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LONGITUDINAL STUDY OF CHILD  
DEVELOPMENT IN QUÉBEC  
(ÉLDEQ 1998-2002)

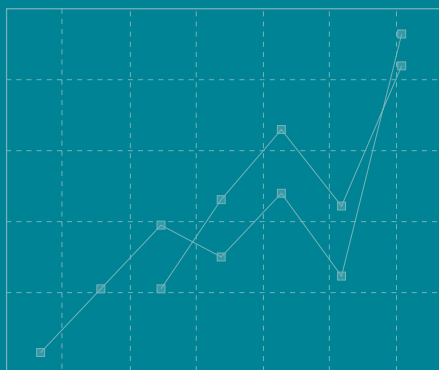
5-MONTH-OLD INFANTS

COLLECTION  
**Health and  
Well-Being**

Motor, Social and Cognitive  
Development

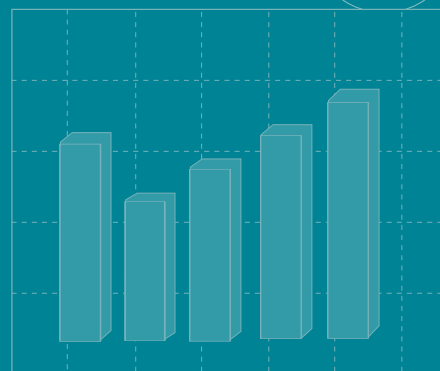
Volume 1, Number 8

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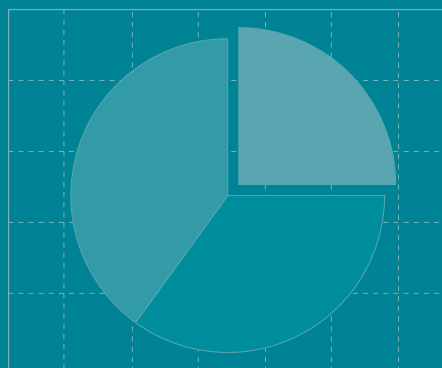
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November 2001

# Foreword

Similar to what has been observed in the majority of industrialized nations over the past twenty years, Québec and Canada have seen a significant increase in the costs related to maladjustment, particularly in young people. The Longitudinal Study of Child Development in Québec (*l'Étude longitudinale du développement des enfants du Québec*) (ÉLDEQ 1998-2002) being conducted by *Santé Québec* (Health Québec),<sup>1</sup> a division of *l'Institut de la statistique du Québec (ISQ)*<sup>2</sup> (Québec Institute of Statistics) in collaboration with a group of university researchers, will provide an indispensable tool for action and prevention on the part of government, professionals and practitioners in the field, who every day must face maladjustment in children.

More precisely, a major purpose of this longitudinal study of a cohort of newborns is to give Québec a means of preventing extremely costly human and social problems, such as school dropout, delinquency, suicide, drug addiction, domestic violence, etc. Similar to what is being done elsewhere (in the UK, New Zealand, the US), *Santé Québec* and a group of researchers have designed and developed a longitudinal study of children 0 to 5 years of age (2,223 children in this study and 600 twins in a related one). It will help gain a better understanding of the factors influencing child development and psychosocial adjustment.

The general goal of ÉLDEQ 1998-2002 is to learn the PRECURSORS, PATHS and EFFECTS, over the medium and long terms, of children's adjustment to

school. ÉLDEQ is the logical extension of the National Longitudinal Study of Children and Youth (NLSCY, Canada). These Québec and Canada-wide longitudinal studies are both comparable and complementary. They employ distinct survey methods, and use different techniques to obtain the initial samples. Though many of the instruments are practically identical, about a third of those being used in ÉLDEQ are not the same.

