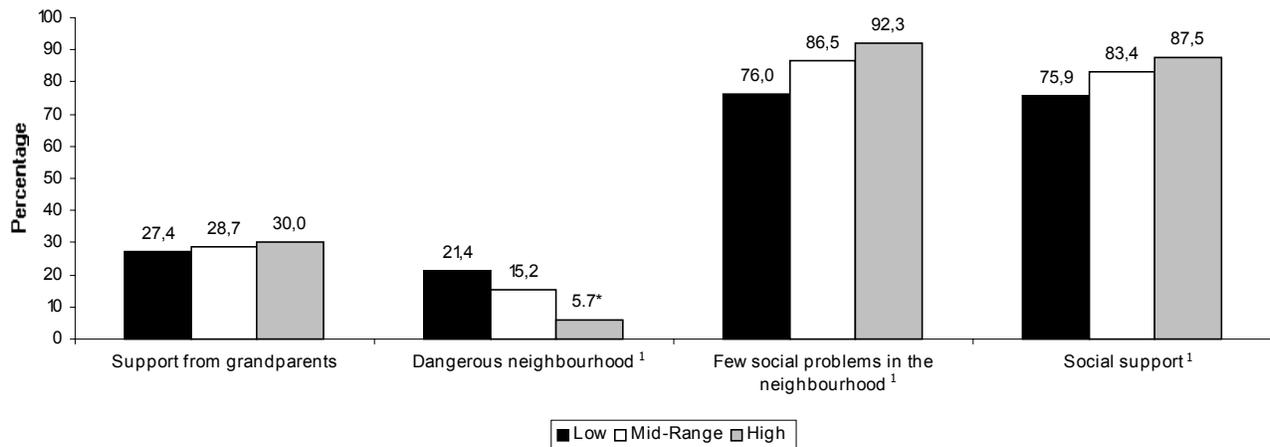
* Coefficient of variation (CV) between 15% and 25%; interpret with caution.

** Coefficient of variation (CV) over 25%; imprecise estimate for descriptive purposes only.

Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 4.4

Links between specific aspects of the neighbourhood in the 2000 round and family social position since birth, Québec, 1998, 1999 and 2000



1. Significant chi-square test ($p < 0.001$).

* Coefficient of variation between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

For example (and as shown in Figure 4.3), among children belonging to the most disadvantaged social group in the first three rounds, 40% were from single-parent families in at least one of the three rounds, while there were proportionally far fewer in the mid-range social group (14%) and barely 6% in the higher group. Proportionately speaking, there were many more disadvantaged children exposed to second-hand smoke in the home in the 1999 and 2000 rounds (see Figure 4.3) than in families with mid-range or high social standing (65%, 45% and 17%, respectively). In addition, 81% of the disadvantaged children were not breastfed for a minimum of six months in the lower group as compared to 60% in the group with higher social standing (Figure 4.1). Toddlers living in the higher group were more likely to eat vegetables every day (59% as compared to 35%; see Figure 4.1). The reverse is true in the case of soft drinks and fruit drinks; children living in more disadvantaged circumstances tend to consume more (21% as compared to 8%; see Figure 4.1).

The PMK's perception of the type of neighbourhood and social support received varies as might be expected; the higher the family's social status, the less dangerous their neighbourhood and the fewer the social problems. Moreover, PMKs in these families say they have more social support (see Figure 4.4).

We were somewhat surprised by results on support received from grandparents, a factor measured in the 2000 round. This phenomenon would seem to be equally distributed across all social categories, with about 30% of respondents in each group reporting that they receive instrumental or emotional support from maternal or paternal grandparents (Figure 4.4). Finally, there is a strong relationship between the family's socioeconomic level and their use of daycare. In the higher socioeconomic category, 45% of children go to daycare, as compared to 28% of children in the middle category and only 7% in disadvantaged families (Figure 4.1). This result is not much of a surprise, since more mothers from families with a higher social position are in the workplace. In addition, the questions concerning the use of types of daycare were directed at families with a single parent or both parents working or studying.

5. Multivariate analysis of the relationship between child health and family social position since birth

The multivariate analyses presented in this section take another look at the relationship between social position in the first years of life and indicators of toddlers' health. The statistical procedure adopted, logistic regression models (Hosmer *et al.*, 1989), was used to determine the net effect of family social position on the health differences observed among children when the risk and protective factors discussed in the preceding section are taken into consideration. To put it another way, if every social class had the same proportion of toddlers who, for example, had been breastfed for 6 months, lived in a single-parent family, or had parents who smoked at home, would we still observe health differences in terms of family social position? Multivariate analyses were conducted and six logistic regression models were developed specifically to control for these factors.

5.1 Methodological considerations

The dependent variables in the regression models presented in this section are the health indicators identified in section 3 that have a statistically significant association with family social position at 0.10 level (see Table 3.1): hospitalization, perceived health, respiratory tract infections, asthma, and consultations with general practitioners and pediatricians. In addition, to validate the links between social position and the health indicators, a variable that takes into account the type of family the child lives in (single-parent or two-parent) must be added to the models from the outset, as recommended by the designers of the SES index (Willms and Shields, 1996). Otherwise, families with only one parent would always be disadvantaged in comparison to the others. The independent variables in the models in this section

were identified in section 4.⁹ The analyses use only variables drawn from the ICCQ and the ICPQ and include all the children (1,985) involved in the first three rounds of the survey.

To ensure its validity, the model must also include potentially confounding factors of whatever level of significance. As a rule, a variable will be considered confounding if it is shown to be related to both a health indicator and social position. Significant differences observed between one level of social position and another may be due solely to the fact that a confounding variable is not uniformly distributed across the groups; the differences would thus not be due to social position. Adding the confounding variable to the model will therefore substantially change the relationship—which may or may not then remain significant—between an indicator and social position.

Furthermore, if we are to detect modifying factors (Bernard *et al.*, 1991; Kleinbaum, 1982) as well as identify confounding variables, dual interactions between social position and potentially modifying variables have to be included in the models. An interaction judged to be statistically significant would indicate the existence of a modifying effect. Clear-cut distinctions might also be constructed and tested on the variables in these models. The association

9. Table 4.1 shows the list of variables for which data were collected in the first three rounds of the QLSCD and which, in our opinion, may intervene in the relationship between social position and the presence of a health problem. For a more detailed description of the variables, see Appendix 1. We should point out that, in terms of health, boys generally do not do as well as girls, and so a child's sex ought to be accepted as an explanatory variable rather than a confounding one in the analyses. Since the variables were drawn from a number of different instruments (ICCQ, ICPQ SAQM and SAQF), our model building first centred on children who had lived with both biological parents since birth. The sample for this limited population was only 1,431 children. Although some of the variables drawn from the SAQM and SAQF proved to be very significant in the models explored, none proved to be a modifying variable or seemed to play an important confounding role (results not shown). Further use of these variables in building the models thus seemed pointless. We should point out that, in terms of health, boys generally are not doing as well as girls, and so a child's sex ought to be accepted as an explanatory variable rather than a confounding one in the analyses.

between social position and a health indicator might, for example, be checked and compared for different levels or categories of the same factor. This, in fact, is the course we chose to follow, since, given the small size of our sample, most of the interactions tested in the proposed models are not highly significant (results not shown). We will thus consider modifying factors for which the relationship between social position and a health indicator is almost non-existent for some categories but seems to persist for others. If the relationships are almost non-existent, we will be dealing with protective factors.

