Institut de la statistique Québec

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

FROM BIRTH TO 29 MONTHS

COLLECTION **Health and Wellness**

Survey Description and Methodology

Volume 2, Number 1

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May 2002

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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Symbols

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

Abbreviations

CV Coefficient of variation
Non signif. Not significant

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 Family and Child 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 et des enquêtes spéciales – DMES* 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 interviewers[2] 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.[3]

A heartfelt thank-you!

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

2. All the interviewers in this survey were women.

3. 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.

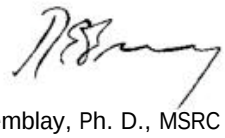
Researchers now have available more data than ever before about this stage of life. But this abundance of data has a perverse effect. If cross-sectional studies allow us to draw conclusions on the causes of problems observed, why shouldn't we go ahead and indulge in longitudinal data as well? When one 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 will do 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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Survey Description and Methodology

Part I

Logistics and Longitudinal Data Collections

1. Introduction to the QLSCD 1998-2002

Following in the tradition of Volume 1, this paper is intended to provide readers unfamiliar with the survey information indispensable for a clear understanding of the results presented in Volume 2 in this QLSCD 1998-2002 series. As the introductory paper in this second volume containing the first longitudinal analyses, the pages that follow present the basic elements of this prospective longitudinal study. The first section comprises a review and discussion of the various conceptual, operational and logistical aspects, while the second provides details on different aspects of the statistical methods employed in the annual surveys. Specifically, this first section presents:

1. A brief description of both new and old data collection instruments;
2. A review of the themes which fueled the contents of the first three years of data collection;
3. The various data collection processes and the degree to which the parents and children participated;
4. A short description of data processing procedures and certain components of the longitudinal validation.

The second section has a more statistical focus, presenting an analysis of the results from the perspective of the cross-sectional and longitudinal response rates of the major instruments, and the measures taken to reduce the potential biases due to overall non-response. Also examined are complementary aspects such as partial non-response rates, statistical methods chosen, and how the complex sample design was taken into account in the analyses.

1.1 Specifications of the Study

The Québec Longitudinal Study of Child Development began in 1998 on a cohort of 2,120 Québec infants who are being surveyed annually from 5 months to approximately 4 years of age. This volume covers longitudinal data from the first three years of data collection. Although during the first round of the QLSCD in 1998 the sample was representative of singleton births in Québec 1997-1998, it subsequently lost, at least partially, cross-sectional representativity of babies at a given age. A certain number of conceptual and methodological considerations led to the decision not to recruit children annually from amongst those who arrived in Québec after birth and who would therefore otherwise be part of the same age cohort as the initial sample.[1] However, the exceptionally low attrition rate of the initial sample suggests that the final sample will be relatively similar to the one in 1998.

The primary goal of the QLSCD 1998-2002 is to gain a better understanding of the precursors of social adjustment, its developmental pathways, and possible effects at school entry and over the long term. Therefore, it was decided to collect certain key data from the age of 5 months, since this is considered the earliest at which it is possible to measure variables such as temperament, sleep, diet, health status, and the physical and family environment. It was agreed to survey the children and their immediate family at precise and regular intervals of 12 months up to the age of 41 months. Precise intervals of measurement are dictated by the rapidity of development in early childhood.[2] However, in the 5th year of the QLSCD, the data collection interval has been changed to correspond with the end of the school year entry into kindergarten. The third volume in this series will contain an in-depth explanation of this change in the data collection cycle between the 4th and 5th years of Phase I of the QLSCD. This important change is really an investment in the future. After the 5th round is accomplished, the study will then be ready to continue its longitudinal path after the children have entered the school system, entering Phase II, which will run from 2003 to 2010.

1. Based on Statistics Canada (population estimate data for November 2000), the Sociodemographic Statistisc Division of Statistics Canada estimates the proportion of children 0 to 5 years of age arriving annually in Québec to be 1% (see sub-section 7 of Part II of this paper).

2. In terms of gestational age, less than four weeks separate the majority of infants in each annual data collection. Gestational age is defined as the sum of the duration of the pregnancy and the chronological age of the baby in weeks.

1.2 Progress of the Longitudinal Study

Second in a series of three volumes, the papers comprising this one are primarily devoted to the description and first analyses of the longitudinal data gathered during the first three rounds, namely, 1998, when the babies were 5 months old, 1999, when they were 17 months (1½ years) and 2000, when they were approximately 29 months old (2½ years). In 1999 and 2000, pretests were also conducted for the 4th and 5th rounds, namely for the surveys in 2001 and 2002. In 1997, the QLSCD published a preliminary report (Santé Québec *et al.*, 1997) based on the first pretest, and in 2000 a cross-sectional report (Jetté *et al.*, 2000) on data from the first round of the study (Table 1.1).

As indicated in Table 1.1, the first phase of the QLSCD is nearing completion. As the first papers in this second volume go to press, all the pretest and survey data collections will have been completed. All that remains will be to publish the final volume in this series, which will present the longitudinal analyses of approximately 2,000 Québec children from birth to the age of 4 years. Given the enormous potential of the this first phase of the study, it can be said that, even without being able to produce exhaustive analyses of all the data, the three volumes of the QLSCD 1998-2002 will no doubt open the floodgates to a seemingly endless stream of information, much of which will be new and never before published.

Table 1.1
Overview of pretests, surveys and publications by year, Québec, 2000

Year	Pretest	Survey	Report
1996	5-month-old infants		
1997	17-month-old children		
1998	29-month-old children	5-month-old infants	Preliminary report Pretest 5-month-old infants
1999	41-month-old children	17-month-old children	
2000	Fifth pretest held later in 2001[1]	29-month-old children	Cross-sectional Report (Vol. 1) 5-month-old infants
2001	*59-month-old children*	*41-month-old children*	
2002		*45-56-month-old children*[1]	Longitudinal Report (Vol. 2) Children 5 to 29 months of age
2003			
2004			*Longitudinal Report (Vol. 3)* *Children 5 to 56 months of age*

Guide to table:
Grey background: pretest and surveys finished and data published
Italics: pretest and surveys finished, data to be published
Source: *Institut de la statistique du Québec*, *QLSCD 1998-2002*.

1. In May 2001, *Direction Santé Québec* of the *ISQ* and QLSCD researchers decided to delay the fifth pretest (P5). Since this decision only concerns the fifth year of data collection, it will be explained in detail in the third volume in the series to be published in the summer of 2004. In brief, children entering school follow a certain calendar that is not based on age. Because of this, QLSCD researchers chose to change the collection periods to correspond to the school calendar. The year preceding the entry of certain numbers of children into pre-school (nursery school) was considered to be the best choice.

2. Overview of the Longitudinal Survey 1998 to 2000

2.1 Brief Description of Annual Survey Precedures

The annual interviews of the QLSCD had an average duration of approximately 1 hour and 45 minutes. Each interview was conducted in the child's home[3], face-to-face with a key respondent, who in more than 99% of cases was the biological mother. The major reason for this high percentage is that in the first round of the study (1998), the mother was the person who most often stayed at home with the five-month-old newborn. Since the respondent to the main questionnaire of the survey (the Interviewer Completed Computerized Questionnaire – ICCQ, see Table 2.1) must be the person most knowledgeable of the child (PMK), the mother was designated the key respondent almost as a matter of routine. Out of concern for consistency, a prerequisite of valid and accurate longitudinal study, the QLSCD encourages the PMK to be the same person year after year. Indeed, in the third round of the survey, the PMK remained unchanged since the first round for 98% of the children.

Following completion of the ICCQ, the mother and father (or new spouse/partner of the PMK), are asked to complete a self-administered questionnaire specifically designed for each of them.[4] The Self-Administered Questionnaire for the Father (SAQF) comprises the same questions used in either the ICCQ, the Interviewer Completed Paper Questionnaire (ICPQ) or the Self-Administered Questionnaire for the Mother (SAQM), making it possible to compare the responses of the biological father (or mother's new spouse/partner) with those of the biological mother (or father's new spouse/partner). In addition, each year from the age of 5 months, the child participates in activities that are designed to measure his/her cognitive development. The older the child gets, the more complex (from the 1st to the 3rd round) and more numerous (4th and 5th rounds) these activities become. Every two years, namely in the 2nd and 4th rounds, the PMK is interviewed about one of the child's siblings (see Section 2.2.1). At the end of each interview, the interviewer fills out an instrument called Observations of Family Life (OFL, see Table 2.1).

2.2 Administrative and Data Collection Instruments

Table 2.1 lists all 17 administrative and data collection instruments used in the first three years of the longitudinal study. Since the beginning, the QLSCD has used nearly 20 instruments. However, approximately 13 are regularly used each year. Since virtually all the instruments in Table 2.1 were described in Jetté and Des Groseilliers (2000), we will concentrate here on highlighting certain ones, particularly the two that were refined after the first year, namely the Sibling Questionnaire and the Vocabulary Test, used in 1999 and 2000 respectively.

- Administrative Instruments

Instruments 1, 4, 5 and 6 are the administrative instruments used every year to solicit and maintain participation of families. Table 2.4 (see sub-section 2.3) shows that these instruments, which comprise the principal means of not losing contact with the families (or their participation), have been very effective. Indeed, the annual and longitudinal attrition rate of the families has remained very low since the QLSCD began.

3. Because some families temporarily moved out of Québec, slilghtly more than 1% of interniews in the 3rd round had to be conducted by telephone. Consequently, self-administered questionnaires in these cases became postal questionnaires, and the children could not participate in the cognitive tests.

4. These self-administered questionnaires are either filled out during the home visit and given to the interviewer, or sent in later by mail.