This first report casts light on the enormous potential of the data generated by this study. From the descriptive analyses of the results of the first year of the study to the longitudinal analyses of subsequent years, there will be an enormous wealth of data. With updated knowledge on the development of the cohort of young children, the annual longitudinal follow-up will respond to the needs which the *ministère de la Santé et des Services Sociaux du Québec - MSSS* (Ministry of Health and Social Services), who financed the data collection, expressed in both the Report of the Working Group on Youth (*Rapport Bouchard, 1991, Un Québec fou de ses enfants - the Bouchard Report, 1991, A Québec in Love with its Children*) and the policy papers entitled *Politique de la santé et du bien-être, 1992* (Health and Well-Being) and *les Priorités nationales de santé publique 1997-2002* (Public Health Priorities 1997-2002).

Director General

Yvon Fortin

- 
1. Certain French appellations 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.
  2. *Santé Québec* officially became a division of the *ISQ* on April 1, 1999.

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

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**Caution:**

Unless indicated otherwise, "n" in tables represents data weighted to the size of the initial sample.

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

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

In section I, weighting and the complex sample design were taken into account in calculating the results and their precision. The precision of the estimates of proportions was calculated using a mean design effect. This was also used for the chi-square tests, except in questionable cases for which the SUDAAN software program was used. In all other analyses, SUDAAN was used. Basic hypotheses, such as the normality of the data, were verified before applying the selected statistical tests.

The second part of this paper presents certain results which could not be verified by the Santé Québec Division and the Methodology and Special Surveys Division, namely those derived from Latent Class Analysis (LCA). Though this type of model may prove to be the most appropriate and promising for assessing cognitive development and behaviours in children (see Baillargeon, Tremblay and Willms, 1999), it does not allow for calculating estimates of variance that take into account the complex sample design of ÉLDEQ. Therefore, the results and the paper presented herein are the sole responsibility of the authors and not the ISQ.

**Symbols:**

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

**Abbreviations**

CV Coefficient of variation  
Not avail. Not available  
Non signif. Not significant



# Acknowledgements

*Santé Québec* recognizes that the development and implementation of the Longitudinal Study of Child Development in Québec (ÉLDEQ 1998-2002) flows directly from the synergy of effort and professionalism of many people throughout the whole process of mounting a survey of this size. Since 1995, individuals, various groups and organizations, a survey firm and the staff of *Santé Québec* have become indispensable links in making this ambitious project a reality - the first annual longitudinal survey of Québec infants.

A major characteristic of this project is that a pretest and survey are conducted every year. To accomplish this, we must annually: 1) make two sets of instruments (pretest and survey), 2) conduct two data collections, 3) analyze two sets of data, and 4) produce two types of communications materials. The results of each pretest means fine-tuning and developing instruments for the survey, which follows 17 months later. The results are sent to the parents (highlights), published in reports, and communicated to the scientific community and the public at large. The professionals and staff involved in collecting the data, as well as those involved before and after, must put their nose to the grindstone every year. We cannot over-emphasize our profound recognition of the incredible, concerted effort they are putting into this project over an 8-YEAR period, from the first pretest in 1996 to the final report to be published in 2004!

First, it must be said that without Daniel Tremblay, Director of *Santé Québec* (now part of the *ISQ*) since 1994, Christine Colin, Assistant Deputy Minister responsible for Public Health 1993-1998, Aline Émond, Director of *Santé Québec* 1986-1993, Richard E. Tremblay, Director of the ÉLDEQ research project, and Marc Renaud, President of *le Conseil québécois de la recherche sociale - CQRS* 1991-1997. ÉLDEQ 1998-2002, also known as "In 2002...I'll Be 5 Years Old!," would have never seen the light of day. In turn and together, they developed, defended and obtained the financing for this study. Thank you for your indefatigable tenacity.

A warm thanks to all the researchers and the support staff of their respective research groups, whose determination over the years has never wavered. Putting

their research grants together every year has contributed to the development of the instruments, analysis of the data and publication of the copious results.

I would like to thank Lyne Des Groseilliers, ÉLDEQ's statistician since 1996, Robert Courtemanche, statistical advisor, and France Lapointe, ÉLDEQ's statistician 1995-1996. These three colleagues in the *Direction de la méthodologie et des enquêtes spéciales* (Methodology and Special Surveys Division) (*ISQ*) managed, with great skill, to set the signposts and navigate the somewhat winding course of this large-scale survey first.