We also considered logistic regression models that fully retain the longitudinal aspect of the QLSCD data, namely repeated-measure models. For each child for whom we have three records, we want to highlight the links that may exist between the health indicators and social position in each round of the study rather than combine them across the rounds (as social position since birth). As we have seen, social position (and, indeed, health indicators) may change over time, and it may be important to take this fact into account. Classic logistic regression models assume independence of observations. However, since we are dealing with longitudinal prospective data, the observations are not independent, and the correlation structure must be modeled for measures taken over time for the same children (or families)¹⁰ (Allison, 1991). This model was applied only to the health indicators measured in all three of the first rounds of the study, namely overnight stays in hospital and the perception of the child's health. For both these model series, the results of the regression analyses are shown as odds ratios.

5.2 Results of multivariate analysis of the relationship between child health since birth and family social position

5.2.1 Hospitalization

The first model analyzes the relationship between family social position and an approximately

29-month-old child's admission to hospital for one night since birth (Table 5.1). The results indicate that a significant link in favour of better-off children persists even when the effects of all the control variables are taken into account; low social position remains associated with a higher probability of having been admitted to hospital. In addition to SES, other factors increase the probability of a toddler spending at least one night in hospital: living in a single-parent home during at least one round of the study, being a boy, having a mother who is not an immigrant, and not having been breastfed for six months.

When we examine the modifying effects, we see (in Figure 5.1) that the influence of social position on the probability of having spent a night in hospital is strong for children who were not breastfed for six months, but statistically insignificant for children who were. The influence of social position is also stronger for two-parent families than for single-parent ones, but there is no real difference in terms of the mother's immigrant status (data not shown). Socioeconomic level thus does not seem to affect the probability of having spent at least one night in hospital since birth for children who were breastfed for six months; the probabilities of having been hospitalized for one night are lower for children in this group, whatever their social background, than for those who had not been breastfed for at least six months (Table 5.1). This model thus reveals a first protective factor: breastfeeding for at least six months.

10. There are a number of methods available for remedying this problem. We preferred to use Generalized Estimating Equations (GEE), a method the SAS GENMOD procedure suggests and we do not impose any constraints on the structure of interindividual correlation.

Table 5.1

Explanatory factors relating family social position and child's hospitalization for at least one night between birth and the age of approximately 29 months, Québec, 1998, 1999 and 2000

Explanatory factor ¹	Model 1 ²		Model 2 ³	
	OR	Confidence interval (95%)	OR	Confidence interval (95%)
Social position since birth ⁶				
Low	1.90	(1.34; 2.70)	1.72	(1.29; 2.31)
Middle (High)	1.54	(1.18; 2.00)	1.30	(1.02; 1.64)
Single-parent family in at least one round ^{4,5,6} (Two-parent in all three rounds)	1.46	(1.05; 2.03)	1.32	(0.97; 1.80)
Boy (Girl)	1.38	(1.10; 1.74)	1.41	(1.15; 1.72)
Non-immigrant mother/spouse (Immigrant)	1.86	(1.21; 2.85)	1.68	(1.10; 2.58)
Not breastfed for 6 months (Breastfed for 6 months)	1.34	(1.03; 1.74)	1.35	(1.06; 1.72)
Age of child				
5 months	...		1.86	(1.40; 2.11)
17 months (29 months)	...		1.72	(1.49; 2.33)

1. Reference category in parentheses

2. Model with highest family social position attained.

3. Repeated measures model using social position in each round. Confidence intervals shown for this model do not take sample design into account.

4. Confounding role in the relationship between social position and the health indicator.

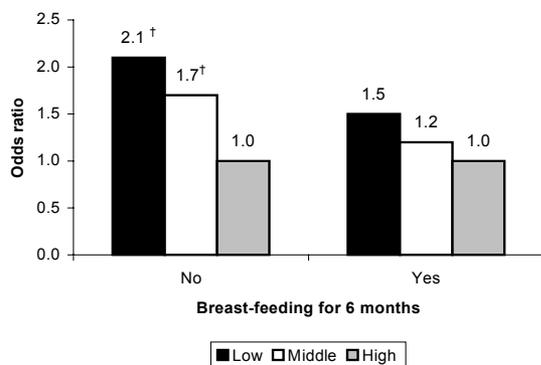
5. Parameter not significant at 0.05 level in model 2.

6. For model 2, data in each round.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Figure 5.1

Comparison of relationships between family social position and child's hospitalization for at least one night by feeding method, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Comparison with repeated measures model

At first glance, when the repeated measures model is compared to the previous one (which used social position since birth as a measure) we find relatively few changes in the odds ratios of the common parameters or their level of significance (see Table 5.1, model 2). It is noteworthy, however, that in the repeated measures model, the link with social position is weaker, though still significant. This weakening can easily be explained by the fact that some families are in an adverse social situation only during their child's first few months of life. This finding further bears out our choice of a social-position measure that takes into account variations in SES over time. The repeated measures models also have the advantage of allowing for the addition of the age variable to explain health problems. The results show that children aged 5 or 17 months are more likely to spend a night in hospital than are children aged 29 months.

5.2.2 Perceived health

The second multivariate analysis model deals with the relationship between family social position and the perception of the child's health status since birth by the person most knowledgeable about the child (PMK) (Table 5.2). The results show that, even when certain factors are controlled for, social position remains positively associated with the perceived health status of toddlers. The lower the social position of the family, the more frequently is perceived health less than very good in one of the first three rounds of the

investigation, even when demographic, protective and risk factors are taken into account. Other factors, apart from low SES, also increase the probability that a mother will perceive a child's health as being other than very good: living in a single-parent home during at least one of the three rounds, having a mother who has stated that she is not in very good or excellent health, having brothers and sisters, and living in a family that does not receive support from grandparents.

Table 5.2

Explanatory factors relating family social position and child health perceived as less than very good in at least one of the three rounds, Québec, 1998, 1999 and 2000

Explanatory factor ¹	Model 1 ²		Model 2 ³	
	OR	Confidence interval (95%)	OR	Confidence interval (95%)
Social position since birth ⁷				
Low	1.76	(1.19; 2.60)	1.79	(1.27; 2.52)
Middle	1.40	(1.03; 1.89)	1.29	(0.97; 1.71)
(High)				
Single-parent family in at least one round of the study ^{4,7} (Two-parent in all three rounds)	1.58	(1.15; 2.19)	1.44	(1.03; 2.03)
No support from maternal or paternal grandparents – round 3 only ⁶ (Support)	1.37	(1.03; 1.82)	1.23	(0.93; 1.62)
Number of children in the household ⁷				
2 children	1.48	(1.10; 1.99)	1.51	(1.15; 2.01)
3 children or more	1.58	(1.09; 2.28)	1.66	(1.19; 2.31)
(One child)				
Mother's health perceived as being less than very good in one of the three rounds of the study ⁷ (Health perceived as excellent or very good in all three rounds)	2.71	(2.12; 3.48)	2.89	(2.34; 3.58)
Principal method of child care used ^{4,5,7}				
Daycare centre in 1999 and 2000 rounds	1.50	(1.06; 2.11)	1.65	(1.14; 2.38)
Other methods of child care	1.23	(0.90; 1.68)	0.98	(0.70; 1.38)
(None)				
Age of child ⁶				
5 months	...		1.04	(0.79; 1.37)
17 months	...		1.22	(1.00; 1.49)
(29 months)				

1. Reference category in parentheses.

2. Model with highest family social position attained.

3. Repeated measures model using social position in each round. Confidence intervals shown for this model do not take sample design into account.

