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

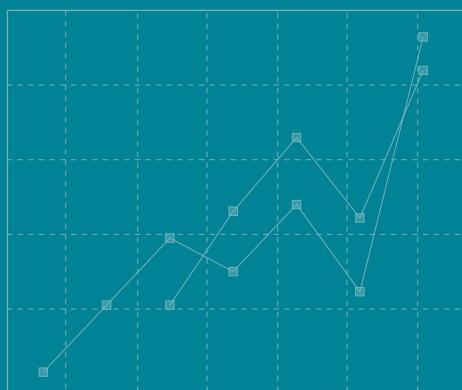
COLLECTION Health and Wellness

FROM BIRTH TO 29 MONTHS

Trends in Dietary Behaviours and
Practices

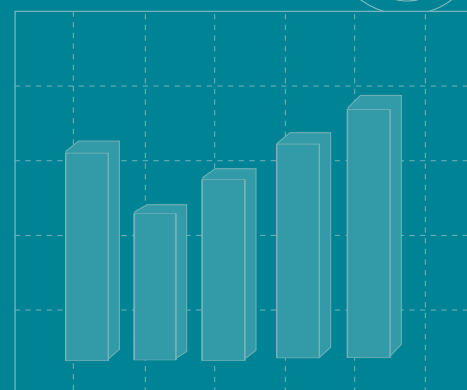
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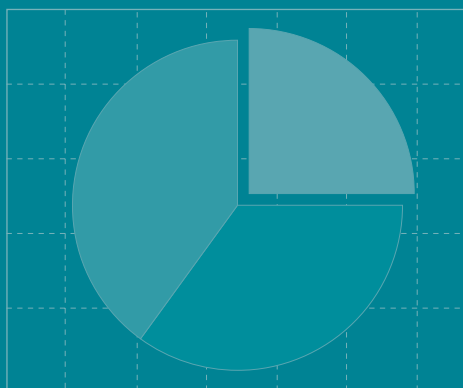
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May 2002

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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This analytical paper is also available in French. (Ce numéro est aussi disponible en version française sous le titre « Évolution des comportements et des pratiques alimentaires » dans *Étude longitudinale du développement des enfants du Québec (ÉLDEQ 1998-2002) – De la naissance à 29 mois*, Québec, Institut de la statistique du Québec, vol. 2, n° 5).

<p>A Word of Caution, Symbols and Abbreviations can be found in Section "Review of the Methodology and Caution"</p>
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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 interviewers² 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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Review of Methodology and Caution

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

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

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

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

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

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

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

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

Caution

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

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

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

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

Symbols

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

Abbreviations

CV Coefficient of variation
Not signif. Not significant

Trends in Dietary Behaviours and Practices

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

1. Introduction

The data presented in this issue deal with various aspects of the diet of children under 3 years of age in Québec. This information is invaluable because it allows us to describe, for the first time, the practices surrounding the feeding of preschool-aged children throughout the province.

The first volume of the QLSCD 1998-2002 presented the results obtained in the 1998 round when the children were about 5 months old. The issue dealing with the diet of babies discussed, among other things, breast-feeding and the introduction of solid food (Dubois *et al.*, 2000a). The current issue deals with the data gathered in the 1999 and 2000 rounds of the QLSCD, when the children were between about 17 and 29 months old. We will first treat complementary information gathered retrospectively on the total duration of breast-feeding and on other aspects of infant feeding (ex.: age at the introduction of infant formulas, "solid cut" food, and cow's milk) in order to compare it with the Québec nutrition recommendations on infant feeding.

The data also make it possible to characterize various aspects of the diets of children between about 17 and 29 months old, such as the frequency of meals taken away from home each week and certain child behaviours (ex.: "being picky eaters", "eating at irregular times", and "eating too much or too fast"). The frequency of daily consumption of certain foods (dairy products, bread and cereals, fruits and vegetables, meats and meat substitutes, and fats and sugars) will also be given consideration. An overview of the daily consumption of certain liquids complements this information. We will accordingly pay close attention to the total daily quantities of milk and juice or fruit drinks consumed and to the frequency of daily consumption of soft drinks and fruit drinks.

In addition to describing these aspects of children's diets, this issue will dwell on certain characteristics likely to be associated with diet at an early age, such as primary child care practices and the socio-economic status of the family. The food insecurity experienced in the most disadvantaged families is also discussed.

Finally, our analyses examine certain diet-dependent aspects of the health and development of children, such as height and weight, as well as the frequency of infections and the use of antibiotics. The relationship of these latter to dietary habits in children will be discussed.

On occasion, when the relationship between practices and behaviours may be observed for the same children when they are about 1½ and 2½ years old, we will examine them longitudinally.

Beyond question diet plays an important role in child development. The analyses presented in this issue not only should advance our understanding of the connection between certain determinants of healthful diets and the actual diets of toddlers, but also should identify certain consequences of diet for their physical development.

2. Problem Statement

2.1 Nutrition in childhood and health in adulthood

The influence of nutrition on population health is clear from the first years of life (Barker, 1992). From a physiological standpoint, it is important that children reach their full potential growth, since some studies have established a relationship between the average size of adults and the prevalence of cardiovascular disease or mortality rates for different countries (Davey Smith and Brunner, 1997). In addition, arteriosclerosis, blood cholesterol levels, and osteoporosis are attributable not only to the quality of the adult diet, but also to childhood diet (Gallo, 1996; Planoulaine *et al.*, 2000; WHO Collaborative Centres on Nutrition, 1991).

The quality of the diet among young children is associated with various indicators of socio-economic status such as employment status of the mother and family income (Johnson *et al.*, 1992). In Québec, some studies have shown the influence of various variables relating to social status on the quality of the adult diet, whether measured in nutrients or foods (Dubois and Girard, 2001). Such situations are not without effects on children, for especially during the preschool years, food choices are highly dependent on the conditions in which children live (ex.: type of family, family income, employment status of parents) (Cowin *et al.*, 2000; North *et al.*, 2000). By contrast, an increasing number of young children have some of their meals each week in childcare settings. In this way, food taken outside the home complements that taken in the home and may modify certain aspects of nutritional status to the point of affecting the health and growth of children (Goodwin *et al.*, 1999; Stearns Bruening *et al.*, 1999). In addition, the fact that both parents work outside the home changes their dietary habits at home given the limitations on the time available for food preparation (Johnson *et al.*, 1993).