Table 2.1
List of administrative and data collection instruments by survey year, Québec, 1998, 1999 and 2000

	1998	1999	2000
1) Introductory Letter	√	√	√
2) QLSCD Brochure	√	...	...
3) Souvenir Folder	√	...	...
4) Semi-Annual Newsletter to the Parents	√	√	√
5) Birthday Card for the Child	√	√	√
6) Change of Address Postcard	√	√	√
7) Informed Consent Form	√	√	√
8) Authorization Form for the Hospitals to send information contained in the medical records of the mother, child or sibling	√	√	√
9) Interviewer Completed Computerized Questionnaire (ICCQ)	√	√	√
10) Interviewer Completed Paper Questionnaire (ICPQ)	√	√	√
11) Imitation Sorting Task (IST)[1]	√	√	√
12) Self-Administered Questionnaire for the Mother (SAQM & SAQMABS)[2]	√	√	√
13) Self-Administered Questionnaire for the Father (SAQF & SAQFABS)	√	√	√
14) Observations of Family Life (OFL)	√	√	√
15) Sibling Questionnaire included in the ICCQ	...	√	...
16) Vocabulary Test (included in the ICPQ)	...	...	√
17) Baby Diary	√	√	...

√ Indicated instrument was used.
... Indicates instrument was not applicable in that year.
1. In Volume 1, No. 1, this was called the "1, 2, 3, Hands Game." In this paper and in future publications in the QLSCD series, it will be called the "Imitation Sorting Task" which best describes the psychometric nature of the test.
2. Where possible, a biological mother who is absent from the child's home is sent the usual SAQM, which is then designated as the SAQMABS (suffix "ABS"). The same procedure applies to absent biological fathers; the SAQF becomes the SAQFABS. Since an absent biological mother is an extremely rare phenomenon, not enough questionnaires warranted the creation of a file for the SAQMABS. However, since an absent biological father was a more common phenomenon, a file was created for data specific to the SAQFABS, which is discussed in section II of this paper.

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

- Data Collection Instruments

Medical records requested in 1999 using Instrument No. 8 were, in the first instance, those of children for which their mothers had refused access the previous year, or those for which it had been impossible to obtain written consent in 1998 because of absence, sickness, etc. Also in 1999, authorization was requested for obtaining the same information on a sibling as that of the survey child, namely the conditions surrounding his/her birth. For the 3rd round in 2000, requests for authorization to access records were only made to the mothers for whom we had not received consent in 1998 and 1999. Two new data collection instruments, the Sibling Questionnaire and the Vocabulary Test, are described in detail below to supplement information on instruments provided in Volume 1 No. 1.

2.2.1 Sibling Questionnaire

The questionnaire designed for the target child's sibling, part of the ICCQ in the 1999 round, was drawn exclusively from the collection instruments used for the target child (see Table 2.3 for a complete description of the themes covered by this instrument). It is important to note that variables from this instrument are processed as characteristics of the target child. Given that the siblings were not selected at random, they therefore cannot be considered a specific sub-group of the cohort. The selection criteria for the brother or sister of the target child is as follows:

1. Only one child was chosen independent of the number of brothers and sisters;
2. This brother or sister had to be closest in age to the target child;

3. If both a brother and sister presented the same age difference with the target child, the same sex sibling is selected;
4. A biological brother or sister was chosen over stepbrothers or stepsisters, even if any of the latter better fulfill one or more of the above-mentioned criteria;
5. Longitudinal study of a biological sibling was considered preferable. Even if another brother or sister who better fulfilled the above-mentioned criteria was born after the second round in 1999, the sibling selected in the 2nd round was kept for the 4th round;
6. Only in cases where the target child had no siblings in the 1999 round or if the sibling selected in 1999 was unavailable in 2001 (ex.: no longer resides in the same household following a divorce, has died, etc.) was another representative of the sibling selected in 2001.

Even though the siblings of QLSCD children cannot be used as a specific sub-sample for analyses, it is still worthwhile to gain a better understanding of the role these brothers and sisters play in the developmental processes of the target children. For example, is there a link between having a rambunctious brother or sister and presenting aggressive behaviours? Or can a sibling's success in school be related to higher cognitive performance in a target child?[5] These are the types of questions that researchers will try and answer in Volume 3 of the QLSCD series. This will be facilitated by the fact that longitudinal data on siblings will be available from two data collections, 1999 and 2001.

2.2.2 Vocabulary Test

The first Vocabulary Test, part of the ICPQ, was introduced in the QLSCD when the child was 29 months of age. Still too young to do the Peabody Picture Vocabulary Test[6] (PPVT), widely used in both Canadian and American longitudinal surveys, QLSCD researchers chose to modify an existing instrument, the MacArthur Communicative Development Inventories (Fenson et al., 1997), and adapt it to very young children. A list of 25 words was drawn up. This is given to the mother, who indicates whether her child can understand and say these words. The results of this original test conducted by proxy will be compared to those of the PPVT test administered to the children in subsequent rounds, so its predictive value can be determined.

2.2.3 Instruments Not Applicable in Certain Years

In Table 2.1, the code "not applicable" indicates that an instrument was not used that year for specific reasons. The QLSCD brochure and the souvenir folder are no longer being used, given that all the families received one in the first year and no new family has been recruited during the first phase of the study. If indeed the QLSCD continues on when the children are entering the school system, it will be necessary to produce new informative and motivational instruments of this type to clearly explain Phase II to the parents. As the results in Table 2.4 clearly indicate, one of the many lessons learned in the QLSCD is that both the recruitment and retention of families in a longitudinal survey are directly related to certain factors, such as the information they have at their disposal, frequency of communication, transparency in the survey process and predefined limits to their commitment of time.

The "not applicable" code assigned to the Sibling Questionnaire (1998 and 2000 rounds) is a reminder that the QLSCD only collects information on a brother or sister every two years.

The Vocabulary Test and Baby Diary were "not applicable" in certain years because they were or became inapplicable, given the age of the survey child. Just as it is inappropriate to measure the vocabulary of a 5-month-old or even a 17-month-old child, given unacquired abilities and the contents of existing tests, it would also be inappropriate to keep a journal of the behaviours of a 29-month-old child (to the nearest five minutes). The task would be too onerous for parents, irrespective of whether they work outside the home, have other children, etc.

5. Having decided to select only one representative of the siblings, characteristics of the other brothers and/or sisters are not available. Therefore, it is not because the selected brother or sister does not present a certain behaviour that no other sibling would display it. The decision was between gathering no information on siblings, collecting a small amount of information on all the siblings, or asking for information on just one sibling. We chose the last option. This will be further explained when data is published on the siblings.

6. A scale developed by Dunn and Dunn (1981) at the University of Hawaii.

2.2.4 Themes and Variables of the QLSCD Between 1998 and 2000

To gain a better understanding of the variety of themes covered by the various instruments, Table 2.2 provides a brief review of the acronyms, names of the main data collection instruments and their respondents.

Given the wide variety of variables measured related to the themes of the survey, Table 2.3 shows only an *APPROXIMATE NUMBER OF VARIABLES* to give a rough idea of the importance of each theme. Given this table provides only a cursory glance at range of a theme; an exhaustive list of the variables associated with each theme is presented in No. 12 of this volume.

By clearly identifying the instrument(s) related to a theme, the table below helps distinguish the responses furnished directly by the person concerned from those given by proxy. For example, if the variables come from the ICCQ, the person who best knows the target child (PMK) is the one who responded to the questions, whether they are about the child, a brother, sister or spouse/partner. However, if the father (or mother's spouse/partner) was present during the interview, it is also possible that he answered questions on himself (see the second to last section of Table 2.3 on the father of the target child – variables on health, lifestyle habits and sociodemographic data). Indeed, for questions in the ICCQ, other than the PMK, only the father (or mother's spouse/partner) could have answered certain questions that concern him, because the children (either the target child or sibling) were not surveyed by questionnaire during the three first years of the survey.

Table 2.2
Review of main data collection instruments by respondents, first three rounds of the QLSCD, Québec, 1998, 1999 and 2000

Acronym	Name of Instrument	Respondent
ICCQ[1]	Interviewer Completed Computerized Questionnaire	Person Who Best Knows the Child (Person Most Knowledgeable) (PMK, in 99% of cases the biological mother)
ICPQ[2]	Interviewer Completed Paper Questionnaire	Person Who Best Knows the Child (Person Most Knowledgeable) (PMK, in 99% of cases the biological mother)
BD	Baby Diary	Parents or anyone who provides ongoing basic care to the child
SAQM and SAQMABS	Self-Administered Questionnaire for the Mother (and non-resident biological mother)	Mother (and/or father's spouse/partner)
SAQF and SAQFABS	Self-Administered Questionnaire for the Father (and non-resident biological father)	Father (and/or mother's spouse/partner)
OFL	Observation of Family Life	Interviewer

1. In the 2nd round, the ICCQ included the Questionnaire on Siblings (see Table 2.1).
2. The ICCQ contained the Vocabulary Test in the 3rd round (see Table 2.1).

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

Table 2.3

List of themes and estimated number of variables measured in the QLSCD, by person concerned and instrument, Québec 1998, 1999 and 2000

Theme	Instrument	Estimated Number of Variables measured, by Round		
		1998 (5 months)	1999 (17 months)	2000 (29 months)
About the Survey Child				
Activities	ICCQ	3	3	31
Diet	ICPQ	42	34	30
Literacy	ICPQ	—	—	54
	ICCQ	3	10	7
Behaviours	Baby Diary	12	12	—
	ICPQ	—	6	—
	OFL	1	1	1
	ICCQ	—	63	54
	SAQF	—	25	20
Cognitive Development	IST	N/A	N/A	N/A
Motor Development and Socialization	ICCQ	26	27	3
Sociodemographic Data	ICCQ	7	2	3
Pregnancy	SAQM	—	1	—
Child Care	ICCQ	23	39	47
Family Environment	SAQM	32	26	17
	SAQF	32	26	17
Medical Information	Medical Report	50	—	—
	ICCQ	18	4	—
Health	ICCQ	20	26	28
	ICPQ	6	15	18
	SAQM	—	3	3
Sleep	SAQM	8	12	18
Temperament	ICCQ	10	11	—
	SAQF	11	11	—
Sibling of Target Child				
Literacy	ICCQ	...	8 to 10 varies by age	...
Behaviours	ICCQ	...	46 to 53 varies by age	...
Sociodemographic Data	ICCQ	...	14 to 16 varies by age	...
Family Environment	ICCQ	...	4 to 17 varies by age	...
Family Relations	ICCQ	...	7	...
Medical Informations	Medical Record	...	To be determined	...
	ICCQ	...	14	...
Health	ICCQ	...	30	...
Family Environment of Target Child				
Composition	ICCQ	24	25	25
Socioeconomic Conditions	SAQM	—	3	—
	ICPQ	5	—	4
	ICCQ	10	18	18
Sociodemographic Data	ICCQ	3	3	3
Physical Environment	ICCQ	11	7	3
	OFL	9	9	9
Social Environment	ICCQ	17	—	11