4. Confounding role in the relationship between social position and the health indicator.

5. Parameter not significant at 0.05 level in model 1.

6. Parameter not significant at 0.05 level in model 2.

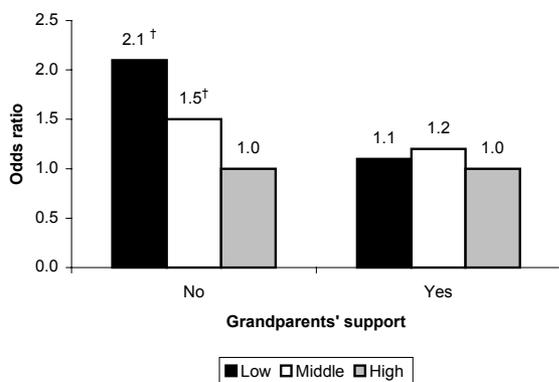
7. For model 2, data from each round.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Moreover, we must point out the confounding effect on the relationship between SES and the perception of child health that is created by introducing the “type of family” and “principal method of child care” variables into the model. The factors differ in their impact on the relationship, though; while family type weakens it, the principal method of child care reinforces it (data not shown).

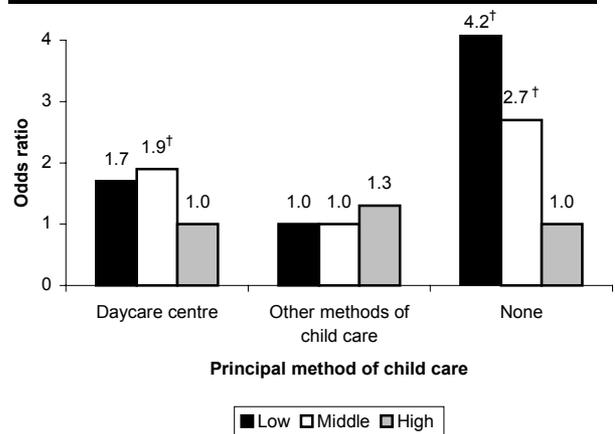
When we turn to the modifying effects (See Figures 5.2 to 5.4), we find that the link between socioeconomic level and toddlers’ perceived health status persists independent of the number of children in the household or of the type of family (data not shown). While the link persists among children attending a daycare centre, the effect of social position becomes very marked for children staying home with one of their parents (Figure 5.3). Conversely, for children in a family that has consistently been in a lower social position, the probability that the child will have been said to be in less than very good health disappears with support by grandparents (Figure 5.2) and with having a mother who perceives herself to be in very good or excellent health (Figure 5.4).

Figure 5.2
Comparison of relationships between family social position and child health perceived as being less than very good in at least one of the three rounds by presence of absence of grandparents’ support, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level
 Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 5.3
Comparison of relationships between family social position and child health perceived as being less than very good in at least one of the three rounds by principal method of child care, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level
 Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 5.4
Comparison of relationships between family social position and child health perceived as being less than very good in at least one of the three rounds by perception of mother’s health, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level
 Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Two other protective factors for children living in socioeconomically disadvantaged families thus emerge from the second multivariate analysis model: support from maternal or paternal grandparents and a mother who says she is in very good or excellent health. In other words, when the other factors are controlled for, low social position has no impact on the perceived health of toddlers in families in which grandparents provide support and in those in which the mother claims to be in very good or excellent health. Meanwhile, attendance at a daycare centre weakens but does not entirely eliminate the relationship.

Comparison with the repeated measures model

As we observed in the case of hospitalization, the orders of magnitude of the odds ratios for the independent variables common to models 1 and 2 are very similar. However, in the repeated measures model, grandparents' support no longer seems to play

a significant part in explaining perceived child health. Nor does the probability that a child will be perceived as being in poor health differ at different ages.

5.2.3 Respiratory tract infections

The third model (Table 5.3) examines the relationship between respiratory tract infections at the age of 2½ years and family social position since birth; the respiratory-tract-infection data refer to the three months preceding the survey. The results reveal the persistence of a negative relationship, even when the effects of the control variables are taken into account. Thus, for 29-month-old children, as family social position declines, the probability of having had a respiratory tract infection rises. Moreover, premature birth increases the risk of having had such a health problem.

Table 5.3

Explanatory factors relating family social position and respiratory tract infections¹ in children approximated 29 months old, Québec, 1998, 1999 and 2000

Explanatory factor ²	Model 1 ³	
	OR	Confidence interval (95%)
Social position since birth		
Low	1.53	(1.12; 2.10)
Middle	1.29	(1.04; 1.61)
(High)		
Single-parent family in at least one round of the study ^{4,5} (Two-parent in all three rounds)	1.03	(0.77; 1.36)
Baby premature (Not premature)	1.66	(1.03; 2.66)
Principal method of child care used (1999 and 2000 rounds) ^{4,5}		
Daycare centre in 1999 and 2000 rounds	1.34	(1.04; 1.73)
Other methods of child care (None)	1.15	(0.90; 1.47)

1. Social position alone does not seem to be significant at 0.05 level, but adjusting for form of daycare brings it out more. The confounding effect of the principal method of child care on the relationship between social position and respiratory tract infections is thus great.

2. Reference category in parentheses.

3. Model with highest family social position attained.

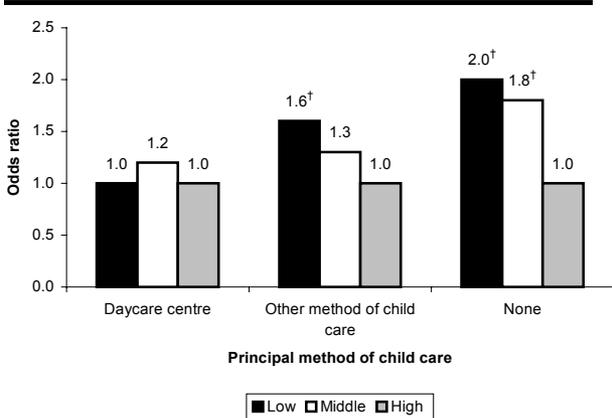
4. Confounding role in relationship between social position and the health indicator.

5. Parameter not significant at 0.05 level in model 1.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Stratified analysis, meanwhile, indicates that the link between respiratory tract infections and social position disappears for 2½-year-old children who attended daycare centres at the age of 17 and 29 months (Figure 5.5). In other words, children who attend daycare centres run the same risk of getting respiratory tract infections independent of their parents' socioeconomic level. At 2½ years of age, better-off children attending a daycare centre thus lose whatever advantage high social position gives them for respiratory tract infections. However, the situation is quite different for children who are not cared for outside the home. For them, the probability of having had a respiratory tract infection is closely connected to family social position: the lower the family's social position, the greater is the probability of infection.

Figure 5.5
Comparison of relationships between family social position and respiratory tract infections in children approximately 29 months old by principal method of child care, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level
 Source: Institut de la statistique du Québec, QLSCD 1998-2002

In short, the impact of SES is strong for children who stay home, so disadvantaged children then have a greater probability than others of having respiratory tract infections. In contrast, we do not observe any differences related to social position among children who attend daycare: all of them have a higher probability of respiratory tract infection, no matter what their parents' social position is. We know, furthermore, from longitudinal studies conducted elsewhere (Denny *et al.*, 1986; Presser, 1988;

Palacio-Quintin *et al.*, 1999) that there is an increased risk of respiratory tract infection during the first two years of attendance at daycare. However, the same studies show, children who have attended daycare have fewer respiratory tract infections during their first few years of school. It will be interesting to see if future rounds of the QLSCD provide confirmation of the phenomenon for Québec.