Although there are no Canadian data for making this type of evaluation here, it seems that in several developed countries the diets of a large proportion of young children do not conform to national nutrition recommendations. In the United States only 35% of 2- and 3-year-olds have diets considered adequate

(Lino *et al.*, 1998). Data from the *Continuing Survey of Food Intakes by Individuals* (CSFII 1985-1986) also reveal that more than 80% of children between 2 and 5 years old consume higher proportions of total fats, saturated fats, and cholesterol than recommended (Thompson and Dennison, 1994). In Great Britain only 10% of children from 1 to 4 years old have diets that meet the standards of the *Recommended Nutrient Intake* for at least three of the five main nutrients that are essential to development (iron, zinc, vitamins A, D, C), whereas 16% have diets that do not satisfy any of the recommendations. The situation is even less favourable for children from disadvantaged settings (Gregory *et al.*, 1995). These results are of great concern since the quality of the childhood diet influences health not only during childhood but also, as we have seen, in adulthood.

2.2 The main problems related to the diet of children in developed countries

There are two main areas of concern about the diet of children in developed countries: first, obesity, which is associated with plentiful supplies of food, and second, the lack of certain nutrients among poor children, which can lead to certain deficiencies.

It is well known that obesity is rising in Canada, not only among adults but also among school-aged children. Between the mid-1980s and the mid-1990s, for example, the prevalence of obesity went from 14% to 24% among girls and from 18% to 26% among boys (Santé Canada, 1996). Childhood obesity is a risk factor for cardiovascular disease, diabetes, cancer, and hypertension in adulthood (Acheson *et al.*, 1998).

Iron deficiency, which may cause anaemia, affects mainly poor children. Anaemia can have short- and long-term consequences on the health and the physical and cognitive development of children. In particular, it can lead to lowered resistance to infection, stunted growth, or delays in the onset of puberty (Harris, 1997; Rose *et al.*, 1998). Iron deficiency and anaemia among children could increase in the years to come because poverty is on

the rise in Canada and is affecting more and more families with young children (Federal-Provincial-Territorial Advisory Committee on Population Health, 1999). For example, in large Canadian cities at the end of the 1990s, up to 25% of preschool-aged children were living in low-income households (McIntyre *et al.*, 2000).

Lack of money directly affects the quality of the diet and can result in situations of food insecurity for some families (i.e., situations where food is in limited quantity or lacking, or where people fear not having enough for themselves or their children). The *Enquête sociale et de santé 1998* (ESS 1998), conducted by the *Institut de la statistique du Québec*, found that 8.3% of families in Québec live in situations of food insecurity (Dubois *et al.*, 2000b). This proportion rises to 22.4% among single-parent families. Data from the *National Longitudinal Study of Children and Youth* (NLSCY), gathered in 1994, indicate that 1.2% of Canadian children under age 12 have suffered from hunger at some time (McIntyre *et al.*, 2000). Yet today these situations are no longer found only in parts of the population where poverty is passed from one generation to another. Actually, in Canada, two-thirds of the mothers who have known hunger have completed secondary school, and half have post-secondary degrees. This phenomenon is all the more disturbing because of its negative impact on the nutritional status of children. For example, results of the ESS 1998 show that families who have known food insecurity are twice as likely as the rest of the population to report dietary habits of fair or poor quality (Dubois *et al.*, 2000b). In addition, compared to other mothers in Québec, those living in situations of food insecurity are at higher risk for chronic illnesses, limitations of activity, or psychological distress (Rouffignat *et al.*, 2001), factors that can hinder parenting. Similar results have been observed in data from the *National Population Health Survey* (NPHS) (1998-1999) (Che and Chen, 2001).

In the final analysis, a diet of good quality in early childhood is important in both the short and long terms. The data from the first three rounds of the QLSCD make it possible for the first time to examine various aspects of the diet of Québec children under 3 years old and to identify certain factors associated with them.

3. Methodological Considerations

The analysis presented in this issue are based on a sample of 1,985 children who participated in the first three rounds of data collection for the QLSCD. More specifically, they deal with data collected in the 1999 and 2000 rounds, when the children surveyed were about 17 months (about 1½ years) and 29 months (about 2½ years) old, respectively.¹

To perform the analyses presented in this issue, several variables and indicators were developed. They relate to breast-feeding and to the feeding of infants and young children, certain dietary habits and behaviours, the frequency of consumption of certain foods and liquids, food insecurity, height and weight, and certain infections, as well as antibiotic treatments given to children. These indicators and variables are described in detail in the relevant sections. Note that the data on child feeding are drawn from the Interviewer Completed Paper Questionnaire (ICPQ) at the time of face-to-face interviews. This questionnaire was intended to be answered by the Person Most Knowledgeable (PMK) about the child, which in the majority of cases was its biological mother.

The approach used in the analyses is first and foremost descriptive. Variables and indicators pertaining to diet will be described first. The statistical relationships between different indicators about diet that derive from data gathered at the same time, or gathered from other rounds, will also be examined.

Data gathered about diet will then be analyzed based on the indicators that describe the living conditions of the children, which could have an influence on behaviours or dietary practices: the socio-economic status of the family and, except for the section discussing the diets of babies, childcare arrangements. These latter indicator data come from the Interviewer Completed Computerized Questionnaire (ICCCQ) and are available for each survey round. The data on food insecurity, which come from the ICPQ, have been gathered exclusively from the 1999 survey round.