A very special thanks to all the master designers of the National Longitudinal Study of Children and Youth (NLSCY, Canada). Without their expertise, advice and generosity, our survey would never have been accomplished. In many senses of the word "modeling," ÉLDEQ has learnt a lot from the NLSCY.

We would also like to extend out gratitude to the staff of the *Groupe de recherche sur l'inadaptation psychosociale chez l'enfant - GRIP* (Research Unit on Children's Psychosocial Maladjustment) at the University of Montréal. Without their expertise, some of our survey instruments would have never been computerized to such a high level of quality.

We would like to thank the personnel in the *Service de support aux opérations de la Régie de l'assurance-maladie du Québec - RAMQ* (Operations Support Section of the Québec Health Insurance Board). Without their efficiency, fewer letters of introduction would have found their way to the correct addresses of respondents.

Our sincerest thanks go to our survey firm, *Bureau d'interviewers professionnels (BIP)*. Since 1996, this polling company has been responsible for data collection in the pretests and surveys, and follow-up of families both inside and outside of Québec. Lucie Leclerc, President of *BIP*, has set the standard of quality for our numerous and complex data collections. Assisted by Véronique Dorison, she has instilled in her interviewers a great sense of respect for the respondent families, as well as a rigorous regard for all the norms governing this first-of-a-kind survey in Québec.

A big thank-you to the directors-general, directors of professional services, and staff of the medical records departments of some 80 hospitals in the province who accepted to collaborate in our study at a time when resources were rare and time was at a premium, and when the medical records departments in many hospitals were merging or in the process of doing so. Their support was exceptional. Birthing centres also graciously accepted to participate in this first Québec longitudinal study of children. A special thanks to Julie Martineau, medical records specialist, who contributed to the analysis of indispensable medical information by ensuring very rigorous coding of the data, which often lay concealed in the medical files of the infants and their mothers.

It goes without saying that the staff of *Santé Québec* Division directly attached to ÉLDEQ 1998-2002 are the cornerstone of its success from practically every point of view. Special thanks for their ongoing contribution and constant hard work go to Hélène Desrosiers and Josette Thibault, responsible respectively for analysis of the data and creation of the measurement instruments; Martin Boivin, Rolland Gaudet and Gérald Benoît, who constantly pushed the limits of what computer software can do in terms of programming and data processing; Suzanne Bernier-Messier and Diane Lord, who give meaning to the word versatility, who must organize, code and manage incredible quantities of data to ensure the progress of the study. Not directly attached to the team but who made extremely important contributions are: France Lacoursière, France Lozeau and Thérèse Cloutier, who put the finishing touches to the *Santé Québec* "look" in the survey instruments, reports and conference publications; Lise Ménard-Godin, who conducted fruitful literature searches and advised on many aspects of the collection instruments. The hard work, constant availability, ability to adapt, and finely-honed skills of the people working on this project match the enthusiasm that all our partners have demonstrated in making this study a resounding success.

Finally, I would like to extend a very special thank-you to the 2,223 families who responded to our survey. Thank you for the trust you have shown in *Santé Québec*, our partners and collaborators. Thanks to your participation, your children have become the veritable stars of ÉLDEQ 1998-2002, and are making it possible, in the short term, to gain a better understanding of psychosocial adjustment in children. In the medium and long terms, they will likely be in large part responsible for the establishment of early detection programs, better designed prevention programs, and more effective interventions for such an important clientele - all of Québec's children.



Mireille Jetté  
Project Coordinator  
*Santé Québec* Division, ISQ

# Introduction of ÉLDEQ 1998-2002

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## Preventing Social Maladjustment

It suffices to consider the costs engendered by behavioural problems in children - school dropout, delinquency, alcoholism, drug addiction, family violence, mental disorders and suicide - to conclude that they largely surpass what a modern society can accept, morally and economically. Faced with the enormity of these problems, the first reflex is to provide services to these people which will, ideally, make the problems disappear, or at the very least, lessen their severity. For many years we have tried to offer quality services to children and adults who suffer from antisocial disorders, alcoholism, drug addiction, depression, and physical or sexual abuse. However, in spite of enormous investment, these curative services are far from being able to respond to the demand.