5.2.4 Asthma

The fourth model (Table 5.4) analyzes the relationship between asthma at the age of 17 and 29 months and family social position since birth. The results indicate that, when the effects of the control variables are taken into account, the differences observed in the bivariate analyses are no longer significant. Although the mother's assessment of the neighbourhood as having many social problems may have some explanatory value, only boys' greater vulnerability in terms of health provides a statistically significant explanation of part of the observed differences.

Table 5.4

Explanatory factors relating family social position and asthma in children aged 17 and 29 months, Québec, 1998, 1999 and 2000

Explanatory factor ¹	Model 1 ²	
	OR	Confidence interval (95%)
Social position since birth ⁴		
Low	1.68	(1.07; 2.62)
Middle	1.23	(0.86; 1.77)
(High)		
Single-parent family during at least one round of the study ^{3,4} (Two-parent during all three rounds)	1.19	(0.80; 1.78)
Boy	1.75	(1.27; 2.41)
(Girl)		
Neighbourhood social problems ⁴ (Few social problems)	1.49	(0.97; 2.29)

1. Reference category in parentheses.

2. Model with highest family social position attained.

3. Confounding role in relationship between social position and the health indicator.

4. Parameter not significant at 0.05 level in model 1.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

5.2.5 Consultation with general practitioners (family physicians)

The fifth model examines the relationship between family social position and consultation with a general practitioner for the child during the three rounds of the inquiry. The results presented in Table 5.5 indicate that there is still a significant negative relationship even when the effects of the control variables are taken into account; a consistently low social position remains associated with a higher probability of having consulted a general practitioner at 5, 17 and 29 months. In addition to low SES, other factors too increase the probability of young children seeing a general practitioner: having a non-immigrant mother, not enjoying any support from grandparents and attending a daycare centre.

When we study the modifying effects, we find that, regardless of type of family or of grandparents' support (data not shown), the association between social position and consultation of a general practitioner is negative. However, the relationship is stronger for children who do not attend daycare and for those with a non-immigrant mother (Figures 5.6 and 5.7).

Table 5.5

Explanatory factors relating family social position and consultations with general practitioners at 5, 17 and 29 months, Québec, 1998, 1999 and 2000

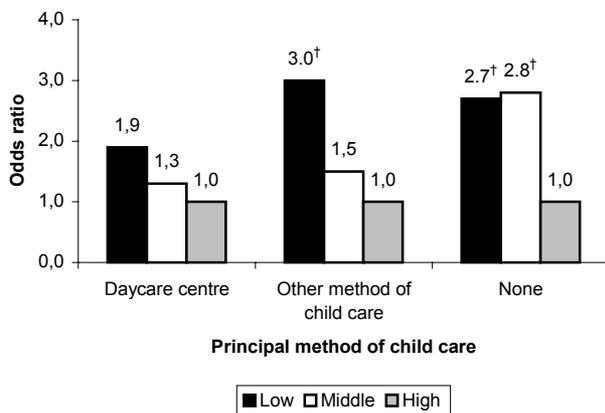
Explanatory factor ¹	Model 1 ²	
	OR	Confidence interval (95%)
Social position since birth		
Low	2.17	(1.54; 3.05)
Middle	1.57	(1.26; 1.97)
(High)		
Single-parent family during at least one round of the study ^{3,4} (Two-parent during all three rounds)	0.93	(0.68; 1.26)
Non-immigrant mother (Immigrant)	2.90	(1.96; 4.30)
No support from maternal or paternal grandparents (2000 round only) (support from maternal or paternal grandparents)	1.38	(1.11; 1.72)
Principal method of child care used (1999 and 2000 rounds) ³		
Daycare centre in 1999 and 2000 rounds	1.58	(1.18; 2.12)
Other methods of child care (None)	1.21	(0.93; 1.57)

1. Reference category in parentheses.
2. Model with highest family social position attained.
3. Confounding role in relationship between social position and the health indicator.
4. Parameter not significant at 0.05 level in model 1.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Figure 5.6

Comparison of relationships between family social position and consultation with general practitioners at 5, 17 and 29 months by principal method of child care, Québec, 1998, 1999 and 2000

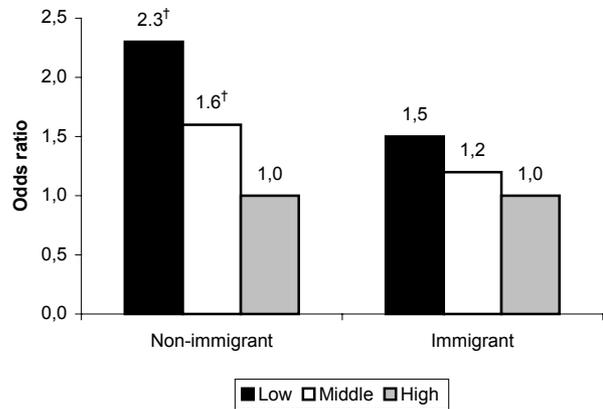


† Odds ratio significant at 0.05 level

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Figure 5.7

Comparison of relationships between family social position and consultation with general practitioners at 5, 17 and 29 months by mother's immigration status, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

5.2.6 Consultation with pediatricians

The last model demonstrates the persistence of a positive association between consultation with a pediatrician during the three rounds of the survey and the family's social position since the birth of the child, even when the effects of potentially confounding factors are taken into account (Table 5.6). Higher social position is related to a stronger probability of having consulted a pediatrician. This is rather astonishing, for over the course of this inquiry we have seen that it is children of low social position who are more likely to be in poor health and would thus expect them to see pediatricians more. In addition to high SES, other factors too increase the probability of a child having been seen by a pediatrician in the twelve months preceding each round of the study: enjoying the support of grandparents, not consuming soft drinks or fruit drinks often (less than once a day) and having an immigrant mother.

There are some modifying effects that come into play. The influence of social position on consultation with a pediatrician declines as the number of children in the family (Figure 5.8) rises. If there are only one or two children in a family, the probability of consulting a pediatrician is greater when the family has a high social position than when it is disadvantaged. The influence of SES is also evident among children who do not consume many soft drinks or fruit drinks (less than once a day). The model thus reveals two factors that can eliminate the peculiar association between social position and consultations with a pediatrician: living in a family of three or more children and consuming a relatively large amount of soft drinks or fruit drinks. In other words, for children in families of three or more siblings or consuming soft drinks or fruit drinks at least once a day, social position no longer seems to affect the probability of having consulted a pediatrician in the three rounds of the study.