Socio-economic status (SES) indicators, available annually, were developed by the *Direction Santé Québec* of the *Institut de la statistique du Québec* based on the level of education and the prestige of the profession of the parents, as well as the gross household income, during the 12 months preceding each of the survey rounds. In the analyses this index is grouped into 5 categories (quintiles), where category 1 indicates families with the lowest socio-economic status and category 5 families with the highest socio-economic status. Childcare arrangements refer essentially to the situation prevailing during each round, which is to say, for this issue, when children were about 17 and 29 months old. We should make clear here that data on childcare arrangements pertain solely to children who were in childcare because their parents were working or in school. Children may, however, have been in childcare for other reasons or may not have been in childcare in cases where the parents took turns working.

According to the QLSCD data, about half the children received childcare outside the home, either in a childcare centre or at the home of someone else, both at ages 1½ (47%) and 2½ (50%), because parents were working or studying, while 11% and 8% of children respectively received childcare in their homes. The proportion of children who went to childcare centres nevertheless increased with age, going from 9% around age 1½ to 17% a year later (data not shown). It should be noted that – except in the analysis of child eating behaviours where only the fact of being in childcare or not was considered in order to observe behaviour differences between children with their mothers and those with childcare providers – the categories applied in analyzing factors associated with dietary practices were: 1) children who did not go to childcare or had childcare at home, 2) children who went to childcare centres, and 3) children who received childcare at someone else's home.

1. Note that the youngest children were 16 months old when data were collected in 1999, and 28 months old when collected in 2000.

Childcare arrangements are associated with SES and, more specifically, with the job status of the mother. Compared with other children, children whose mothers work full-time go to childcare in greater proportion at someone else's home, whether aged 1½ or 2½. Similarly, children who go to childcare centres come from families who are socio-economically better off whereas those who do not have childcare because of their parents' work or study situations are relatively more numerous in socio-economically disadvantaged settings (data not shown). It is important to keep these relationships in mind when analyzing the data.

The results presented here are representative of the situation for children who were born in Québec in 1997-1998 and who, around the age of 29 months, had not left the province for good. Chi-square tests were used to study associations between two indicators. When two indicators proved to be associated (i.e., statistically significant at the 0.05 level), further analyses were done to clarify differences in indicator levels. Only differences that proved statistically significant have been reported in the text. Comparisons of means were also done by using analyses of variance (ANOVA) followed by multiple comparisons. The level of significance was set at 5%.

4. Results

4.1 The diet of babies: An overview

The recommendations concerning breast-feeding set forth in *L'allaitement maternel au Québec, lignes directrices* promote breast-feeding to the exclusion of other solid and liquid foods (and no water or bottle) during the first six months of life (*ministère de la Santé et des Services sociaux*, 2001). It is also recommended to continue breast-feeding as a complement to solid foods at least until the child has reached age 1, and as long thereafter as the child and mother wish.

In addition, the recommendations suggest introducing cow's milk between 9 and 12 months of age (*Société canadienne de pédiatrie et al.*, 1998). It is also recommended that complementary foods (purees and juices) be introduced between 4 and 6 months, and that solid cut foods be introduced around 1 year of age. Baby cereals should be included in the diet for their iron content until age 2 (*Doré and Le Hénaff*, 1997). From age 1 onward, children are sufficiently developed to be offered the same foods as the other members of the family.

The data collected in the second round of the QLSCD (1999) allow us to fill in gaps in the information already collected about the diets of children around 5 months old.² The data covered the period between 5 and 17 months of age. The issues addressed by this second collection were, among others, the total length of breast-feeding, the age at which children stopped drinking infant formulas, and the age at which they began to drink cow's milk or to eat solid cut food. The data collected also revealed the proportion of children who ate baby cereals and who were still being bottle-fed around 17 months of age, or, if not being bottle-fed, at what age bottle-feeding had stopped.

2. For example, during the first round of data collection, mothers of 5-month-old babies had indicated whether they were then breast-feeding or had ever breast-fed their children; if they had ceased breast-feeding, they indicated how long. One year later, mothers were asked again to give the age of their children when breast-feeding stopped. Proceeding this way allowed reducing recall biases linked to memory for mothers who had stopped breast-feeding in the first weeks or first months of their children's lives.

4.1.1 Total duration of breast-feeding

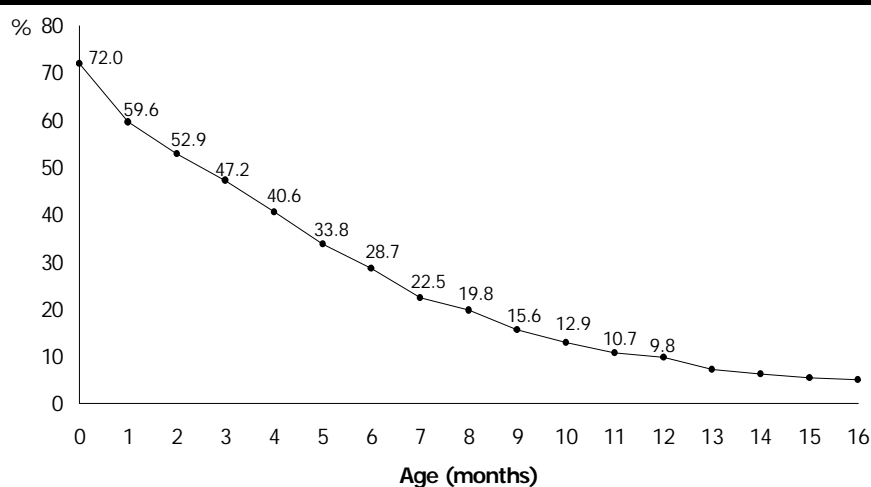
Figure 4.1 shows the prevalence of total breast-feeding from birth to 16 months, which was the age of the youngest children at the time of the second data collection (round 1999). This type of breast-feeding includes all breast-fed children, whether breast-feeding was exclusive, mixed (alternating with infant formulas), or complemented by solid foods or other liquids (water, juices, cow's milk, etc.). As can be seen, the proportion of breast-fed children declined rapidly in the first months of life. For example, whereas 72% of the children studied in Québec had been breast-fed at birth, this proportion was only 60% at 1 month of age and 47% at 3 months of age. At 6 months, about 3 children out of 10 (29%) were still being breast-fed, and for the majority breast-feeding was not exclusive.³ Finally, 16% of the children were still being breast-fed at nine months of age and only a tenth of them (10%) at 12 months. Very few children were breast-fed in accordance with the public health recommendations, which, as mentioned earlier, encourage exclusive breast-feeding until 6 months of age.