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Theme	Instrument	Estimated Number of Variables measured, by Round		
		1998 (5 months)	1999 (17 months)	2000 (29 months)
Family of Target Child and Conjugal Dynamics				
Family History	ICCQ	92	—	102
Conjugal Dynamics	SAQF	—	1	8
	SAQM	5	6	8
Parenting Practices	ICCQ	7	7	22
	SAQF	—	7	—
Family Dynamics	SAQF	—	7	—
	ICCQ	13	7	—
Social Support	ICCQ	—	4	4
	ICPQ	—	—	10
Mother of Target Child (or Father's New Spouse/Partner)				
Leisure Activities	SAQM	5	—	—
Behavioural History	SAQM	13	—	—
Family History	ICPQ	9	—	—
	SAQM	—	—	14
Behaviours During Interview	OFL	23	23	22
Sociodemographic Data	ICCQ	17	1 to 12 (12 if new family member)	3 to 13 (13 if new family member)
Pregnancies and Fecundity	SAQM	6	2	—
	Medical Report	To be determined	To be determined	—
Health and Lifestyle Habits	Medical Report	To be determined	To be determined	—
	ICCQ	24	25	30
	SAQM	—	26	3
Employment	ICCQ	17	20	21
	SAQM	—	5	8
Father of Target Child (or Mother's New Spouse/Partner)				
Leisure Activities	SAQF	5	—	—
Behavioural History	SAQF	12	—	—
Family History	ICPQ	9	—	—
	SAQF	—	—	14
Sociodemographic Data	ICCQ	17	1 to 12 (12 if new family member)	1 to 13 (13 if new family member)
Health and Lifestyle Habits	ICCQ	11	12	12
	SAQF	13	26	20
Employment	ICCQ	13	16	17
	SAQF	—	5	7
Absent Biological Parent (mother or father)				
Behavioural History	SAQM	8	—	—
Sociodemographic Conditions	SAQM	1	2	2
Sociodemographic Data	ICCQ	12	11	9
Family Environment	ICCQ	1	3	1
	SAQM	1	5	5
	SAQF	—	3	5
Health and Lifestyle Habits	SAQM	—	20	—

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

The above table provides only a brief glance at the variables. It is certainly hard to assess how themes may evolve over the years. However, by examining the number of variables, the recurrence of a theme in many instruments in the same year, and a theme's staying power through the various rounds, we note that "behaviours" stands out, and seems to be more or less at the heart of the QLSCD. Moreover, in the 2nd and 3rd rounds, the multiplication of sources of information and people documenting the behaviours

of the child, such as the parents in the Baby Diary, the mother and father individually in the ICCQ, ICPQ, SAQF and the interviewer in the OFL, suggests the predominance given this theme in recording the child's level of social adjustment. Yet the table does not show if the contents of certain questions or variables change as the child ages. To examine this in depth, the questionnaires themselves should be seen. Indeed, to obtain further details on the 1,300 variables generated annually by the QLSCD, it is suggested that No. 12 in this volume be read after this paper.[7] It will help shed light on themes based on evolving variables, on variables and questions which remain identical from year to year, and on those which were withdrawn.

2.3 Data Collection and Annual Cooperation of the Parents

In the first three years of the QLSCD, annual data collection took place between March and December, with a break during the summer between June and September.[8] The six collection waves of four weeks each were mutually exclusive. Each July a mid-year databank was made. The final databank of annual data was available six months after all the data had been collected in the year. This databank was then subjected to an exhaustive validation process, including cross-sectional or longitudinal weighting conducted by the *Direction de la méthodologie et des enquêtes spéciales*, and annual validation of nearly 100 derived variables by the *Direction Santé Québec* in collaboration with QLSCD researchers. To illustrate the production cycle of these databanks, the 2000 round is a good example. The survey began in March 2000 and the first half of data collection finished in early June. A month later in July, the data were made available to researchers and authors. The second half of data collection was conducted between September and December 2000, and as of July 2001, namely six months following completion of the round, the final data bank with weights and derived variables was available for analyses. Certain aspects of the weighting process are presented in Part II of this paper.

In terms of the logistics of data collection, the *Direction Santé Québec* uses the term "cooperation level" of the parents.[9] This new term should help prevent confusion with terminology that certain readers may apply to essentially cross-sectional surveys, such as participation rates. Given that, to the best of our knowledge, there is no history of specific terminology in the field of longitudinal studies for describing the participation of respondents, the QLSCD has adopted its own nomenclature for covering this aspect, which is often neglected in the official documentation of studies. While annual cooperation levels[10] serve to qualify the participation of the families and the efficacy of data collection, essential to any survey, annual and longitudinal response rates provide a certain measure of data quality.[11]

To calculate the cooperation level of the parents, not only refusals were taken into account, but also the reachability a family. When it was impossible to contact a family or the *Direction Santé Québec* gave a directive to cease the longitudinal study of a child (and family), this meant exclusion from the calculation of cooperation because there was no question of participation in these cases. Cooperation in the QLSCD[12] implies that it must have been possible to participate, which is not the case for families who could not be reached or children and families who were excluded from the survey in light of its stated objectives (Table 2.4). This also applies to the annual cooperation levels of a given instrument.

7. The questionnaires of the QLSCD 1998-2002 are posted on the ISQ website at **http://www.stat.gouv.qc.ca**.

8. The sample of children in the QLSCD was designed to take into account the fact that every year there is no data collection between mid-June and the end of August, nor between the beginning of December and the end of February. Therefore all the survey children attain the age targeted by the survey during the months when data is collected (Jetté and Des Groseilliers, 2000).

9. Although in Volume 1, participation rates were distinguished from statistical response rates, in future the notion of cooperation will be used to describe parents' participation in the QLSCD.

10. Since using cooperation levels presents certain challenges which remain to be met, Volume 3 will publish them for the first five rounds of the QLSCD.

11. These are the result of applying a certain number of mathematical and statistical parameters, and are the foundation of statistical operations such as the calculation of weights to infer the results to the population.

12. Cooperation is calculated by dividing the number of children/families who participated (in the annual survey or longitudinally) by the number of families that **could be reached**.

Table 2.4

Annual samples and cooperation levels of children and their families, Québec, 1998, 1999 and 2000[1]

	Round 1998		Round 1999		Round 2000	
	Target children		Target children		Target children	
	n	%	n	%	n	%
Initial Sample	2,940	100.0	**2,120**	100.0	**2,101**	100.0
Familes Not Found	172	5.9	9	0.4	5	0.2
Familes Excluded	93	3.2	10	0.5	8	0.4
Reachable Families	2,675	90.1	**2,101**	99.1	2,088	99.3
Unreachable Families	14	0.5	0	0	1	0.05
Prolonged Absences	...	...	...	0	2	0.1
Families Who Refused	438	16.4	56	2.6	44	2.1
Refusals from the Previous Year	...	...	...	...	44	2.1
Total refusals + unreachables + absences	452	16.9	56	2.6	91	4.4
Cooperation	2,223	83.1	...	...	...	...
Parficipating Families Withdrawn from the Longitudinal Survey (Ice Storm 1998)	103	...	...	...	...	...
Annual Cooperation	**2,120**	83.1	2,045	97.4	1,997	95.6
Cooperation of Families Who Refused in the 2nd Round	...	...	...	...	12	21.4
Cooperation of Families Who Accepted in the 2nd Round	...	...	...	...	1,985	97.1

1. Data unweighted.

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

As seen in Table 2.4, cooperation in the first round was 83% for a total of 2,120 children/families, after children who were withdrawn from the longitudinal follow-up were excluded.[13] Only the 2,120 families who participated in the initial data collection could be studied longitudinally. By establishing this constraint, the study's researchers ensured an identical starting line for all the children. In addition, for a prospective longitudinal study in which aspects of early childhood are of monumental importance, having initial measurements in real time, not obtained retrospectively, was judged to be paramount.

Though the infant and the family had to have participated in the first round of the survey to participate in the second (1999), the situation changed in 2000, in that it was no longer requisite to have participated in the preceeding round to be in the longitudinal study. This is why the sample of 2,101 children/families in 2000 (Table 2.4) came from those identified as being reachable in the 1999 round. The result of this methodological decision was that the sample of families eligible for 2000 (2,101) was larger than that of families who were respondents in 1999 (2,045), since it comprised an additional 56 (2.6%) who had refused the first time to participate in the longitudinal study in 1999.[14] It is clear to the *Direction Santé Québec* that the annual cooperation level expected for this particular sub-sample will be vastly lower than that expected for the rest of the sample. Table 2.4 shows that annual cooperation obtained in the 2000 round among families who first refused in 1999 was approximately 21%, whereas that of the families having accepted to participate in the first and second rounds was 97.1% in the third, virtually identical to that in 1999 (97.4%). Therefore, though we must conclude that cooperation in 2000 (95.6%) was 1.8% lower than that in 1999, it should

13. Because of the ice storm which hit Québec in January 1998, the first year of the QLSCD, the researchers and *Direction Santé Québec* decided to increase the sample to verify the impact of this natural disaster on children. Following numerous verifications, it was concluded that the ice storm did not seem to have affected the children in the cohort. Therefore, the "ice storm" over-sample, comprising 123 families of which 103 were respondents, was withdrawn from the longitudinal study.