Although the idea of early intervention as a preventive measure can be traced at least as far back as ancient Greece, the second half of the 20th century will certainly be recognized as the dawn of the field of social maladjustment prevention (Coie *et al*, 1993; Mrazek & Haggerty, 1994). Numerous programs have been developed for adolescents and teenagers to prevent school dropout, delinquency, drug addiction and suicide. Scientific evaluations of these programs have been far too few in number, but they tend to demonstrate that it is extremely difficult to help those most at risk in this age group (Rosenbaum & Hanson, 1998; Rutter, Giller & Hagell, 1998; Tremblay & Craig, 1995). It is becoming increasingly clear that the factors which lead to serious adaptation problems are in place long before adolescence. Hence the idea that the prevention of social adaptation problems should start at least during childhood, and preferably right from pregnancy (Olds *et al*, 1998; Tremblay, LeMarquand & Vitaro, 1999). These principles are clearly outlined in the objectives of the *Politique de la santé et du bien-être* (Policy on Health and Well-Being) and *les Priorités nationales de santé publique* (Priorities for Public Health) set by the government of Québec (ministère de la Santé et des Services sociaux, 1992; 1997).

## The Need to Understand Early Childhood Development

If the field of maladjustment prevention appeared at the end of the 20th century, it has certainly come on the heels of child development. "*Émile*," by Jean-Jacques Rousseau, needs to be re-read in light of recent studies to realize just to what degree it is impossible to understand the complexity of child development, and therefore the means of preventing deviant paths, simply by reflection or introspection. Although considerable knowledge has been acquired in the neurological, motor, cognitive, affective and social development of children, what really hits home is that Jean-Jacques Rousseau and his followers in education seemed to have had more certainty about the ways of educating children than we do today.

Progress in child development research has made us realize that things are not as simple as we can or would like to imagine. We have obviously all been children, and most of us have become parents, indeed, relatively well-adjusted ones. But we still do not clearly understand when, how and why adjustment problems appear, and above all, how to prevent and correct them.

Our ignorance is obvious when we examine the debates among specialists on the role of parents in the development of maladjustment problems in children. Some suggest that social maladjustment in children is largely determined by genetic factors (Bock & Goode, 1996; Rowe, 1994). Some accentuate economic factors (Duncan & Brooks-Gunn, 1997). Other researchers attribute a determining role to peer influence (Harris, 1998; Harris, 1995; Vitaro *et al*, 1997). These larger questions lead to narrower ones which focus on particular aspects - the role of fathers in childhood maladjustment, the impact of alcohol and cigarette consumption during pregnancy, the effect of prenatal and birthing problems, the importance of breast feeding and diet; the role of sleep, cognitive development, temperament, and so on.

The majority of these questions are at the heart of the daily concerns of parents, grandparents, educators, family service providers, and legislators. What can we do to maximize the development of our children, to prevent severe psychosocial maladjustment? What should we do when problems begin to appear, when pregnant mothers, or fathers themselves have a long history of disorders? The answers to these questions obviously have an effect on the policies put forth by Québec government Ministries such as *ministères de la Famille et de l'Enfance* (Family and Child Welfare), *de l'Éducation* (Education), *de la Santé et des Services sociaux*, *de la Solidarité sociale* (Social Solidarity - formerly Income Security (Welfare)), *de la Sécurité publique* (Public Security), *de la Justice* (Justice), and *le ministère de la Recherche, Science et Technologie* (Research, Science and Technology).

### **The Contribution of ÉLDEQ 1998-2002**

The Longitudinal Study of Child Development in Québec (ÉLDEQ 1998-2002) was conceived in order to contribute to our knowledge of the development of children in their first 5 years of life. The main goal is to gain a better understanding of the factors, in the years of rapid growth, which lead to success or failure upon entry into the school system. The goal of the second phase (if approved) is to better understand development in elementary school, in light of development in early childhood.