For all children together, the average duration of breast-feeding was 3.9 months⁴. This length of time varied according to the socio-economic status of the family in which the child was living between 5 months of age and about age 1½, ranging from 2.8 months for children in the most disadvantaged families to 5.0 months for those in the most well-off families (Table 4.1).

3. Let us recall that the first report of the QLSCD indicated that at 4 months of age only 6% of children were being exclusively breast-fed. We may thus assume that this proportion would be even lower at 6 months.

4. This length of time is underestimated because we considered children still being breast-fed at the time of the second round, when they were about 17 months old, to have ceased breast-feeding at 16 months of age (see note 1 of Table 4.1). For these children, we do not actually know the duration of breast-feeding. Note that for children no longer being breast-fed at 17 months of age, the average duration of breast-feeding was 3.3 months.

Figure 4.1
Prevalence of breast-feeding by age of child, Québec, 1998 and 1999



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

Table 4.1
Mean duration of breast-feeding, mean age at introduction of complementary foods and of cow's milk by family socio-economic status, Québec, 1999 and 2000

	Mean duration of breast-feeding (months) ¹	Mean age at introduction of complementary foods (weeks) ²	Mean age at introduction of cow's milk, by family socio-economic status (months) ³
	Mean		
Quintile 1 (Disadvantaged)	2.82	11.69	8.15
Quintile 2	3.52	11.54	8.31
Quintile 3	3.59	12.68	8.99
Quintile 4	4.42	13.73	9.77
Quintile 5 (Privileged)	5.04	15.16	10.59
Total	3.87	12.94	9.15

1. Mean duration of breastfeeding between birth and 16 months of age, age of the youngest children of QLSCD. The mean duration is underestimated because about 7% of the breastfed children were still breastfed at this age.

2. Mean age at introduction of complementary foods among children who had already had these foods by 5 months of age; 124 children were withdrawn because they had not yet begun to consume these foods at the time of the survey.

3. Mean age at introduction of cow's milk among children who had begun to have it at about 1½ years; 42 children were excluded because they had not yet begun to consume it at the time of the survey.

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

4.1.2 Other aspects of baby feeding

About 9 children out of 10 (90%) consumed infant formulas, either as their main means of nourishment or as a complement to or a substitute for mother's milk, at one time or another after birth (data not shown). The data presented in Table 4.2 show that between birth and 4 months of age, the proportion of children receiving infant formulas went from 33% to 77%. Infant formulas were generally replaced by cow's milk, which appears in the diets of about one baby out of four (23%) toward 6 months of age. At 9 months, around half of the children (52%) were

already taking it, and this proportion rose to 92% by 12 months of age. Toward 1½ years of age, virtually all children (98%) had begun to consume it (data not shown). It should be emphasized here that about three-quarters (72%) of the children who were around 1½ years old were being bottle-fed whereas 4.2% never had been. Among those who had stopped bottle-feeding at age 1½ (24%), around a third (7%) had stopped doing so before reaching 12 months of age (data not shown).

Table 4.2

Proportion of children consuming infant formula, cow's milk, complementary foods (purees and juices), and solid cut foods at various ages during the first year of life, Québec, 1998 and 1999

	Birth	3 months	4 months	6 months	9 months	12 months
	%					
Infant formula	33.4	70.8	76.5
Cow's milk	-	2.3 *	6.0	23.2	52.3	92.1
Complementary foods (purees and juices)	-	50.1	85.8
Solid cut foods	-	0.3 **	1.0 **	11.2	51.0	93.0

.. The questions allowing the creation of this indicator were asked only during the first round of data collection when children were about 5 months of age; the data are thus not available for other ages.

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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

The average age at which cow's milk was introduced, for children who had begun to have it at about 1½ years of age, was 9.2 months. This age varied with socio-economic status, ranging from 8.2 months in the most disadvantaged settings to 10.6 months in the most privileged (Table 4.1).

Data from the survey also reveal that babies were introduced very early to complementary foods, which included their first pureed foods as well as juices, followed by solid cut foods (Table 4.2). Half the children (50%) had already eaten complementary foods (in the form of purees or juices) by 3 months of age, and the vast majority (86%) by 4 months. The consumption of solid cut food became more common after 6 months of age, reaching its highest levels at 12 months. As such, the proportion of children having begun to eat solid cut food went from 11% at 6 months of age to 51% at 9 months of age and 93% at 12 months. In the matter of baby cereals, 22% of children were still consuming them around 1½ years of age, and about a third (36%) had stopped eating them before age 1, despite recommendations that they be continued until age 2 (data not shown).

The average age at the introduction of complementary foods (in the form of purees or juices), for children who had begun to have them at about 5 months of age, was 13 weeks. The introduction of this type of food occurred later for children of better-off families (between 12.7 and 15.2 weeks for quintiles 3, 4, and 5) than for the others (between 11.5 and 11.7 weeks for quintiles 1 and 2) (Table 4.1).

4.1.3 Results of the QLSCD and infant feeding recommendations

The results presented here reveal that the majority of children are not fed in accordance with the Québec recommendations. Indeed, the proportion of children being breast-fed, at different ages, whether exclusively so or not, was well below the recommended levels. In the same way, we find that nearly a fourth of children consumed cow's milk at 6 months of age, which is well before the recommended age of 9 months. Similarly, although it is suggested that complementary foods be introduced around 6 months of age, the majority of children had already consumed these around 4 months of age. As for baby cereals, about a third of children were already no longer consuming them at 1 year of age, although they should have been doing so until age 2. Finally, although infant formula should be given in those rare cases where breast-feeding is not possible, the majority of children around 1½ years old had had it at one time or another in their lives (Table 4.3).