Table 5.6

Explanatory factors relating family social position and pediatric consultations at 5, 17 and 29 months, Québec, 1998, 1999 and 2000

Explanatory factor ¹	Model 1 ²	
	OR	Confidence interval (95%)
Social position since birth		
High	2.30	(1.68; 3.16)
Middle	1.47	(1.09; 1.98)
(Low)		
Period of single parenthood during the three rounds of the study ^{3,4} (Two-parent household in at least one round)	1.55	(0.95; 2.54)
Immigrant mother/partner (Non-immigrant)	1.93	(1.39; 2.68)
Maternal and/or paternal grandparents' support (2000 round only) (No support)	1.47	(1.19; 1.83)
Number of children in household (2000 round)		
2 children	1.08	(0.86; 1.36)
3 children or more	0.70	(0.52; 0.93)
(One child)		
Consumption of soft drinks or fruit drinks at least once a day (2000 only)	1.62	(1.20; 2.19)
(Once or more a day)		

1. Reference category in parentheses

2. Model with highest family social position attained.

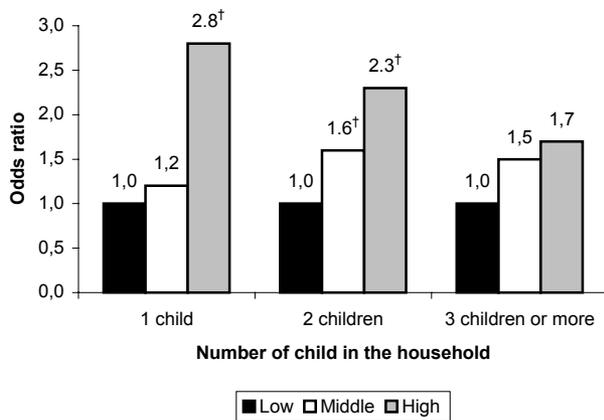
3. Confounding role in relationship between social position and the health indicator.

4. Parameter not significant at 0.05 level in model 1.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

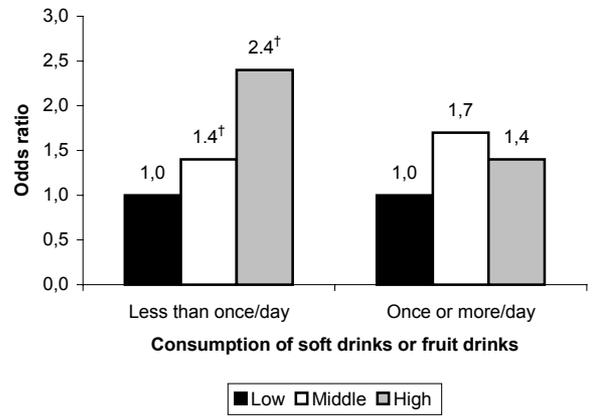
With the knowledge available to us, we can briefly posit a number of hypotheses to interpret these results. We know that people from the least advantaged social classes tend to “overestimate” their health status or to have a partial view of it centred on aspects of body function (Sen, 2002; Girard *et al.*, 2000; Paquet, 1990). Moreover, a degree of fatalism seems to prevail among the less advantaged regarding disease (Paquet, 1990). Parents of high social position, meanwhile, tend to be more concerned about health in general (Paquet, 1990), and their concern may be accompanied by a level of anxiety. Consequently, even if a child is not really ill, parents from higher social classes may seek reassurance by seeing a specialist. Low consumption of soft drinks would thus be a marker of this greater and more general interest in health, while having few children might indicate a level of anxiety stemming from a lack of experience with infant ailments. We might also hypothesize about the relevance of the possibility that pediatricians are located far from disadvantaged neighbourhoods and of the preference of patients in a low social position for consulting physicians in such places as emergency rooms. The lack of pediatricians in rural areas and their concentration in large university cities and towns might similarly be considered explanatory hypotheses.

Figure 5.8
Comparison of relationships between family social position and consultation with pediatricians at 5, 17 and 29 months by number of children in the household, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level
 Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Figure 5.9
Comparison of relationships between family social position and consultation with pediatricians at 5, 17 and 29 months by consumption of soft drinks or fruit drinks, Québec, 1998, 1999 and 2000



† Odds ratio significant at 0.05 level
 Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

5.3 Summary of the major findings of the multivariate analysis

Multivariate analysis revealed the persistence of a link between child health indicators and the social position of the family since the birth of the child even when the unequal distribution of risk, protective and demographic factors is taken into account. The only exception to these general findings was for asthma among 17- and 29-month-old children; the relationship between asthma and family social position since birth was no longer statistically significant.

Let us sum up the associations that are seen to persist when all control factors are considered. Disadvantaged social position since birth remains associated with a greater probability of having been admitted to hospital since birth, enjoying health that is perceived as less than very good or excellent and having had a respiratory tract infection in the three months prior to the 2000 round of the QLSCD. Similarly, consistently low social position remains associated with a higher probability of having consulted a general practitioner but with a lower probability of having been seen by a pediatrician. In general, the fact that poor health is more common among toddlers of low socioeconomic status cannot

be entirely explained by the greater frequency of risk factors observed among disadvantaged groups. Family social position affects child health status and does so independently of other factors.

Nonetheless, an examination of the modifying effects revealed that the influence of family social position on the health of toddlers may be almost entirely eliminated by a number of protective and risk factors. For hospitalization, the factor involved is breastfeeding for at least six months. For the perceived health status of the child, the relevant factors are grandparents' support and a mother in very good or excellent health. For respiratory tract infections, the factor is attendance of a daycare centre, while for consultation with general practitioners, the factors are attending daycare and having an immigrant mother. For consultations with pediatricians, the relevant factors are living in a family with three or more children and relatively high consumption of soft drinks or fruit drinks. The identification of factors that can nearly level the playing field for young children in terms of health clearly indicates interesting points to ponder and courses of action to take for the planners and stakeholders who formulate public policy.

6. Conclusion

The links between health status in early childhood and in adulthood remind us how important it is to analyze the role of social factors in producing and reproducing health inequalities from a very early age on. As the psychologist Erik H. Erikson demonstrated, “psychosocial relativity is essential. It is impossible to understand how people develop without understanding the cultural, historic, personal, and social context of the course of their life. Like the coloured threads that make up the tapestry of a life, these issues can become leads that help us understand our own and other people’s story” (Houde, 2003: A9).

The QLSCD data on the same children at 5, 17 and 29 months of age have given us the opportunity to increase our understanding of the influence of family social position on health. Our results, like those of other studies, suggest that, in Québec, despite our universal health and social services system and prevention programs, the health of young children is still related to their family’s social position. For most of the indicators, the higher the social position, the better is the toddler’s health. We cannot merely take note of the fact that social inequalities in health exist, however. If we really want to reduce them, we have to go beyond reporting and propose a course for further interpretation and preventive intervention. Let us, therefore, briefly summarize our study in the hope that new courses of action may develop.

First, during a child’s first months of life, many Québec families are temporarily at a lower socioeconomic level. An indicator representing social position since the birth of the child was therefore developed to distinguish temporary situations from more permanent ones as they affect health.

Second, six logistic regression models were developed to determine the net contribution of social position to the health of children when we control for risk and protective factors. The results show that a link between the indicators of child health and family social position persists even when the unequal social distribution of many risk, protective and demographic factors is taken into account. Asthma, however, is an exception among children aged 17 and 29 months.

The results indicate that, for a child born in Québec at the end of the 1990s, being part of a family that since the child’s birth has been at the bottom of the social scale in terms of education, income and parents’ profession increases the probability that the child’s health will not be very good. Moreover, the fact that poor health is more common among young children from a low social position cannot be explained entirely by the greater prevalence of the risk factors observed among the disadvantaged. Family social position thus seems to play a decisive and distinct role with regard to child health.

Even so, the influence of social position on toddlers’ health seems to vanish when certain protective and risk factors are present. This observation encourages us to venture into the sphere of public policy and suggest avenues for the development of interventions that may level the playing field for health. Clearly, the most effective way of reducing health inequality in a society is by reducing socioeconomic inequality. This study shows, however, that until we can attain that worthy objective, priority should be given to certain orientations in public health interventions aimed at populations at the bottom of the social scale. Let us outline them briefly.