14. This decision was based on the principle that during a longitudinal study, a certain number of families and their children may temporarily refuse to participate without wanting to be excluded permanently. In the 1999 round, some families (approximately 30%, data not shown) refused to participate for reasons which led us to believe they would participate again. Some examples were: a mother, who had given birth in 1997 or 1998, then gave birth to twins; in one family, the mother died; a mother justified her refusal by describing she was living through a difficult period in her relationship; another mother's spouse was very sick. Confirming our intuition about re-enrolling, 20% of these refusals (and not 30% as had been previously estimated) returned to the study in the 2000 round. It will be interesting to see if in the balance of the survey the families who withdrew in a given year present a higher risk of abandoning the study or participating in it in erratic fashion.

be kept in mind that this percentage is based on a larger number of participating families (1,997) than that obtained if there had been no attempt at recuperation (1,985). Maintaining cooperation over the years is vital to any longitudinal study.

Before going further, let us briefly focus on the annual attrition rate discussed briefly in 2.2 and 2.2.3. "Annual attrition" refers to the number of children/families who no longer participate. As seen in Table 2.4, there are a number of ways in which the survey has lost the participation of a family.

"Families not found" were those for whom the address and/or telephone numbers are incorrect (<1% in both 1999 and 2000). The tiny percentage of families who in a given year leave no trace of their whereabouts bears witness to the efficacy of the annual follow-up instruments, the importance of maintaining regular biannual contact with the parents, and the effectiveness of reminders for the families to indicate any change in address.

In general, "excluded families" were those who neither speak nor understand French or English, are permanently leaving Québec, or whose child is deceased (in all, <1% for both 1999 and 2000).[15] No longitudinal monitoring protocol can mitigate the occurrence of these types of situations.

"Unreachable families" and "prolonged absences" obviously impede the conducting of the annual interview. These were practically non-existent in the QLSCD.

Finally, there were some families who refused to participate in a given year (2.6% in 1999 and 2.1% in 2000).

It is important to indicate that the extremely low number of families designated "not found," "unreachable" or "refusal" is in part attributable to the very nature of the survey and the sample. A focus on childhood leads to better family retention, many families seem not to move very often, the instruments are adapted to the sample, etc. Another very important element in the stability of the sample in this longitudinal study should be highlighted. Though by no means their only strong point, far from it, the excellent work of the survey firm in meeting with the families every year has been a crucial factor in the success of maintaining family loyalty to the project. The annual solicitation of families, the ingenuity used in tracking families down even when they have omitted notifying us of change of address, the respect which characterizes their interviewer-respondent relations – all these have considerably reduced the annual attrition rate. Indeed, from the very beginning, the researchers, *Direction Santé Québec* and the survey firm have been following very strict guidelines with two key components: 1) respecting the right of a respondent to completely or temporarily withdraw from the QLSCD at any time, and 2) never being in the position of possibly overwhelming or harming an infant or family. Conducting a *LONGITUDINAL* survey of families over many years means accepting the responsibility of entering and exiting their lives, and even withdrawing totally from them, when situations warrant or the respondents request it. If the notion of respect for respondents is at the heart of any longitudinal study, it acquires added importance in a survey in which the sample is composed of very young children (5 months to 4 years of age) whose parents speak for them, and data collection is repeated every year in the same families.

We conclude this section on the cooperation of families by briefly describing sub-group participation. Since the beginning of data collection, annual cooperation of the mothers has remained exceptionally high (more than 96%, data not shown). There were two distinct levels of cooperation among the fathers, one for those who resided at the same address as the child,[16] and one for absent fathers, namely those known not to reside at the same address.[17] Since the first round in 1998, resident fathers' cooperation has remained high, consistently above 90%. The year-after-year percentages justify the original decision to interview Québec fathers and treat them as accessible contributors of information about their children, freeing family history from the sole purview of mother and child. The significant

15. While 87% of families excluded in 1998 were done so because of a language problem, understanding neither French nor English, almost all of those excluded later in the 1999 and 2000 rounds were done so because they were permanently leaving Québec.

16. Whether he was the biological father of the child or the new spouse/partner of the mother, he was asked to complete the SAQF (see section 2.2.4 and Tables 2.2 and 2.3).

17. This sample uniquely comprises biological fathers permanently living at another address. They are annually solicited to fill out the SAQFABS (see sub-section 2.2.4 and Tables 2.2 and 2.3).

increase in non-resident fathers' (44% in 1998 to 52% in 1999, to 59% in 2000) has encouraged the QLSCD team to continue to approach this key person in the family, which is rarely done in large-scale surveys in Québec or elsewhere (Desrosiers *et al.*, 2001).

2.4 Data Processing

We conclude this first part of the paper with an overview of the main stages that punctuate the validation process of the annual and longitudinal data. The validation process has remained essentially unchanged since the one used with the first data bank, and has been described in rather exhaustive fashion in Jetté and Des Groseilliers (2000), and more recently in Desrosiers *et al.* (2001).

Put simply, all codes are validated to eliminate ineligible or aberrant values. Second, the data are examined for consistency and logic through cross-validation. Third, inter-instrument validation is conducted to eliminate errors of inconsistency that could have slipped in at any time during the course of an interview. Fourth, derived variables are created to validate discrete and continuous ones through frequency distributions or graphs. In addition to this rather heavy annual validation process, basic longitudinal validation began after the second round in 1999. Data are studied in terms of the values they assumed longitudinally. For example, education cannot be regressive, nor can a child's height. A person cannot indicate marital status as single if married was previously indicated, etc. With rare exceptions, *Direction Santé Québec* does not do reverse validation or value imputation. Therefore, in a given year, a datum appearing anomalous will either be kept or designated as a missing value.

This concludes the first part of this paper on the progress of the QLSCD. The second part will describe this first Québec cohort from a statistical perspective. New aspects will be discussed and others revisited to review techniques which have long been the object of consensus. However it is important to reiterate that all the methodological decisions made in conducting the QLSCD, and the statistical methods used to test, indeed, improve the quality of the data, represent for *Direction Santé Québec* the alpha and omega of any large-scale survey in that they are as indispensable as they are complementary.

Survey Description and Methodology

Part II

Statistical Methodology – Longitudinal Aspects of the First Three Rounds, 1998 to 2000

1. Results of Data Collection

In this second part of Volume 2 Number 1, the *Direction de la méthodologie et des enquêtes spéciales* of the ISQ presents major aspects of the statistical methods used in the first three rounds of the QLSCD from a longitudinal perspective, complementing those covered in Volume 1 Number 1. First the response rates of the data collections and instruments are discussed, and second, the measures taken to reduce potential biases induced by non-response.

1.1 Longitudinal Study Begun in 1998

The initial sample of the 1998 round comprise 2,940 infants approximately 5 months of age, of which 2,223 were respondents. This included an oversample of 123 infants residing in the Montérégie region of Québec, which was seriously affected by a devastating ice strom in January 1998. This oversample was abandoned and not included in the longitudinal survey. Therefore, in the pages that follow, the 1998 initial sample refers to 2,817 families (2,940 minus 123). Although the sampling unit was the target child, we will also use "respondent family" to designate the family in which he/she was living.

Table 1.1 summarizes the response rates to the ICCQ in the first three rounds, 1998, 1999 and 2000. As indicated in the table, of the 2,817 families in the 1998 initial sample, 2,120 were respondents. Only these 2,120 were considered for the longitudinal study and solicitated for subsequent rounds. The 697 families who did not participate in the 1998 round were excluded from the longidutinal study. The data collected at the age of 5 months were in fact essential for any longitudinal analyses.

Families who did not participate in 1998 comprised mostly people who refused, could not participate for various reasons, or were unreachable. These 689 families were considered non-respondents. There were also eight families who did not fulfill the criteria of the target population (baby physically handicapped, a twin, or had died) and were therefore ineligible. In contrast, the 689 non-respondent families were eligible for the survey. Though they were not studied longitudinally, they formed part of the population on which inferences can be made based on data provided by respondent families. Families who could not be reached could have permanently moved out of Québec, and would therefore not be part of the target population. Information on permanent moves being unavaiable, counting these as non-respondents results in a slight underestimate of response rates.

Table 1.1
Results of data collection in the first three rounds by response to the ICCQ, Québec, 1998, 1999 and 2000

Initial sample in 1998 (excluding the oversample)	**2,817**
Units ineligible for the 1998 round	8
Non-respondent units in the 1998 round	689
Respondent units in the 1998 round (solicited for the 1999 and 2000 rounsd)	**2,120**
Units ineligible for the 2000 round (i.e. ineligible for 1999 or 2000)	19
Units eligible for the 2000 round (among 1998 respondents)	**2,101**
Non-respondent units in the 1999 or 2000 rounds (among 1998 respondents)	116
Respondent units 1998 to 2000 (units for longitudinal analysis)	1,985

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

The size of the target population is decreasing over time mainly because some families permanently leave Québec during the course of the survey. Moreover, since it was decided not to include children in families who arrived in Québec after July 1998 in the target population, the size of the population to which inferences can be made is shrinking. The same applies to the eligible sample, composed of both respondents and eligible non-respondents. It will shrink as children become ineligible over the course of the survey.

1.2 Eligibility for the 2000 Survey Round

Among the 2,120 respondent families in 1998, 135 did not participate in 1999 or 2000. Of these, 18 families had moved out of Québec, and from information gathered during data collection, this was on a permanent basis. There were also 13 families who could not be found, and one whose child had died. The rest refused to participate or were not in a position to do so.

The 18 families who left Québec are no longer part of the target population and inferences can no longer be made on them. In a number of cases, they permanently left Québec to return to their country of origin. Their characteristics differed more than those of respondents compared to other non-respondents. They tended to live in the greater Montreal region or Laval, comprise immigrant parents, and have income levels below the low-income cutoff. They were considered ineligible for the 2000 round, and are therefore ineligible for inferences based on longitudinal data from the first three rounds. The population upon which longitudinal inferences can be made is composed of children (singleton births) born to mothers living in Québec between October 1997 and July 1998, who continued to live in the province to the age of 29 months, or who had left the province only temporarily. The family whose child died was considered ineligible for the survey because analyses cover only those children who were still living during the 2000 round.

Families who were unreachable, refused to respond or were not in a position to do so were all considered eligible for the survey. Although it was clear that among unreachable families, some could have permanently moved out of Québec, their numbers were too small to be taken into account, particularly in calculating response rates and weights. Therefore, the sample of eligible families in the 2000 round comprised 2,790 units, of which 2,101 had been respondents in the 1998 round.