Table 4.3

Comparison of certain infant dietary recommendations and objectives with data from the QLSCD, Québec, 1998 and 1999

Québec recommendations and objectives	QLSCD data
Breast-feeding at birth	
MSSS objectives for 2007 (MSSS, 2001): Breast-feeding on leaving maternity care: 85% mixed; 75% exclusive	Breast-feeding at birth: 72% mixed; 66% exclusive
Exclusive breast-feeding during first 6 months	
MSSS objectives for 2007: Breast-feeding in 2 nd month: mixed 70%; exclusive 40%	
Breast-feeding in 4 th month: mixed 60%; exclusive 30%	Exclusive breast-feeding at 4 months: 6%
Breast-feeding in 6 th month: mixed 50%; exclusive 10%	Mixed breast-feeding at 6 months: 29%
Breast-feeding until 1 year of age	
MSSS objectives for 2007: Breast-feeding at 1 year of age: 20%	Breast-feeding at 1 year of age: 10%
Introduce cow's milk between 9 and 12 months	
	Drinking cow's milk at 6 months: 23%
	Drinking cow's milk at 9 months: 52%
	Drinking cow's milk at 12 months: 92%
Introduce complementary foods at about 6 months	
	Eating complementary foods at 4 months: 86%
Introduce solid cut foods at about first birthday	
	Eating solid cut foods at 6 months: 11%
	Eating solid cut foods at 9 months: 51%
	Eating solid cut foods at 12 months: 93%
Eating baby and infant cereal until 2 years of age	
	Eating baby cereal but stopping before 1 year of age: 36%
	Eating baby cereal at about 17 months of age: 22%
Commercially prepared products for infants: should not be given except in special cases, if the baby can not be breast-feed	
	Commercially prepared products at birth: 33%
	Commercially prepared products at 4 months: 77%
	Commercially prepared products between 0 and 17 months: 90%

Sources: *Institut de la statistique du Québec, QLSCD 1998-2002; Dubois et al. (2000); MSSS (2001).*

4.2 Some habits and behaviours associated with diet

Certain factors may influence children's diets in ways that do not always allow parents full control over what their children eat. In this context, questions about the frequency with which meals are consumed outside the home were asked of mothers when their children were around 2½ years old.

Parent must also deal with a second factor that influences the food consumption of young children: the behaviour of children toward food or at meal times. These aspects were addressed in the 1999 and 2000 rounds of the QLSCD when the children were around 1½ and 2½ years old. Based on this information it has been possible to identify general behavioural patterns at these two ages and to study changes in behaviour between these ages for specific children.

4.2.1 The frequency of meals taken away from home around age 2½

The number of meals consumed outside the home was determined by counting the number of breakfasts, lunches, and dinners that children took – whether at a restaurant, in childcare, at the home of grandparents, or in any other place outside the home – during the week preceding the survey. This information was collected only for the third round of the QLSCD.

At 2½ years, only 1 child out of 5 (20%) ate all meals during the week at home (data not shown). The results presented in Table 4.4 show that nearly three-

quarters (72%) of children of this age always ate breakfast at home, 29% had all their lunches there, and 65% all their dinners. The data also show that during the 7 days before the survey, about a quarter (28%) of the children had five lunches outside the home.

Among children about 29 months of age, a little more than 4 out of 10 (42%) ate two meals or fewer per week outside the home, almost a third (30%) had from 3 to 5, and more than a quarter (28%) took six or more (Figure 4.2).

Table 4.4
Distribution of children about 29 months of age by number and type of meals eaten outside the home (during the 7 days before the survey), Québec, 2000

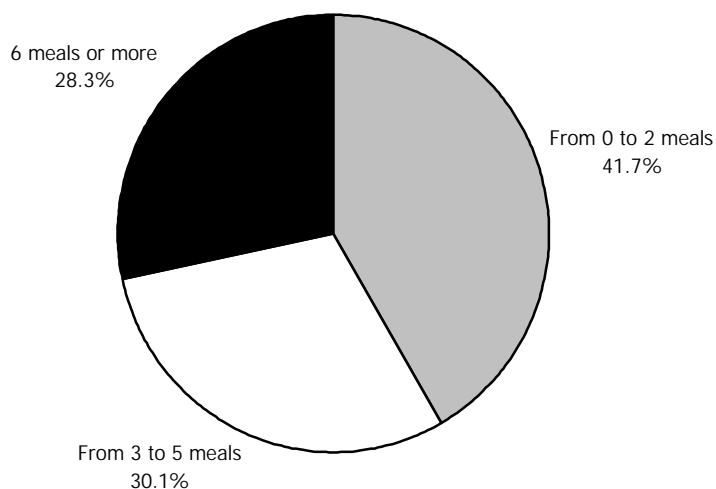
	None	Number of meals							Total
		1	2	3	4	5	6	7	
%									
Breakfast	72.3	7.7	4.8	3.8	2.2*	7.3	0.5**	1.4*	100.0
Lunch	29.0	11.5	11.1	9.3	7.1	27.6	2.4*	2.0*	100.0
Dinner	64.5	17.6	8.3	4.4	1.4*	2.3*	0.3**	1.3*	100.0

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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

Figure 4.2
Distribution of children about 29 months of age by the number of meals consumed outside the home during the 7 days before the survey, Québec, 2000



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

At this age most meals eaten outside the home were taken in childcare settings. In fact, children going to childcare centres or receiving childcare at the home of someone else because their parents were working or attending school ate meals outside the home more often than those who received childcare in their own homes or those who did not receive childcare. Since childcare arrangements are strongly associated with socio-economic status, it is hardly surprising to find that the number of meals taken outside the home also varies according to socio-economic status. The proportion of children who ate at least 6 meals a week outside ranged from 19% among children from disadvantaged families to 34% among those from well-off families (Table 4.5).