We know that this survey cannot be a definitive one on child development in Québec, but it is the first representative study of a provincial cohort of children who will be measured annually from birth to entry into the school system. It specifically aims at understanding the development of basic skills needed for educational success.

Although the effort to set up this study began in 1989, the first data collection coincided with the Québec government's implementation of its *Politique Familiale* (Policy on Families). The policy has virtually the same objectives as our study:

"These services for children 5 years and under should give all Québec children, whatever the socioeconomic status of their parents, the chance to acquire and develop the skills that will allow them to succeed in school (1997, p. 10)."

On March 3 1999, in the speech opening the 36th session of the Québec legislature, Premier Lucien Bouchard confirmed that early childhood development was a priority for the government:

"The theme that will dominate our actions this year, next year, and throughout our mandate, is youth... The priority... with regards to youth in Québec, begins with the family and childhood... This massive investment in early childhood... will give our children the best chance of success in the short, medium and long terms. It is our best asset against alienation and despair. It is our best preparation for personal, social and economic success."

Because of this historic coincidence, ÉLDEQ has the potential of becoming an invaluable tool for monitoring the effects of Québec's massive investment in early childhood which began in 1997. Thanks to the data collected by the federal government's National Longitudinal Study of Children and Youth (NLSCY, Canada), we will be able to compare child development in Québec with that elsewhere in Canada, before and after the implementation of Québec's new policy on the family.

However, our initial objectives are more modest. The 12 or 13 papers in this series present the results of our first annual data collection. They describe the characteristics of the families and children when the latter were 5 months old<sup>3</sup> They cover sociodemographic characteristics, nature of the birthing process, health and social adaptation of the parents, family and couple

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3. To simplify the text in this report, the phrase "5-month-old infants" will be used to refer to infants whose mean age was 5 months during data collection in 1998. In section 3.1.3 (Volume 1, Number 1), we explain why the infants were not all exactly the same age. As indicated in no. 2 of this series, 52% of the infants were less than 5 months, and 3.4% were 6 months of age or over.

relations, parent-infant relations, and characteristics of the 5-month-old, such as sleep, diet, oral hygiene, temperament, and motor, cognitive and social development. These data will eventually be compared to those on children the same age collected by the NLSCY in 1994 and 1996.

### **An Interdisciplinary, Multi-University Team of Researchers**

This study saw the light of day because of the collaboration of many people. In the preceding pages, Mireille Jetté thanked a number of them. I would like to take advantage of this introduction to emphasize that the survey was set up and continues forward because of the dedication and hard work of a group of researchers from a variety of disciplines and universities. I would particularly like to thank Michel Boivin, School of Psychology at *Université Laval*, and Mark Zoccolillo, Department of Psychiatry at McGill University, who have been actively involved in this project since 1992. It was in that year that we prepared our first grant application for the Social Sciences and Humanities Research Council of Canada. A second group of researchers joined the team in 1993 and 1994: Ronald G. Barr, pediatrician, Montréal Children's Hospital Research Institute, McGill University; Lise Dubois, dietitian and sociologist, *Université Laval*; Nicole Marcil-Gratton, demographer, University of Montréal and Daniel Pérusse, anthropologist, University of Montréal. Jacques Montplaisir, Department of Psychiatry, University of Montréal, joined the team in 1995. Louise Séguin, Department of Social and Preventive Medicine, University of Montréal and Ginette Veilleux, *Direction de la santé publique de la Régie régionale de la santé et des services sociaux de Montréal-Centre* (Public Health Department, Montréal-Centre Regional Health Board), joined in 1998. Three post-doctoral researchers have also made an important contribution. Raymond Baillargeon developed the task for measuring cognitive development. Christa Japel is the assistant to the scientific director for planning, analysis and presentation of the results. Heather Juby collaborates in the analysis of the data on couple and family history.