1.2.1 Response Rates

Table 1.2 presents the number of respondents to the various instruments or sections of instruments in the survey. The questionnaires completed by the interviewer, ICCQ or ICPQ, had to have been completed prior to the parents filling out the SAQM, SAQF, SAQFABS or SAQMABS. The number of respondents to the SAQM is a sub-total of mothers (or father's spouses/partners) living in families who were respondents to the ICCQ. Similarly, fathers (or mother's spouses/partners) who were solicited for the SAQF were those living in families who were respondents to the ICCQ. Non-resident biological fathers of a target child in a respondent family were asked to fill out the SAQFABS if they had been in contact with the child at least once a month. The same applied to non-resident biological mothers for the SAQMABS instrument.

In a similar vein, only children in families who responded to the ICCQ were solicited to do the Imitation Sorting Task (IST), used as a measure of cognitive development. Among these, with the exception of those who refused to participate, a certain number were considered non-respondents. These were children who were asleep, sick or tired, whether they had begun the task or not, or whose mother had intervened during its administration. Children who had not tried the first components of the task, even if they had done the ones which normally follow these, were also considered non-respondents. Otherwise, children who had begun the task but not all of its components were considered respondents. The missing data for these were processed as partial non-response. The idea of treating these children as respondents was related to the fact that they seemed to present success rates which were lower than those who had done all the suggested components of the task. The hypothesis is that they tended not to do all the components because they had difficulty in accomplishing them. Since these children had characteristics not independant of the task being measured, they could not be considered non-respondents and still have inferences made to the target population from them as respondents. Finally, the few children whose files were lost were considered non-respondents.

From a longitudinal point of view, only the 1999 and 2000 rounds were studied for the IST. Therefore, longitudinal respondents to this instrument are defined as children who responded to the IST in 1999 and 2000, from among those whose families responded to the ICCQ. The partial non-response rate for the 1999 and 2000 analyses was 6.9%. This non-response is non negligible. It has to be taken into

account in the interpretation of the IST results (see number 8 of this volume).

The 1,985 respondents to the three rounds (1998-2000) were the basic unit used for longitudinal analyses comprising only variables from the ICCQ and ICPQ instruments. Among the 1,997 respondents in the 2000 round, only 12 families (1,997 minus 1,985) had not participated in the 1999 round.

Table 1.2
Number of respondents per instrument or section of instrument, Québec, 1998, 1999 and 2000

	Round 1998 (5 months)	Round 1999 (17 months)	Round 2000 (29 months)	1998 to 2000 Rounds[1]
			n	
ICCQ or ICPQ	2,120	2,045	1,997	1,985
ICCQ (MOTHER section)[2]	2,119	2,042	1,990	1,977
ICCQ (FATHER section) [3]	1,949	1,855	1,773	1,694
ICCQ (SIBLING section)[4]	...	1,196	...	...
SAQM	2,051	1,966	1,934	1,839
SAQF[5]	1,775	1,673	1,616	1,431
SAQFABS[6]	44	69	91	...
SAQMABS[7]	0	4	4	...
IST[8]	...	1,934	1,883	1,795

1. Number of respondents in the three rounds.
2. The number of respondents equals the number of resident mothers (or fathers' spouses/partners) among respondents to the ICCQ.
3. The number of respondents equals the number of resident fathers (or mothers' spouses/partners) among respondents to the ICCQ.
4. The number of respondents equals the number of children with eligible siblings.
5. The SAQF is for fathers (or mother's spouses/partners) who live in the household.
6. The SAQFABS is for biological fathers not living in the household but who maintain contact with the target child at least once a month.
7. The SAQMABS is for biological mothers not living in the household.
8. In this volume, the study of cognitive development is based on data from only the 1999 and 2000 rounds. Data from 1998 are therefore not shown. The 1,795 longitudinal respondents here are those who responded to the ISQ in 1999 and 2000 among respondents to the ICCQ in 2000.

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

Table 1.3 shows the weighted cross-sectional and longitudinal response rates of the ICCQ and ICPQ. The cross-sectional response rates are based on the response in a given round, whereas the longitudinal rates refer to families who responded in the three rounds. In the rest of this section, ICCQ will be used as a single term to designate both the ICCQ and ICPQ instruments.

In the QLSCD, since respondent families represent a variable number of families in the target population – varying probability of selection of babies, response rates vary according to socioeconomic characteristics, etc. – the response rates should be based on weighted data. These rates can therefore be comparable to any weighted response rate of a survey on the same population, independent of the distribution of the sample. Hence, all rates presented in this section are weighted.

Table 1.3 shows that a large majority of respondent families in 1998 continued to participate in the survey through 2000. The weighted proportion of non-respondents in the 1999 round, among those in the 1998 round who were still eligible in 1999, was 3.5% (100% minus 96.5%). This rose to 5.8% (100% minus 94.2%) in 2000, among 1998 respondents who were still eligible for the 2000 round. The cross-sectional response rate in 2000 was approximately equal to the longitudinal response rate. This was due to the fact that only 12 families who responded in 2000 had not participated in the 1999 round.

Table 1.4 shows the weighted cross-sectional and longitudinal response rates for the SAQM, SAQF and IST. Among the families who responded to the ICCQ, there were proportionately more respondents to the SAQM than to the SAQF. For both instruments, this proportion varied little from one round to the next. However, the group of non-respondent families was not the same from one round to the next, which explains why the longitudinal proportion of respondents were lower than the cross-sectional ones.

Table 1.3
Weighted cross-sectional and longitudinal response rates to the ICCQ or ICPQ[1], Québec, 1998, 1999, and 2000

	%
Round 1998 (5 months)	
Weighted cross-sectional response rate	**75.3**
Round 1999 (17 months)	
Weighted proportion of 1999 respondents among 1998 respondents eligible for the 1999 round	96.5
Weighted cross-sectional response rate	**72.7**
Round 2000 (29 months)	
Weighted proportion of 2000 respondents among 1998 respondents eligible for the 2000 round	94.2
Weighted cross-sectional response rate	**70.9**
1998 to 2000 Rounds	
Weighted proportion of 2000 respondents among 1998 respondents eligible for the 2000 round	93.7
Weighted longitudinal response rate	**70.5**

1. The cross-sectinal response rate of the 1998 round is the ratio of the weighted sum of responding families to the weighted sum of all families eligible for the 1998 sample. For the 1999 round, first the proportion of respondents among families who responded in 1998 and were eligible for the 1999 round was calculated. Then the response rate for the ICCQ in 1999 was calculated as the product of the response rate of 1998 and the proportion of respondents in 1999. Exactly the same procedure was used for the 2000 round, with the same reference year of 1998. Finally, longitudinal response was calculated as the product of the 1998 response rate and the proportion of families who responded in all three rounds among those who responded in 1998 and were still eligible in 2000. The weights used for a response rate were those used to adjust for non-response. This is covered in the section on weighting the families who responded to various instruments.

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

Table 1.4

Weighted cross-sectional and longitudinal response rates to the SAQM, SAQF[1] and IST, Québec, 1998, 1999 and 2000

	Round 1998 (5 months)	Round 1999 (17 months)	Round 2000 (29 months)	1998 to 2000 Rounds
			%	
ICCQ				
Weighted response rate	**75.3**	**72.7**	**70.9**	**70.5**
SAQM				
Weighted proportion of respondents among ICCQ responding families with resident mother (or father's spouse/partner)	96.5	95.7	96.5	91.8
Weighted response rate	**72.7**	**69.6**	**68.4**	**64.7**
SAQF				
Weighted proportion of respondents among ICCQ responding families with resident father (or mother's spouse/partner)	90.1	88.9	90.3	83.2
Weighted response rate	**67.8**	**64.6**	**64.0**	**58.7**
IST				
Weighted proportion of respondents among ICCQ responding families	...	93.7	93.8	89.2[2]
Weighted response rate	....	**68.1**	**66.5**	**62.9**

1. In a given round, the SAQM response rate is the product of the ICCQ response rate and the proportion of SAQM respondents among residing mothers (or fathers' spouses/partners) in families who responded to the ICCQ. The longitudinal response rate for the SAQM is the product of the ICCQ longitudinal response rate and the proportion of SAQM respondents among residing mothers (or fathers' spouses/partners) in the three rounds among families who responded to the ICCQ in the three rounds. The same applies to the cross-sectional and longitudinal response rates for the SAQF. This method of calculating response rates is directly related to adjusting the weights for non-response.
2. This is the proporition of children who participated in the IST in 1999 and 2000, irrespective of their participation in it in 1998, among families who responded to the ICCQ.

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

2. Longitudinal Weighting

In order to make inferences from the sample data to the target population, each respondent family must be given a weight. The weight is the number of children a given respondent represents in the target population of the survey. Analyses of the 1998 data published in Volume 1 were conducted with weights based on the infant's probability of selection for the sample. The weights were adjusted to compensate for non-response and were subjected to poststratification.

The longitudinal analysis of data from the first three rounds also required appropriate weighting. Since only respondents in the 1998 round were eligible for longitudinal study, the longitudinal weights were based on the weighting of the ICCQ calculated for 1998.

First, the longitudinal weighting of ICCQ respondents in 1998 had to be adjusted for ICCQ non-response in 1999 or 2000. This step provided weights that can be used for longitudinal analyses of data from the ICCQ.

For analyses of variables from the SAQM or SAQF, an additional adjustment of the ICCQ weights was required to compensate for the overall longitudinal non-response to these two instruments. In the 1998 round it was decided not to adjust the weights for the SAQM given the very low rate of non-response for this instrument. Since non-respondents to the SAQM were not necessarily the same from one round to the next, its longitudinal non-response was higher only than the 1998 round (8% v. 3.5% among respondents to the ICCQ). For the SAQF, it was also necessary to adjust the longitudinal weights of the ICCQ, as it was for the 1998 round. The longitudinal non-response to this instrument was higher than that observed in the 1998 round (17% v. 10% among respondents to the ICCQ).