4.2.2 Some behaviours linked to diet around 1½ and 2½ years of age

When the rounds for 1999 and 2000 were conducted, mothers had to indicate the frequency of occurrence for certain child behaviours toward food and at meal

times. A greater number of behavioural dimensions were measured at 2½ years, which made it possible to derive a behavioural typology for this age. This typology allowed grouping children according to three food behaviour types. The first category includes children considered to be “picky eaters”. It includes children who were “often” picky, who ate meals that were “always” different from those the parents ate, or who “often” refused to eat. The second category applies to children who “eat at irregular hours”. It includes children who “never”, “rarely” or “sometimes” took their meals at regular times or who ate “often” between meals. Finally, the third category pertains to children who “eat too much or too fast”. It includes children who, according to the parent, “sometimes” or “often” showed this behaviour. In all other cases, the child was considered not to have the behaviour. We should emphasize that these groupings are not mutually exclusive and that, as a result, a child can manifest more than one type of behaviour.

Table 4.5

Distribution of children about 29 months of age by number of meals eaten outside the home (during the 7 days before the survey), primary mode of childcare, and family socio-economic status, Québec, 2000

	0-2 meals	3-5 meals	6 meals or more	Total	χ^2
	%				
Primary mode of childcare					
Children not receiving childcare or receiving it in their own homes	73.7	16.8	9.5	100.0	p < 0.001
Children going to childcare centres	6.5 *	49.1	44.4	100.0	
Children receiving childcare at someone else's home	12.0	40.1	47.9	100.0	
Socio-economic status					
Quintile 1 (Disadvantaged)	61.4	20.1	18.5	100.0	p < 0.001
Quintile 2	46.9	29.5	23.6	100.0	
Quintile 3	42.9	25.3	31.8	100.0	
Quintile 4	28.5	38.5	33.0	100.0	
Quintile 5 (Privileged)	28.4	37.2	34.4	100.0	
Total	41.7	30.1	28.3	100.0	

* Coefficient of variation between 15% and 25%; interpret with caution.
Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Table 4.6 shows the different dimensions of child behaviour toward food, as reported by the mother when the children were 1½ and 2½ years old.

For all children taken together, the frequency of occurrence for certain behaviours was similar at 1½ and 2½ years of age. At both ages about 6% of children always or almost always ate meals that differed from those other members of the family ate,

about 1 out of 10 qualified as picky eaters, and about 2% of them often ate too much. Other behaviours, however, varied with age. For instance, the percentage of children who never showed picky-eater behaviour and the percentage who often ate adequately declined between ages 1½ and 2½ years (Table 4.6).

Table 4.6

Distribution of children about 17 months and 29 months of age, by selected eating behaviours, Québec, 1999 and 2000

Behaviours	Questions	%	
		17 months	29 months
Difficult		..	15.3
Frequency with which child eats meals different from others	Always	1.0**	1.8*
	Almost Always	4.7	4.1
	Sometimes	18.6	11.7
	Almost Never	75.8	82.4
Frequency with which child is picky eater	Never	42.9	29.5
	Rarely	20.0	20.4
	Sometimes	28.2	37.4
	Often	8.8	12.7
Frequency with which child refuses to eat	Never	..	25.3
	Rarely	..	32.6
	Sometimes	..	37.3
	Often	..	4.9
Eats at irregular times		..	12.6
Frequency with which child eats between meals and is no longer hungry at meal times	Never	..	35.0
	Rarely	..	26.8
	Sometimes	..	32.5
	Often	..	5.7
Frequency with which child eats at regular times	Never	..	1.1*
	Rarely	..	2.0*
	Sometimes	..	5.1
	Often	..	91.7
Eats too much or too fast		..	23.0
Frequency with which child eats too much	Never	73.1	71.7
	Rarely	11.7	16.9
	Sometimes	12.5	9.4
	Often	2.6	2.0*
Frequency with which child eats too fast	Never	..	68.2
	Rarely	..	16.4
	Sometimes	..	12.3
	Often	..	3.1
Question not included in typology			
Frequency with which child eats adequately	Never	0.2**	0.5**
	Rarely	2.0*	3.6
	Sometimes	9.6	15.2
	Often	88.3	80.6

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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

When we examine the results for the same children, we find that behaviours sometimes were modified and sometimes remained the same. For instance, a third (32%) of the children who were sometimes or often picky eaters at 1½ years were not at 2½ years. By contrast, this behaviour was present among 39% of children aged 2½ who did not have it a year earlier. Among children aged 1½ who (sometimes or often) ate too much, according to their mothers, about 35% showed this behaviour a year later (data not shown).

In the same way, about half (49%) of the children who (often) did not eat enough at 1½ had this same behaviour at 2½, whereas about 15% of children who ate adequately at 1½ no longer did at 2½ (data not shown).

Generally speaking, based on the typology developed, it is estimated that about 15% of children aged 2½ were picky about food, that 13% of them ate at irregular times, and that 23% ate too much or too fast (Table 4.6). About a quarter (28%) of the children of this age who ate at irregular times also proved to be picky eaters (as opposed to 14% of those who ate at regular times). Conversely, only one-tenth of the children who ate too much or too fast were considered picky (as opposed to 17% of the others) (data not shown).

Among those behaviours studied, some were associated with the childcare arrangements or else the socio-economic status of the family. Children who did not receive childcare were more likely to be picky eaters than other children (18% as opposed to 14%) or to eat at irregular times (15% as opposed to 11%). This last behaviour, just as that of eating too much or too fast, was observed much more often among children from socio-economically disadvantaged families (Table 4.7). A relationship also exists between not eating adequately (i.e., never, rarely, or sometimes eating adequately rather than often adequately) and socio-economic status. Children from socio-economically disadvantaged families were more likely to have experienced this situation than others (data not shown).

Finally, it should be emphasized that eating meals outside the home for a week was associated with meal regularity. Children who rarely took meals outside the home (2 meals or fewer per week) were more likely (16%) to eat at irregular times than those who took from 3 to 5 outside (8.6%) (data not shown). We may therefore conclude that, for children, receiving childcare conduces to following a kind of daily routine.