### **A Unique Confluence of Circumstances**

A study such as this requires the coordination of many researchers over many years, enormous financial resources, and a long period of preparation. Though in the early 1990s the research team was convinced of the need for the survey, those responsible for the public purse had also to be convinced. We must therefore acknowledge the happy confluence of circumstances that allowed the players to take advantage of the opportunity at hand. When a number of civil servants in the *ministère de la Santé et des Services sociaux* understood the essential role of prevention, the creation of a committee on children and youth in 1991 led to an increased awareness of the importance of early childhood. At the same time, the president of the CQRS, Marc Renaud, had come to the same realization with his colleagues in the Population Health Program at the Canadian Institute for Advanced Research (CIAR). Aline Émond, the Director of *Santé Québec*, was ready to apply her formidable determination to work for the cause. For their part, Health Minister Jean Rochon and his Assistant Deputy Minister for Public Health, Christine Colin, aware of the importance and benefit of longitudinal studies on early childhood development, authorized the investment of large sums of money during a period of draconian budget cuts. This occurred at the same time as the federal government decided to create its own longitudinal study of children and youth (NLSCY). It is in this context that ÉLDEQ 1998-2002 materialized. Our survey also came to fruition because Mireille Jetté did everything in her power to make the researchers' dreams a reality, and Daniel Tremblay gave her all the support she needed by making various resources available for the project.



Richard E. Tremblay, Ph.D., M.S.R.C.  
Chair of Child Development  
University of Montréal



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# Review of the Methodology

This analytical paper is one of a series presenting cross-sectional data collected on a large sample of 5-month-old infants surveyed in 1998. It reports on the first of 5 annual data collections on 2,120 children in Québec who will be studied until they are 5 years old. In the first year of data collection, the results on 2,223 infants were retained.<sup>4</sup>

The target population of the survey is Québec babies, singleton births only,<sup>5</sup> who were 59 or 60 weeks of gestational age<sup>6</sup> at the beginning of each data collection period, born to mothers residing in Québec, excluding those living in the Northern Québec, Cree, and Inuit regions, and on Indian reserves, and those for whom the duration of pregnancy was unknown. Due to variations in the duration of pregnancy and the 4 or 5 weeks allotted for each data collection wave, the infants were not all exactly the same age (gestational or chronological) at the time of the survey. Therefore, the children in Year 1 (1998) of the survey had a mean gestational age of 61 weeks - about 5 chronological months.

The survey had a stratified, three-stage sampling design, with a mean design effect for the proportions estimated at 1.3. To infer the sample data to the target population, each respondent was given a weight corresponding to the number of people he/she "represented" in the population. ÉLDEQ 1998 comprised eight main collection instruments which obtained data from the person who was closest to the baby (called the Person Most Knowledgeable - PMK), the spouse (married or common-law), the infant and the absent biological

parent, if applicable. Given variation in the response rates to each instrument, three series of weights had to be calculated to ensure inferences to the population were accurate. Except for the Self-Administered Questionnaire for the Absent Father (SAQFABS) and a series of questions in the Computerized Questionnaire Completed by the Interviewer (CQCI) on absent fathers – the overall or partial response rates of which were too high – the results of all the instruments could be weighted. Therefore, the data presented here have all weighted to reduce the biases.

All data that had coefficients of variation (CV) 15% or higher are shown with one or two asterisks to clearly indicate the variability of the estimate concerned. In addition, if the partial non-response rate was higher than 5%, there is a note specifying for which sub-group of the population the estimate is less accurate.

Similar to any cross-sectional population study, the Year 1 part (5-month-old infants) of ÉLDEQ 1998-2002 has certain limits. However, the vast majority of the results are valid and accurate, and provide a particularly detailed portrait, for the first time, of 5-month-old infants in Québec.

Note to the reader: For more details information on the methodology, see Volume 1, Number 1, of this collection.

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4. Though the results for 2,223 children were retained for the first year of data collection, 2,120 will be retained for the rest of the longitudinal study; the extra 103 were part of an over-sample used to measure the effects of the January 1998 ice storm.
  5. Twins (twins births) and other multiple births were not targeted by the survey.
  6. Gestational age is defined as the sum of the duration of gestation (pregnancy) and the age of the baby.