For the Imitation Sorting Task (IST), the longitudinal weights of the ICCQ also had to be adjusted to compensate for non-respondent children in 1999 or 2000. These adjusted weights allowed for longitudinal analysis of IST data for these two rounds.

2.1 Weighting of Families who Responded to the ICCQ

The *Division de la méthodologie et des enquêtes spéciales* adjusted the initial weights of the 1998 ICCQ to compensate for longitudinal non-response to this instrument in the 1999 and 2000 rounds. This meant adjusting the 1998 ICCQ weights for non-response that occurred in 1999 and 2000, among families who responded in 1998 and were still eligible for the survey in 2000. This adjustment was necessary because respondent families in the three rounds presented characteristics different from those of non-respondent families. Adjusting the weights of the 1998 round helped minimize the risk of bias due to non-response in the estimates being produced. However, adjusting the weights does not guarantee the elimination of all bias in the estimates.

Among the 2,101 families who responded to the ICCQ in the 1998 round, 1,985 responded in the 1999 and 2000 rounds, for a longitudinal proportion of respondents of 94%[1] (Table 1.3). Non-response in the latter two rounds was taken as a whole in adjusting the initial weights. This means that adjusting the weights for non-response was done in a single step. An alternative procedure would have been to adjust the weights for non-response only in 1999, then adjust in a second step for non-response in 2000. However, the single-step approach taken had the advantage of using only one model, resulting in more stability in the adjustments. Because additional adjustments had to be done for non-response to the SAQM and SAQF, this seemed to be preferable. Since few respondents were lost after the 1998 round, the results should be quite similar. The approach taken presupposes that the mechanism of non-response was similar in the 1999 and 2000 rounds.

1. Adjusting the weights for non-response in 1999 and 2000 was done on the 1,997 families who responded in 2000, not only the 1,985 who responded longitudinally. This approach was taken because it was felt that including these 12 families who did not respond in 1999 would have a negligible impact on adjusting the weights. Therefore the longitudinal weighting would also apply to cross-sectional analyses based on data from the 1,997 respondents in 2000.

The approach involved the creation of adjustment classes. As in 1998, segmentation modeling based on the CHAID (Chi-Square Automatic Interaction Detection) algorithm (Kass, 1980) was used. Adjusting the weight of a given family consisted of dividing its initial ICCQ weight for 1998 by the response rate observed in the class to which it belonged. Longitudinal weights computed this way should be used in analyzing ICCQ variables in the three rounds. The weighted estimations allow for inferences to be made to the whole target population. These variables and a brief description of the classes are presented in Annex 1.

2.2 Weighting of Families Who Responded to the SAQM

The weights of longitudinal respondents to the ICCQ were adjusted to compensate for longitudinal non-response to the SAQM among families with resident mothers (or fathers' spouses/partners) who responded to the ICCQ in the three rounds. Respondent mothers presented characteristics which differed from those of non-respondents.

Among the 1,985 longitudinal respondents to the ICCQ, 1,977 had mothers (or fathers' spouse/partner) living in the household. Of these, 1,839 responded to the SAQM in the three rounds, for a longitudinal proportion of respondents of 92% (Table 1.4). Similar to the longitudinal weighting done for the ICCQ, adjustment classes were used to compensate for non-response to the SAQM. The results are described in Annex 1.

The longitudinal weights of respondents to the SAQM should be used in analyses of variables from this instrument in the three rounds (alone or with those from the ICCQ). These weighted estimations allow inferences to be made on all the children living with their mother (or father's spouse/partner) in each of the three rounds, irrespective of whether this was the same person over the three years. The population on which inferences can be made based on this weighting represents more than 99% of the total target population of the survey.[2]

2.3 Weighting of Families Who Responded to the SAQF

Adjusting the longitudinal weights of the ICCQ to compensate for longitudinal non-response to the SAQF was done in the same fashion as that for the SAQM. Of the 1,694 fathers (or mothers' spouses/partners) living in families who responded to the ICCQ, 1,431 responded to the SAQF in the three rounds, giving a proportion of respondents of 83% (Table 1.4). The longitudinal weights of respondent fathers should be used in analyses of SAQF variables over the three rounds (alone or with those from the ICCQ). These weighted estimations allow inferences to be made on all the children living with their father (or mother's spouse/partner) in the three rounds, irrespective of whether this was the same person over the three years. The population to which inferences can be made based on this weighting represents 85% of the total target population of the survey.[3] The results of this model are shown in Annex 1.

2.4 Weighting of Children Who Responded to the IST

The longitudinal weights of the ICCQ were adjusted to compensate for non-response to the Imitation Sorting Task in the 1999 or 2000 rounds among families who had responded to the ICCQ in the three rounds, namely the same sub-group of families who responded to the ICCQ in 1999 and 2000. Among the 1,985 longitudinal respondents to the ICCQ, 1,795 children responded to the IST in 1999 and 2000, giving a proportion of respondents of 89% (Table 1.4). Once again, weight adjustment classes were used to compensate for non-response. The results are described in Annex 1. Longitudinal weights of the respondents to the IST in the 1999 and 2000 rounds should be used in analyzing data from the IST in these two rounds to allow inferences to be made to the population of children targeted by this study.

2. The remaining portion of the total target population (<1%) was composed of children whose mother (or father's spouse/partner) was not residing in the household in at least one of the three rounds. The population to which inferences can be made from the longitudinal weighting of the SAQM is therefore very close to the target population of the survey.

3. In contrast to the SAQM, the population to which inferences can be made from the longitudinal weighting of the SAQF may be very different from the total target population of the survey. Compared to the former, the latter includes 15% of children whose father (or mother's spouse/partner) was not residing in the household during at least one of the three rounds.

2.5 Analysis of the Problem of Absent Biological Fathers

The weighting of respondent families to the SAQF allows for making inferences to children whose father (or mother's spouse/partner) was living in the household during the three rounds. However, some biological fathers who did not reside in the household maintained contact at least once a month with the child. With the mother as intermediary, these fathers were asked to fill out the SAQFABS in each round during which they were not living in the household. The object was to see if the data collected on these fathers could be used to make inferences to absent biological fathers during one of these rounds. However, a major problem is the fact their response rate was very low. An analysis of this problem conducted by the *Division de la méthodologie et des enquêtes spéciales* is presented in Annex 2.

3. Partial Non-Response

Appropriate weighting helped minimize total non-response to the major instruments of the survey. However, in a given instrument, there could be partial non-response to one or more questions. Consequently, analyses of one or more variables with partial non-response could result in a bias, similar to that for overall non-response. In cases where non-response is greater than negligible (defined as above 5%), it is recommended to compare characteristics of respondents to those of partial non-respondents to test where a bias, if any, may be, and include these characteristics in the analyses, or nuance the results according to the bias(es) identified.

The *Division de la méthodologie et des enquêtes spéciales* examined partial non-response in the QLSCD from a longitudinal approach among respondents in the three rounds for the instrument in question and linking them to available sociodemographic characteristics. Annex 3 presents the questions in each of the three main instruments, ICCQ, SAQM, and SAQF (1998-2000), which had a partial non-response rate higher than 5%, and the characteristics related to them.

In all instruments and rounds, few questions had a partial non-response rate higher than 5%. However, non-response was particularly high for the question on the perception of the father (or mother's spouse/partner) of the degree of happiness in the couple (12% in 1999 and 22% in 2000). In 1999, partial non-response to this question was higher among unemployed fathers. In 2000, non-response did not seem to be associated with socioeconomic characteristics of the father or family. Given the high partial non-response rate observed, a more thorough analysis was conducted. This showed that non-response seemed to increase with the level of happiness reported by the mother. In other words, fathers whose spouses declared they were very happy with the couple's relationship tended to respond less frequently to this question. It should be emphasized that when estimations are based on several variables presenting partial non-response, they could be subject to a higher degree of bias.

4. Precision of the Estimates

All surveys contain sampling errors. This is related to the fact that only a part of a study population is being surveyed. A sampling error is defined as the difference between the estimate drawn from a sample and the result if the whole population had been individually polled under the same conditions. The coefficient of variation (CV) and confidence interval provide two means of estimating the precision of an estimation, thereby evaluating the size of the sampling error.

The coefficient of variation is a relative measure that quantifies the precision of an estimate, and is defined as follows:

$$CV = \frac{\sqrt{\text{variance of estimate}}}{\text{estimate}}$$

This measurement facilitates interpreting the precision of an estimate. The higher the CV, the less precise the estimate, and vice-versa. Prudence is required in using estimates with a CV higher than 15%. Estimates with a CV higher than 25% are subject to immense variability and should be used for information purposes only. The CV also provides a means of comparing the precision of various estimates to each other.

For a confidence level of 95%, the confidence interval (CI) for a given parameter can be defined as follows:

$$CI = \text{estimate} \pm 1.96\sqrt{\text{variance of the estimate}}$$

This interval illustrates the range of possible values a parameter can have in the population. This means that if the survey was repeated a number of times, 19 intervals out of 20 would contain the real value of the parameter. The definition of this interval is based on a normal distribution. However, the approximation is no longer valid in cases of small proportions (Cohran, 1997). For estimates of small proportions, an approximation based on binomial distribution is suggested (Korn and Graubard, 1998).

Table 4.1 shows the precision of some proportions used to make population inferences for analyses based on the sample of 1,985 families who responded to the survey in the three rounds.

The efficiency of a survey's sample design can be evaluated *a posteriori*. This is done by comparing the results in terms of statistical precision with those that would have been obtained from a simple random sample. The comparison is conducted using a design effect. The mean design effect for a proportion based on the sample of longitudinal respondents in the QLSCD is estimated to be 1.3. Therefore, for the first three years of the survey, the estimate of the variance of a proportion was approximately 30% greater than that of a simple random sample.