While health professionals should adopt a respectful and non-judgmental attitude in dealing with families from a different social background, they should promote and support breastfeeding among disadvantaged populations. If maintained for at least six months, breastfeeding can protect young children from a low social position from hospitalization. Initiatives should also be developed to encourage the strengthening of intergenerational bonds because the material, instrumental and emotional assistance that grandparents provide seems to help protect the health of their disadvantaged grandchildren. We should also remember that public health programs that aim to improve the health of mothers of low social position can kill two birds with one stone and protect the health of their small children as well. Furthermore, in developing programs to prevent respiratory tract infections, special attention ought to be paid to families of a low socioeconomic level whose children do not attend daycare because these children have more respiratory

tract infections than their peers from better-off backgrounds who stay home. Lastly, we must carry on efforts — such as the formation of family medicine groups (FMG) — that encourage Quebecois to have a family physician. Any measure that promotes access to well-organized primary-care services may reduce the propensity to resort to pediatricians of parents at a higher socioeconomic level. Specialized medical resources could then be freed to provide care for young children who are really ill.

When all is said and done, the reduction of social inequalities in health should be the top priority of public-health initiatives. It would be very shortsighted to ignore this major challenge; social inequalities in health have to be reduced in industrialized countries in order to increase national life expectancy. By identifying protective factors, this study seeks to support Québec's researchers and planners in developing ways of truly promoting equal social and health opportunities for the adults of tomorrow.

Annex 1

Additional tables

Table A.1
Distribution of children at the age of about 29 months by certain health indicators, Québec, 2000

Health indicator	%
Acute health problem in the past 3 months	
No	38.8
Yes, at least one problem	61.2
Respiratory infection	
Never	56.8
Once	33.4
Twice	7.2
Three times or more	2.5
Gastro-intestinal infection	
Never	78.5
Once	19.4
Two or more times	2.1 *
Ear infection	
Never	80.5
Once	15.2
Two times or more	4.2
Another infection	
Never	94.6
One time or more	5.4
Number of type of infections	
None	39.0
One	37.9
Two	18.8
Three or more	4.3
Asthma attack in the last 12 months	
No	92.8
Yes	7.2

* Coefficient of variation between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.2
Distribution of children at the age of about 29 months by certain health indicators, Québec, 2000

Health indicator	%
Injury in the last 12 months	
No	90.2
Yes	9.8
Nature of the most serious injury	
Cut or scrape	4.0
Fracture or break	1.5 *
Dislocation or twist or sprain	1.3 *
Burn	0.6 **
Injury to teeth	0.4 **
Concussion	0.3 **
Poisoning	0.2 **
Other	1.3 *
Hospitalization in the last 12 months	
No	92.4
Yes	7.6
Reason for hospitalization	
Respiratory disease	3.2
Gastro-intestinal infection	1.1 *
Injury	0.2 **
Other	3.0
Child's health perceived by the mother as	
Excellent	64.6
Very good	25.7
Good	8.7
Fair or poor	1.0 *

* Coefficient of variation between 15% and 25%; interpret with caution.

** Coefficient of variation greater than 25%; estimate provided for reference purposes only.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.3

Factors associated with acute health problems in children at the age of about 29 months by the number of periods spent living in poverty since birth, Québec, 1998, 1999 and 2000

Associated factor	Acute health problem	
	Model 1	Model 2
	OR (95% CI)	
Acute health problem (1999 round)		2.2 (1.8-2.7) ⁺⁺⁺
Number of periods spent living in poverty		
Never poor	1	1
Poverty in one period	1.2 (0.8-1.6)	1.1 (0.8-1.6)
Poverty in two periods	1.2 (0.8-1.8)	1.2 (0.8-1.9)
Poverty in three periods (chronic)	1.8 (1.2-2.6) ⁺⁺	1.8 (1.2-2.6) ⁺⁺
Child's age (in months) ¹		
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or older		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner		
Lives without a partner		
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant		
Non-European immigrant		
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home	1	1
Child care in a family setting	1.2 (1.0-1.5)	1.2 (1.0-1.5)
Day care centre	1.8 (1.4-2.5) ⁺⁺⁺	1.8 (1.3-2.4) ⁺⁺⁺

1. Variable whose global threshold is not significant (Wald test).

†: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.4

Factors associated with asthma attacks in children at the age of about 29 months by the number of periods spent living in poverty since birth, Québec, 1998, 1999 and 2000

Associated factors	Asthma attack	
	Model 1	Model 2
	OR (95% CI)	
Asthma attack (1999 round)	20.9 (12.4-35.1) ⁺⁺⁺	
Number of periods spent living in poverty		
Never poor	1	1
Poverty in one period	3.3 (1.7-6.2) ⁺⁺⁺	2.9 (1.3-6.2) ⁺⁺
Poverty in two periods	3.3 (1.7-6.3) ⁺⁺⁺	3.4 (1.7-6.8) ⁺⁺
Poverty in three periods (chronic)	2.9 (1.5-5.6) ⁺⁺	3.5 (1.7-7.4) ⁺⁺⁺
Child's age (in months) ¹		
Child's sex ¹		
Girl	1	
Boy	1.8 (1.2-2.8) ⁺⁺	
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years	1	1
Under 20	2.9 (1.4-6.0) ⁺⁺	3.6 (1.6-8.5) ⁺⁺
35 or older	1.2 (0.7-2.3)	1.6 (0.8-3.0)
Mother's level of education (1998 round) ¹		
University/College		1
High school or trade school diploma		0.8 (0.4-1.4)
No high school diploma		0.3 (0.2-0.7) ⁺⁺
Union status (2000 round) ¹		
Lives with a partner		
Lives without a partner		
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant	1	1
Non-European immigrant	0.4 (0.2-0.9) [†]	0.4 (0.1-0.9) [†]
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home		
Child care in a family setting		
Day care centre		
Presence of a domestic animal (2000 round)		
No	1	1
Yes	0.5 (0.3-0.9) ⁺⁺	0.6 (0.3-0.9) [†]

1. Variable whose global threshold is not significant (Wald test).

†: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.5

Factors associated with injuries in children at the age of about 29 months by the number of periods spent living in poverty since birth, Québec, 1998, 1999 and 2000

Associated factors	Injury	
	Model 1	Model 2
	OR (95% CI)	
Injury (1999 round)		1.9 (0.6-6.2)
Number of periods spent living in poverty		
Never poor	1	1
Poverty in one period	1.3 (0.7-2.2)	1.3 (0.8-2.2)
Poverty in two periods	0.8 (0.4-1.6)	0.8 (0.4-1.6)
Poverty in three periods (chronic)	1.2 (0.7-2.1)	1.2 (0.7-2.1)
Child's age (in months) ¹		
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or older		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner	1	1
Lives without a partner	2.1 (1.3-3.5) ^{††}	2.1 (1.3-3.5) ^{††}
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant	1	1
Non-European immigrant	0.3 (0.1-0.7) [†]	0.3 (0.1-0.7) [†]
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home		
Child care in a family setting		
Day care centre		

1. Variable whose global threshold is not significant (Wald test).

†: p < 0,05; ††: p < 0,01.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.6

Factors associated with hospitalization of children at the age of about 29 months by the number of periods spent living in poverty since birth, Québec, 1998, 1999 and 2000