Table 4.7

Proportion of children about 29 months of age having certain eating behaviours, by primary mode of childcare and family socio-economic status, Québec, 2000

	Picky eater		Eats at irregular hours		Eats too much or too fast	
	%	χ^2	%	χ^2	%	χ^2
Primary mode of childcare						
Children not receiving childcare	17.5		14.8		23.2	
Children receiving childcare in their own homes or at someone else's, or who go to childcare centres	13.7	p < 0.05	11.0	p < 0.05	22.8	Not signif.
Socio-economic status						
Quintile 1 (Disadvantaged)	16.7		19.1		30.8	
Quintile 2	16.7		17.8		20.7	
Quintile 3	17.3	Not signif.	11.0*	p < 0.001	24.0	p < 0.01
Quintile 4	13.6		9.2*		18.1	
Quintile 5 (Privileged)	12.8		6.2*		20.8	

* Coefficient of variation between 15% and 25%; interpret with caution.
Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

4.3 The frequency of consumption of different types of foods at 1½ and 2½ years of age

A food frequency questionnaire was designed in order to analyze certain elements of the contents of the diets of children when they were around 1½ and 2½ years of age. This information was not intended to measure the nutrient content of the diet, but rather to identify the categories of foods that were absent from the daily diets of children. At these ages, children do not necessarily eat large quantities of each food, but it is important for them to eat a variety of foods from each of the main groups in the Canadian Food Guide to Healthy Eating (CFG) to meet their overall nutritional needs and to develop healthful

eating habits. The food groups in the CFG are dairy products, breads and cereals, fruits and vegetables, and meats and meat substitutes.

4.3.1 The frequency of consumption of various food groups

Figure 4.3 shows the frequency with which children consumed foods from each of the food groups when they were around 1½ and 2½ years old, as determined by the method described in Box 1. We are thus able to identify the proportion of children who ate foods from each of the selected groups less than once a day, once a day, or twice or more a day.

Box 1

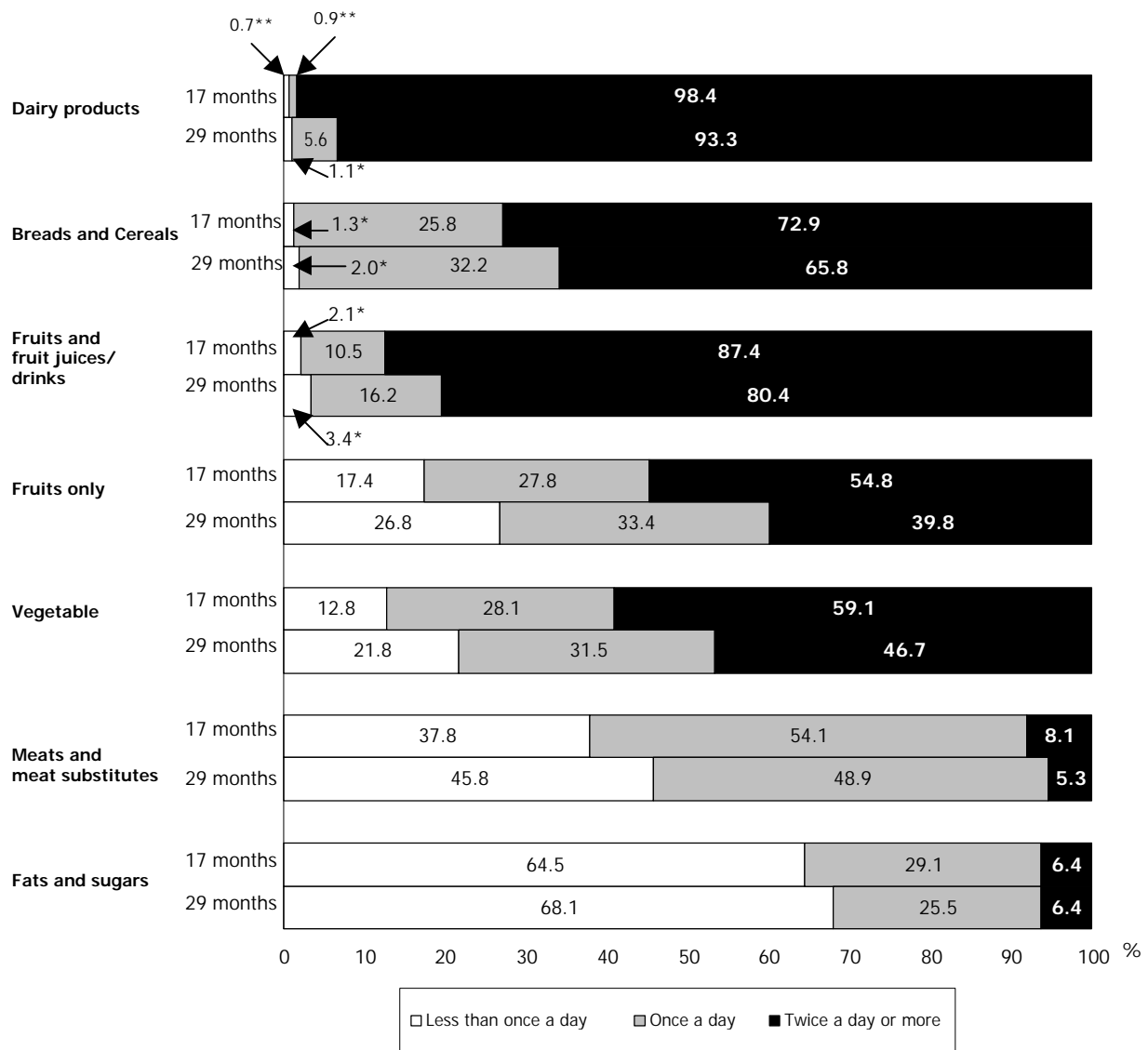
The Food Frequency Questionnaire

In the 1999 and 2000 rounds of the QLSCD, carried out when the children studied were about 1½ and 2½ years old, mothers were asked to answer a food frequency questionnaire (included in ICPO). This questionnaire contained a list of foods to which daily, weekly, and monthly consumption frequencies were assigned. Based on the responses given, six food groups, modeled on the CFG, were created. "Dairy products" included milk, cheese, yoghurt, and dairy desserts. "Breads and cereals" included bread, baby cereals and regular cereals, pastas, and rice. Unlike the groupings that appear in the CFG, fruits and vegetables were treated separately. The "fruits and fruit juices/drinks" group included fruits, fruit juices, and fruit drinks. Fruit drinks could not be distinguished from fruit juices because, at the time data were collected, a number of parents were unable to tell the difference between fruit juices and fruit drinks, primarily because some fruit drinks were vitamin-enriched or contained some fruit juice. Eating fruit by itself, apart from fruit juices or drinks, was studied separately. "Vegetables" referred to vegetables and potatoes. Fish, meats, poultry, and legumes fell under "meats and meat substitutes". The "fats and sugars" group included pastries, sweets, cookies, and chips.