Table 4.1
Precision of proportions (inferable to the population) in the sample of 1,985 longitudinal respondents, Québec, 1998, 1999 and 2000

Estimate	Coefficient of variation	95% Confidence Interval	Approximation Used
	%		
1.0	25.5	[0.6 ; 1.6]	Binomial
2.0	17.9	[1.4 ; 2.8]	Binomial
2.5	16.0	[1.8 ; 3.4]	Binomial
3.0	14.6	[2.2 ; 4.0]	Binomial
4.0	12.5	[3.1 ; 5.1]	Binomial
5.0	11.2	[3.9 ; 6.1]	Normal
10.0	7.7	[8.5 ; 11.5]	Normal
15.0	6.1	[13.2 ; 16.8]	Normal
20.0	5.1	[18.0 ; 22.0]	Normal
30.0	3.9	[27.7 ; 32.3]	Normal
50.0	2.6	[47.5 ; 52.5]	Normal
70.0	1.7	[67.7 ; 72.3]	Normal
80.0	1.3	[78.0 ; 82.0]	Normal
95.0	0.6	[93.9 ; 96.1]	Normal

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

5. Statistical Analyses

Various types of analyses are presented in this volume. The cross-sectional ones describe a phenomenon at a given age, such as estimates of prevalence and latent classes (see No. 8). Most analyses are longitudinal, and in general, cover variables from the three rounds (1998, 1999, 2000) simultaneously. A number of longitudinal analytical methods were used to study the evolution of a phenomenon over time, such as the marginal homogeneity test of which McNemar test (Agresti, 1990), multiple decrement table method, repeated measures analysis of variance, latent class analysis, cluster analysis using a semiparametric model, and the logit model (Agresti, 1990). Other methods were used to attempt to explain phenomena that occurred between birth and the age of 29 months, such as the chi-square homogeneity test using the Satterthwaite adjustment (Skinner *et al.*, 1989), linear regression, logistic regression (Hosmer and Lemeshow, 1989), and survival analysis (Cox regression).

All the analyses were weighted to take the sample design and non-response into account in the rounds and instruments involved. The source of the variables determined the weighting in the models. For example, ICCQ longitudinal weights (section 3.1) were used for analyses based on variables from the ICCQ and ICPQ in the three rounds. Inferences can therefore be made to all the children targeted by the survey. For analyses of variables from the SAQM over the three rounds, SAQM weighting was used (section 3.2), irrespective of whether variables from the ICCQ or ICPQ were in the model. This means inferences can be made to children whose mother (or father's spouse/partner) was living in the household for the three rounds, namely 99% of the total population. Analyses of variables from the SAQF were also weighted (section 3.3), irrespective of whether variables from the ICCQ, ICPQ or SAQM were in the model. This means inferences can be made to children whose father (or mother's spouse/partner) was living in the household for the three rounds, namely 85% of the total population. The above three situations cover most of the longitudinal analyses that were conducted on data from the 1998-2000 rounds.

Appropriate weighting results in estimates with reduced potential for bias. Certain software can help in properly estimating variance in the estimates by taking the sample design into account. Otherwise it tends to be underestimated, and the observed significance level of statistical tests tends to be too low. In the QLSCD, SUDAAN (Survey Data Analysis; Shah *et al.*, 1997) was used to take the sample design into account in estimations of prevalence, homogeneity tests, repeated measures analyses, and linear, logistic and Cox regressions. The significance level was set at 0.05. Since SUDAAN software does not provide for other types of tests such as the McNemar, the significance level in these was lowered to 0.01 to prevent describing results as significant when this may not be the case.

6. Scope and Limits of the QLSCD

Longitudinal analyses based on data collected in the 1998-2000 rounds allow for inferences to be made to the population of children born to mothers living in Québec between October 1997 and July 1998 (singleton births) who remained in Québec to the age of 29 months, or if they had left the province, had done so only temporarily. Therefore, the conceptual and methodological approach not to sample children from among those who had arrived in the province after birth limits inference to this population. The same applies to cross-sectional analyses. The population to which inferences can be made does not include post-birth arrivals and those who left Québec permanently. Therefore, in general, the results of these analyses cannot be interpreted as being representative of a group of children at a given age living in Québec. However, according to data furnished by Statistics Canada (population estimate, November 2000), it is estimated there was 1% undercoverage of 17-month-old children in the 1999 round (new arrivals) and approximately 2% of 29-month-old children in the 2000 round. It is expected that undercoverage will be approximately 1% per year in the coming years of the QLSCD. Though low, this could cover children and families with characteristics relatively different from those in the survey sample, where it is possible the results may be biased if inferences are made to all Québec children 17 or 29 months of age.

Family participation in the 1999 and 2000 rounds was very good. Indeed, 94% of families who participated in 1998 continued to participate in both 1999 and 2000, for a ICCQ longitudinal response rate of 71%. Potential biases induced by non-response were minimized by adjusting the weights of respondents according to characteristics differentiating them from non-respondents. Response to the SAQM and SAQF remained stable from 1998 to 2000, 96% for the former and 90% for the latter (among ICCQ respondents). However, respondent families not being necessarily the same from one round to the next, the weighted proportion of families who responded in all the rounds was lower, namely 92% for the SAQM and 83% for the SAQF (among ICCQ longitudinal respondents) giving longitudinal response rates of 65% and 59% for these two instruments respectively. Therefore continued efforts must be made, particularly with regards to single-parent mothers (see Annex 1), reconstituted families and fathers in general, to obtain the maximum response possible to the self-administered questionnaires.

Annexes

Annex 1
Results of Creating Weighting Classes for the ICCQ, SAQM, SAQF and IST

Weighting of Families who Responded to the ICCQ

A number of sociodemographic variables obtained from the Interviewer Completed Computerized Questionnaire (ICCQ) in the 1998 round were studied to adjust the initial weighting of the 1998 round for longitudinal non-response. Among these, the following were retained: mother's immigrant status, total family income, sufficiency of income, mother's age, main source of family income, administrative region in Québec, and highest level of education attained by the mother. Since family income had a partial non-response rate of 2.0%, imputation was done on the baseline income declared in subsequent rounds, or in a few cases where no income was declared, randomly.[1] Similarly, the income sufficiency variable was imputed based on variables describing family income after imputation and the number of people in the family. This imputation was used for weighting purposes only.

The weighting adjustment process led to the formation of nine weighting classes of values taken from the variables retained. The response rates observed in these classes varied from 61% to 100%. The lowest was observed in the class of families whose annual income was below $10,000 (61%). Therefore, children in these families were under-represented in the longitudinal sample of respondents. Adjusting the weights, however, re-aligned the estimates based on these responding units to be closer to those that would have been obtained for comparable response rates in each of the classes.

Weighting of Respondents to the SAQM

To adjust for longitudinal non-response to the SAQM, eight weight classes were created from the values taken from the following variables: language spoken at home by the mother (1998), presence in the household of the biological father (2000), type of family at the time of the survey (1999), highest level of education attained by the mother (1998) and the mother's feeling of sadness/depression in the previous week (2000). This last variable, taken from the ICCQ, was used because it showed, similar to the other variables listed here, a link with the status of having responded or not to the SAQM. In this volume, SAQM data from the three rounds were used to study, among other things, the mother's perception of her relationship to the father/spouse and her parenting skills, both of which could have been affected by her level of psychological wellness.

The proportion of respondents in the weighting classes (among families who responded to the ICCQ) varied from 45% to 97%. In families where the mother only spoke a language other than French only or English only, lower proportions were observed when the biological father was not living in the household in the 2000 round (45%), and when the mother had been sad or depressed in the week preceding the survey in the 2000 round (72%). In families where the mother spoke only English at home and was a single parent or in a reconstituted family situation in the 1999 round, a proportion of respondents of 65% was observed.

Weighting of Respondents to the SAQF

Of the variables considered for adjusting the weights of the longitudinal non-response to the SAQF, the following were retained: income sufficiency (above the low-income cutoff for the three rounds versus those whose income was below it in at least one round), language spoken at home by the father (1998), highest educational level attained by the father (1998), type of family at the time of the survey (1998 and 2000), total family income (2000) and father's age (1998). For the income sufficiency variable, a random imputation was done to families for whom it could not be deduced whether their

1. For the sole purpose of creating weighting classes, the income of eight families was randomly imputed on the basis of the distribution observed in the income variable for 1998.

income was below the low-income cutoff in at least one round (1.7%).

Nine weighting classes were created from the variables retained in the model. Among ICCQ respondents. The proportion of respondents to the SAQF varied from 73% to 96%. The lowest was observed in the class composed of those whose income was below the low-income cutoff in at least one round (73%).

Weighting of Respondents to the IST

In adjusting the weights for Imitation Sorting Task longitudinal non-response in the 1999 and 2000 rounds, 10 weight classes were created from values taken from variables mainly describing the child: time child takes to get used to being with children he/she does not know (2000), child care status (1999), frequency of being encouraged to watch television "for something to do" (2000), French-speaking status (2000), frequency with which the child punches others (1999), degree of shyness with children the child does not know (2000), reaction to meeting a new person (1999) and eating with a spoon or fork by him/herself (1999). The variable describing the fact that the mother had been working since the birth of the child (1998 and 1999) was also used to construct the weights.

From among ICCQ respondents, the proportion of respondents observed in the 10 weight classes varied from 66% to 95%, with lower ones observed in two sub-groups. The first was among children who often took considerable time to get used to being with children he/she did not know (71%), the second among children who were not in any form of child care and who were often encouraged to watch television "for something to do" (66%).

Annex 2
Analysis of the Problematic of Absent Biological Fathers

Certain biological fathers not living in the household but maintaining contact with the target child at least once a month agreed to fill out the Self-Administered Questionnaire for the Absent Father (SAQFABS). The question is whether the data collected from these men can be used to make inferences about all the children whose biological father was not living in the household for periods of time but maintained contact with the child. This required investigation because the response rate was low in this group.