Associated factor	Hospitalization	
	Model 1	Model 2
	OR (95% CI)	
Hospitalization (1998 round)		2.0 (1.2-3.2) ^{††}
Number of periods spent living in poverty		
Never poor	1	1
Poverty in one period	1.2 (0.6-2.4)	1.2 (0.6-2.4)
Poverty in two periods	2.0 (1.0-3.9)	2.0 (1.0-3.9)
Poverty in three periods (chronic)	1.5 (0.7-3.1)	1.5 (0.7-3.2)
Child's age (in months) ¹		
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or older		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner		
Lives without a partner		
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant		
Non-European immigrant		
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home		
Child care in a family setting		
Day care centre		

1. Variable whose global threshold is not significant (Wald test).

††: $p < 0,01$.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.7

Factors associated with perceived health of children at the age of about 29 months by the number of periods spent living in poverty since birth, Québec, 1998, 1999 and 2000

Associated factor	Health perceived to be less than very good by the mother	
	Model 1	Model 2
	OR (95% CI)	
Health perceived to be less than very good by the mother (1998 round)		4.6 (3.0-7.2) ⁺⁺⁺
Number of periods spent living in poverty		
Never poor	1	1
Poverty in one period	1.3 (0.8-2.3)	1.3 (0.7-2.2)
Poverty in two periods	1.0 (0.5-1.8)	1.0 (0.5-1.8)
Poverty in three periods (chronic)	1.2 (0.7-2.2)	1.1 (0.6-1.9)
Child's age (in months) ¹	0.7 (0.5-0.9) [†]	0.7 (0.5-0.9) [†]
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or older		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner	1	1
Lives without a partner	1.9 (1.2-3.2) [†]	1.7 (1.0-3.0) [†]
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant		
Non-European immigrant		
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home	1	1
Child care in a family setting	1.0 (0.7-1.5)	1.1 (0.7-1.7)
Day care centre	1.8 (1.2-2.7) ⁺⁺	1.8 (1.1-2.8) [†]

1. Variable whose global threshold is not significant (Wald test).

†: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.8

Factors associated with acute health problems in children at the age of about 29 months by the time when the poverty occurred since the child's birth, Québec, 1998, 1999 and 2000

Associated factor	Acute health problem	
	Model 1	Model 2
	OR (95% CI)	
Acute health problem (1999 round)		2.2 (1.8-2.7) ⁺⁺⁺
Timing when the poverty occurred ¹		
Never poor	1	1
Early poverty (1998)	0.9 (0.5-1.4)	0.9 (0.5-1.4)
Temporary poverty (1999)	1.6 (0.8-3.2)	1.5 (0.7-3.1)
Current poverty (2000)	1.6 (0.9-2.8)	1.4 (0.8-2.6)
Persistent poverty (2 or 3 periods)	1.5 (1.1-2.1) [†]	1.5 (1.1-2.1) [†]
Child's age (in months) ¹		
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or more		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner		
Lives without a partner		
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant		
Non-European immigrant		
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home	1	1
Child care in a family setting	1.2 (1.0-1.5)	1.2 (1.0-1.5)
Day care centre	1.8 (1.3-2.4) ⁺⁺⁺	1.7 (1.3-2.3) ⁺⁺⁺

1. Variable whose global threshold is not significant (Wald test).

†: $p < 0,05$; +++: $p < 0,001$.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.9

Factors associated with asthma attacks in children at the age of about 29 months by the time when the poverty occurred since the child's birth, Québec, 1998, 1999 and 2000

Associated factor	Asthma attack	
	Model 1	Model 2
	OR (95% CI)	
Asthma attack (1999 round)	21.1 (12.5-35.4) ⁺⁺⁺	
Timing when the poverty occurred ¹		
Never poor	1	1
Early poverty (1998)	5.0 (2.4-10.6) ⁺⁺⁺	4.2 (1.8-9.7) ⁺⁺⁺
Temporary poverty (1999)	2.4 (0.7-8.6)	2.7 (0.5-13.7)
Current poverty (2000)	0.6 (0.1-4.4)	0.4 (0.1-6.1)
Persistent poverty (2 or 3 periods)	3.1 (1.8-5.1) ⁺⁺⁺	3.4 (1.9-6.1) ⁺⁺⁺
Child's age (in months) ¹		
Child's sex ¹		
Girl	1	
Boy	1.8 (1.2-2.7) ⁺⁺	
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years	1	1
Under 20	2.6 (1.2-5.5) [†]	3.3 (1.4-7.7) ⁺⁺
35 or more	1.2 (0.7-2.2)	1.5 (0.8-2.9)
Mother's level of education (1998 round) ¹		
University/College		1
High school or trade school diploma		0.8 (0.4-1.4)
No high school diploma		0.3 (0.1-0.7) ⁺⁺
Union status (2000 round) ¹		
Lives with a partner		
Lives without a partner		
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant	1	1
Non-European immigrant	0.4 (0.2-0.8) [†]	0.3 (0.1-0.8) [†]
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home		
Child care in a family setting		
Day care centre		
Presence of a domestic animal (1998 round)		
No	1	1
Yes	0.5 (0.3-0.8) ⁺⁺	0.6 (0.3-0.9) [†]

1. Variable whose global threshold is not significant (Wald test).
 †: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.10

Factors associated with injuries in children at the age of about 29 months by the time when the poverty occurred since the child's birth, Québec, 1998, 1999 and 2000

Associated factor	Injury	
	Model 1	Model 2
	OR (95% CI)	
Injury (1998 round) ¹		1.9 (0.6-6.3)
Timing when the poverty occurred ¹		
Never poor	1	1
Early poverty (1998)	2.4 (1.3-4.7) ^{††}	2.5 (1.3-4.8) ^{††}
Temporary poverty (1999)	0.3 (0.1-1.2)	0.3 (0.1-1.2)
Current poverty (2000)	0.6 (0.2-1.8)	0.6 (0.2-1.8)
Persistent poverty (2 or 3 periods)	1.0 (0.6-1.7)	1.0 (0.6-1.7)
Child's age (in months) ¹		
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or more		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner	1	1
Lives without a partner	2.3 (1.4-3.8) ^{††}	2.3 (1.3-3.8) ^{††}
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant	1	1
Non-European immigrant	0.2 (0.1-0.7) ^{††}	0.2 (0.1-0.6) ^{††}
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home		
Child care in a family setting		
Day care centre		

1. Variable whose global threshold is not significant (Wald test).

††: p < 0,01.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.11

Factors associated with hospitalization of children at the age of about 29 months by the time when the poverty occurred since the child's birth, Québec, 1998, 1999 and 2000

Associated factor	Hospitalization	
	Model 1	Model 2
	OR (95% CI)	
Hospitalization (1998 round)		2.0 (1.2-3.3) [†]
Timing when the poverty occurred ¹		
Never poor	1	1
Early poverty (1998)	1.4 (0.6-3.1)	1.3 (0.6-3.0)
Temporary poverty (1999)	0.4 (0.1-3.2)	0.4 (0.1-3.3)
Current poverty (2000)	1.8 (0.7-4.6)	1.9 (0.7-5.1)
Persistent poverty (2 or 3 periods)	1.7 (1.0-2.9)	1.7 (1.0-3.0)
Child's age (in months) ¹		
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or more		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner		
Lives without a partner		
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant		
Non-European immigrant		
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home		
Child care in a family setting		
Day care centre		