From a longitudinal perspective, respondents were defined as biological fathers who responded to either the SAQF or the SAQFABS in each of the three rounds. The two instruments are identical, and the choice of one or the other is related to the biological father's residency status in the household. The population to which inferences would be made is composed of children whose biological father was not residing in the household for at least one round but was in contact with the child at least once a month for the three rounds. In this population, the proportion of respondents among ICCQ ones was 36%, varying according to the household residency status of the father in the various rounds. Proportions of respondents in the order of 25% were observed in biological fathers who were not residing in the household in the 1998 round, irrespective of whether they returned to live there at a later date. Among biological fathers who were residing in the household in 1998 and 1999 but not in 2000, the proportion rose to 50%. For those residing in the household in 1998 but not in 1999, irrespective of 2000, respondent proportions were in the order of 40%. Consequently, these proportions were too small with regards to making inferences to the group of children of biological fathers who were non-resident in one or another rounds, since respondents may have had characteristics very different from those of non-respondents.

However, the sub-group of resident biological fathers in the 1998 and 1999 rounds, as well as that of those residing in the household only in the 1998 round, were studied in depth in order to determine if it was possible to integrate them into the group of fathers (or mother's spouses/partners) who resided in the household during the three rounds. This would allow for inferences to be made on a slightly larger group than the latter, but still relatively homogeneous.[2] To do this, a comparison of the characteristics of respondents and non-respondents was done by sub-group. In addition, respondents in these two sub-groups were compared to those who resided in the household during the three rounds.

For the subgroup of non-residing biological fathers in the 2000 round only, it was revealed that respondents and non-respondents showed substantial differences in characteristics such as education and income. However, respondents in these sub-groups showed little difference from biological fathers (or mothers' spouses/partners) who resided in the household during the three rounds. In light of these analyses, it seems that biological fathers not living in the household in the 2000 round only could be analyzed simultaneously with those residing in the household during the three years. In this regard, inferences can be made on fathers (or mothers' spouses/partners) who were resident for the three rounds and to biological fathers who were non-resident only in 2000 but kept contact with the child at least once a month. Given the above, the sample for analysis comprises 1,754 fathers, compared to 1,694 who resided in the household for the three rounds.[3]

However, given the small proportion of respondents observed for this sub-group of biological fathers non-resident only in 2000 (50% of ICCQ respondent families) as well as substantial differences observed

2. The sub-group of fathers (mothers' spouses/partners) residing in the household in all three rounds may include different people from one round to the next. In these cases, only response to the SAQF was included, and the few cases involving the biological father responding to the SAQFABS were ignored. However, for sub-groups with fathers who were non-resident in each of the rounds, only biological fathers who were resident or in contact with the child at least once a month were included. In these cases, respondents to the SAQF who were not biological fathers were not included.

3. The longitudinal weighting of the ICCQ was adjusted for longitudinal non-response to the SAQF or SAQFABS for the sub-group of fathers who were not residing in the household in 2000 only. A weighting is therefore available upon request for conducting analyses integrating this sub-group with the sample of longitudinal respondents to the SAQF.

between respondents and non-respondents, it is not possible to make inferences of as good quality as those based on the more restricted sub-group of fathers who were resident for the three rounds. Considering the longitudinal response rate to the ICCQ was 71%, the response rate for the sub-group of biological fathers who were non-resident only in 2000 was 36%, compared to 59% for fathers who were living in the household for the three rounds (Table 1.4).

In addition, the sub-group of biological fathers who were only residing in the household in 1998 seems to be too different from the group of fathers (or mothers' spouses/partners) who were residing in the household for all three rounds. It was therefore inappropriate to do an integrated analysis of these fathers, given the low proportion of respondents (42% of ICCQ respondent families).

Annex 3

Partial Non-Response Among Longitudinal Respondents in the First Three Rounds (1998, 1999, 2000)

This annex describes the questions for which a partial non-response rate higher than 5% was observed. In the QLSCD, the partial non-response rate of a given question can be defined as the ratio of the weighted number of non-respondents to a question, to the weighted number of units to which the question was addressed, among overall respondents to the instrument (ICCQ, SAQM, SAQF).

Partial non-response was examined from a longitudinal perspective by considering only responding units to the three rounds for a given instrument. For longitudinal analyses, the risk of bias associated with overall non-response was minimized by weighting to take into account for the characteristics of non-respondents. Partial non-response was analyzed separately in the three main instruments of the QLSCD - the ICCQ, SAQM and SAQF - as a function of sociodemographic characteristics available in the data.

Partial Non-Response to the ICCQ

Partial non-response to the ICCQ was studied among the longitudinal respondents to this questionnaire. The following table presents the questions that presented this problem (from among the approximate 600 variables measured), along with the characteristics of non-respondent families.

	Partial Non-Response	Most Frequent Characateristics of Non-Respondent Families
	%	
AQIED05 (Age of oldest biological child in the father's family)	5.1	Very young mother, with little education, not working, immigrant; single-parent family, in which the language spoken is neither French nor English, with income below the low-income cutoff[1]
CBEE8UU1 (Frequency with which the child helps other children who do not do as well as he/she does)	5.4	Non-francophone family
CHLEQ04 (Weight of child in kilograms)	5.8	Older mother, with little education, not working; single-parent family, non-francophone, with income below the low-income cutoff
CSFFQ06B (Adults in the neigbourhood whom children can look up to)	6.9	Mother not working; single-parent family, with income below the low-income cutoff
AQIED04A and AQIED04B (Age of paternal grandmother and living/deceased status)	8.5 to 8.9	Mother very young or older, with little education, not working, immigrant; single-parent family, in which the language spoken is neither French nor English, with income below the low-income cutoff

Continued on next page...

	Partial Non-Response	Most Frequent Characateristics of Non-Respondent Families
	%	
CSFFQ06A (Neighbours meet to solve problems)	8.8	Non-francophone family
BHLEQ03 (Height of child in meters)	10.1	Mother young, with little education; single-parent family, francophone, with income below the low-income cutoff[1]
AQIED06A and AQIED06B (Age of paternal grandfather and living/deceased status)	13.1 to 13.6	Mother very young or older, with little education, not working, immigrant; single-parent family, in which language spoken is neither French nor English, with income below the low-income cutoff

1. This involves families with income below the low-income cutoff as defined by Statistics Canada for a given year. This threshold is a function of the number of people living in the family and the size of the region in which the household is located.

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

Partial Non-Response to the SAQM

For the SAQM, partial non-response among families in which the respondent mother (or father's spouse/partner) was living in the household for the three rounds was examined. With an average of 100 variables that can be measured annually, non-response was limited to those shown in the following table.

	Partial Non-Response	Most Frequent Characteristics of Non-Respondents Families
	%	
AQMMQ12B (Habits of parent in putting child to bed)	5.2	Mother less educated and language spoken at home is neither French nor English
CQMMQ07B (Total duration of child's sleep during the daytime)	5.2	Mother not working; family income is below the low-income cutoff
AQMMQ76C to AQMMQ76E (Recreational/leisure activities of parent with the child)	5.2 to 6.2	Mother whose language spoken at home is neither French nor English
CQMMQ05A (Total time child is awake at night)	6.7	No particular sociodemographic characteristic

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

Partial Non-Response to the SAQF

Partial non-response to the SAQF among families in which the respondent father (mother's spouse/partner) was living in the household for the three rounds was also studied. For an average of 93 variables measured in this questionnaire annually, partial non-response higher than 5% was observed in only four variables, as indicated in the table below. Partial non-response to the question on the degree of happiness in the couple, as perceived by the father (mother's spouse/partner), was very high, particularly in the 2000 round. However, only one sociodemographic characteristic was linked to non-response to this question, and only in 1999.

	Partial Non-Response	Most Frequent Characteristics of Non-Respondent Families
	%	
BQPJQ02 (Times a day the child is irritable and fussy)	5.8	Family whose income is below the low-income cutoff
BQPJQ75 (Grandparents had problems with alcohol)	12.4	Father with little education and not working; family non-francophone, whose income is below the low-income cutoff
BQPJQ83 (Father's perception of degree of happiness in the couple)	12.4	Father not working
CQPJQ24 (Father's perception of degree of happiness in the couple)	21.8	No particular sociodemographic characteristic[1]

1. Given the high partial non-response observed for this variable, a more detailed analysis was done. The non-response rate for this question seemed to have positive variance with the level of happiness in the couple reported by the mother (SAQM-Q29). This means that fathers whose spouse/partner said she was very happy with the relationship tended to respond to this question less frequently.

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

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Glossary

Direction de la méthodologie et des enquêtes spéciales, ISQ	Methodology and Special Surveys Division, ISQ
Direction des normes et de l'information, ISQ	Standards and Information Division, ISQ
Direction Santé Québec, ISQ	Health Québec Division, ISQ
Institut de la statistique du Québec	Québec Institute of Statistics
ministère de la Famille et de l'Enfance	Ministry of Family and Child Welfare
ministère de la Santé et des Services sociaux du Québec (MSSS)	Ministry of Health and Social Services of Québec
Personne qui connaît le mieux l'enfant (PCM)	Person Most Knowledgeable (PMK)

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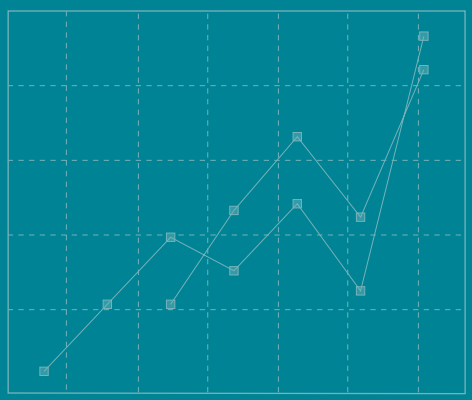
As in Volume 1 Number 1, this paper provides readers unfamiliar with the Québec Longitudinal Study of Child Development information which is indispensable for a clear understanding of the results presented in the 13 papers of Volume 2, the first in this series to provide longitudinal analyses. Part I of the paper revisits conceptual, operational and logistical aspects of the QLSCD. It presents details on the data collection instruments and reviews the major themes of the first three years of the QLSCD 1998-2002. “Cooperation levels” of the parents and the children are shown, and there is a brief description of the processing and validation of the data. Part II of the paper focuses on statistical aspects of the survey, presenting cross-sectional and longitudinal response rates. The approach taken to reduce possible biases due to overall non-response is also discussed. Finally, complementary aspects such as partial non-response, statistical methods used in the analyses and the way the complex sample design is considered are described.



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