1. Variable whose global threshold is not significant (Wald test).

†: $p < 0,05$.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table A.12

Factors associated with children's perceived health at the age of about 29 months by the time when the poverty occurred since the child's birth, Québec, 1998, 1999 and 2000

Associated factor	Health perceived to be as less than very good by the mother	
	Model 1	Model 2
	OR (95% CI)	
Health perceived to be as less than very good by the mother (1998 round)		4.6 (3.0-7.2) ⁺⁺⁺
Timing when the poverty occurred ¹		
Never poor	1	1
Early poverty (1998)	1.6 (0.8-3.2)	1.4 (0.6-2.9)
Temporary poverty (1999)	1.1 (0.4-3.1)	1.1 (0.4-3.1)
Current poverty (2000)	1.0 (0.4-2.9)	1.3 (0.5-3.6)
Persistent poverty (2 or 3 periods)	1.1 (0.7-1.8)	1.0 (0.6-1.7)
Child's age (in months) ¹	0.7 (0.5-0.9) [†]	0.7 (0.5-0.9) [†]
Child's sex ¹		
Girl		
Boy		
Premature birth ¹		
No (> = 37 weeks)		
Yes (< 37 weeks)		
Intrauterine Growth Retardation ¹		
No (> = 10 th percentile)		
Yes (< 10 th percentile)		
Congenital abnormality ¹		
No		
Yes		
Mother's age at delivery ¹		
20-34 years		
Under 20		
35 or more		
Mother's level of education (1998 round) ¹		
University/College		
High school or trade school diploma		
No high school diploma		
Union status (2000 round) ¹		
Lives with a partner	1	1
Lives without a partner	2.0 (1.2-3.3) ⁺⁺	1.8 (1.0-3.0) [†]
Mother's immigration status (1998 round) ¹		
Non-immigrant or European immigrant		
Non-European immigrant		
Number of parents who smoke in the home (2000 round) ¹		
None		
One parent		
Two parents		
Method of child care (2000 round)		
At home	1	1
Child care in a family setting	1.0 (0.7-1.5)	1.1 (0.7-1.7)
Day care centre	1.8 (1.1-2.7) [†]	1.8 (1.1-2.8) [†]

1. Variable whose global threshold is not significant (Wald test).

†: p < 0,05; ++: p < 0,01; +++: p < 0,001.

Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Annex 2

Detailed description of the factors retained for the multivariate analyses

Characteristics of the child

- Premature birth in two categories: less than 37 gestational weeks and 37 and over gestational weeks.
- Method of feeding the baby at birth (3 dichotomous variables) :
 - ◆ Not breastfed at all and breastfed,
 - ◆ Not breastfed for 4 months and breastfed for 4 months or longer,
 - ◆ Not breastfed for 6 months and breastfed 6 months or longer.
- Principal method of child care in the 1999 and 2000 rounds in three exclusive categories: daycare in both rounds, no child care method (the parent alone or one of the parents does not work or study) in both rounds and other child care methods in the 1999 and 2000 rounds.
- Daily intake of soft drinks or fruit drinks in the 2000 round in two categories: once or more and less than once.
- Daily intake of vegetables in the 2000 round in two categories: less than twice and twice or more.

Characteristics of the mother/partner

- Mother's immigration status (2000 round) in two categories: immigrant and non-immigrant.
- Mother's perception of her health (1998, 1999 and 2000 rounds) in two categories: excellent or very good in the three rounds and less than very good in at least one round.
- Mother's smoking (3 dichotomous variables):
 - ◆ Mother who smoked during the pregnancy and mother who did not smoke during the pregnancy;
 - ◆ Mother who smoked in each of the rounds and during the pregnancy; mother who did not smoke in one of the rounds or during the pregnancy.
 - ◆ Mother who smoked in one of the rounds or during the pregnancy; mother who did not smoke in the three rounds and during the pregnancy.

Characteristics of the household in which the child lives

- Type of family (2 variables) :
 - ◆ Single-parent family in all three rounds and two-parent family in at least one round.
 - ◆ Single-parent family in at least one round and two-parent family in all three rounds.
- Marital stress (2000 round): definition of marital stress on the part of the mother or the father as reported by Bégin *et al.* (2002) in two categories: yes and no. From the SAQM and the SAQF, inference to children who have lived with their biological parents since birth.
- Job dissatisfaction for one of the parents: scale of satisfaction above 5 for the mother or the father in two categories: yes and no. From the SAQM and the SAQF, inference for children who have lived with their biological parents since birth.
- Exposure to secondary smoke in the home (2 variables):
 - ◆ One person smokes in the home in the 1999 and 2000 rounds; no one smokes in the home in the 1999 round or in the 2000 round.
 - ◆ One person smokes in the home in the 1999 or 2000 round; no one smokes in the home in the 1999 and 2000 rounds.
- Number of children in the household (1998, 1999 and 2000 rounds) in three categories: just 1 child, 2 and 3 or more.
- Parents' separated since the first interview (2000 round) in two categories: yes and no.
- Support from grandparents: scale of support (instrumental and emotional), greater than or equal to 5 for the maternal or paternal grandparents. Present in the 2000 round only.

Environmental characteristics according to the PMK

- Perception of a dangerous neighbourhood/absence of people who help one another (2000 round) in two categories: yes and no.
- Few social problems in the neighbourhood (2000 round) in two categories: yes and no.
- Social support (2000 round) in two categories: yes and no.

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Glossary

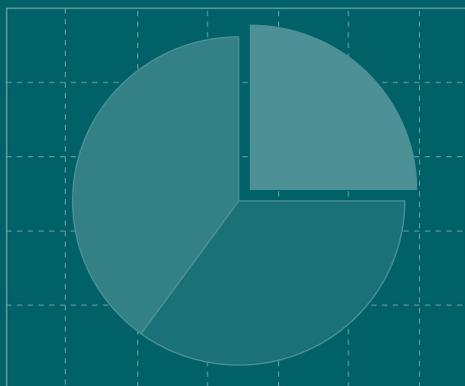
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<i>Direction générale de la santé publique</i>	Public Health Division
<i>Direction Santé Québec, ISQ</i>	Health Québec Division, ISQ
<i>Groupe de recherche interdisciplinaire en santé (GRIS), Université de Montréal</i>	Group for Interdisciplinary Research on Health, Université de Montréal
<i>Institut de la statistique du Québec</i>	Québec Institute of Statistics
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<i>ministère de la Famille et de l'Enfance</i>	Ministry of Child and Family Welfare
<i>ministère de la Santé et des Services sociaux (MSSS)</i>	Ministry of Health and Social Services
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After having described the shifts in the principal health problems in children from birth to 29 months, the authors of the first section study the links between changes in family poverty (insufficient income) and health problems of their 29-month-olds, controlling for the mother's age and level of education. We find that chronic poverty is associated with a greater risk of presenting acute health problems and of having asthma attacks. Moreover, early poverty is linked to a greater risk of asthma attacks at 29 months. On the other hand, there is no link between either temporary poverty or current poverty and a child's health.

In the second section, the authors probe the influence of the family's social position on the health of very young children at the ages of 5, 17 and 29 months in order to identify protective factors that will allow for the development of positive avenues for preventive intervention. The results indicate that for a child born in Québec in the late 1990s, living since birth in a family at the bottom of the social ladder increases the probability that he or she will be in less than very good health. Nevertheless, the influence of social position on the health of young children seems to dissipate in the presence of protective factors.



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ISBN : 2-551-21778-4

\$ 7,95
Website : www.stat.gouv.qc.ca
Printed in Québec, Canada