The frequency questionnaire was not intended to gather information about the amount of food consumed, but rather to assess the usual frequency of consumption for different types of foods, which allowed identifying food categories that were absent from the daily diets of children. Since the frequencies were not additive, the responses were weighted so as to reflect their relative daily importance. Thus, "none" received a score of 0.0, "1 to 2 times a week" a score of 0.2, "3 to 4 times a week" 0.5, "5 to 6 times a week" 0.7, "once a day" 1.0, and "twice a day" 2.0. The scores for each identified food group were then added and finally grouped according to three categories: "less than once a day", "once a day", and "two or more times a day". For example, if a child ate fish 1 to 2 times a week, meat 3 to 4 times a week, and chicken 5 to 6 times a week, the score given to the group "meats and meat substitutes" would be 1.4 (0.2 + 0.5 + 0.7). The consumption frequency for this food group for this child would thus be "once a day".

Figure 4.3

Distribution of children by frequency of consumption of various food groups at about 17 months and 29 months of age, Québec, 1999 and 2000



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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

As can be seen, whatever their age, the vast majority of children were eating dairy products at least twice a day, although the proportion was higher for children aged 1½ years (98%) than for those aged 2½ years (93%). Children were more likely at 1½ years than at 2½ years to eat, at least twice a day, breads and cereals (73% as opposed to 66%) or fruits and fruit juices/drinks (87% compared to 80%). If we exclude fruit juices/drinks, the consumption of fruit also declined with age because 55% of children aged

1½ years had fruit at least twice a day, whereas only 40% of children aged 2½ did.

Vegetables as well as meats and meat substitutes were not only consumed less often than the other food groups, but here again the frequencies of consumption also decreased with age. For example, the proportion of children who ate few vegetables (less than once a day) went from 13% at 1½ years to 22% for 2½-year-olds. The same phenomenon can

be seen for meats and meat substitutes. More than a third (38%) of children aged 1½ years ate them less than once a day, whereas this proportion reached 46% toward the age of 2½ years. By contrast, about a third of children had fats and sweets at least once a day at both ages (35% at 1½ years and 32% at 2½ years).

It is also interesting to look at changes in the consumption of various food groups among the same children in order to identify changes occurring between the ages of 1½ years and 2½ years. The data in Table 4.8 reveal that some children maintained the same eating habits at both ages, whereas others changed them. For example, among children who had dairy products twice a day or more at about 1½ years (98%), the majority (92%) had maintained the same eating habits a year later. By contrast, when it came to breads and cereals, only half of the children consumed them at least twice a day at either age 1½ or 2½, and 15% ate them with

this frequency only at 2½. Nearly three-fourths of children (74%) had fruit and fruit juices/drinks twice a day or more at both ages. However, 10% of children did not eat fruit (excluding fruit juices/drinks) daily either at age 1½ or 2½, whereas a quarter (25%) of children ate it at least twice a day only when aged 1½ (Table 4.8).

This profile is to some extent similar for vegetables since 7% of children did not eat them daily either at age 1½ or at age 2½. Equally significant is the fact that nearly one child out of four (about 24%) did not eat meats or meat substitutes daily at either of these ages (Table 4.8).

In the case of fats and sugars, about one child out of two ate them less than once a day at both ages, whereas 15% increased the frequency of their consumption in the second year (Table 4.8).

Table 4.8

Distribution of children by changes in frequency of consumption of various food groups from 17 months to 29 months of age, Québec, 1999 and 2000

	Present both at 17 months and at 29 months	Present at 17 months but not at 29 months	Not present at 17 months but present at 29 months	Not present either at 17 months or at 29 months	Total
	%				
Less than once a day					
Dairy products	0.2 **	0.5 **	0.9 *	98.3	100.0
Breads and cereals	0.2 **	1.2 *	1.9 *	96.8	100.0
Fruits and fruit juices/drinks	0.7 *	1.4 *	2.7	95.2	100.0
Fruits only	9.6	7.8	17.3	65.4	100.0
Vegetables	6.7	6.1	15.0	72.2	100.0
Meats and meat substitutes	24.3	13.4	21.5	40.8	100.0
Fats and sugars	49.5	15.0	18.6	16.9	100.0
Twice a day or more					
Dairy products	92.0	6.3	1.3 *	0.4 **	100.0
Breads and cereals	51.1	21.7	14.7	12.5	100.0
Fruits and fruit juices/drinks	73.5	14.0	6.9	5.6	100.0
Fruits only	29.7	25.1	10.1	35.1	100.0
Vegetables	36.2	22.9	10.6	30.3	100.0
Meats and meat substitutes	1.3 *	6.8	4.1	87.9	100.0
Fats and sugars	1.0 **	5.4	5.4	88.3	100.0

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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

In sum, the recommendations concerning diet seemed difficult to follow in many cases. A sizeable proportion of children did not consume fruits or vegetables daily, or had cereal products less than twice a day. Moreover, whatever the age, about one child in three ate fats and sweets every day. For young children, however, the daily consumption of this food group is not recommended because these foods offer calories without providing the nutrients essential to growth and development.

4.3.2 Some factors associated with the consumption of various food groups

Analyses were done to verify whether links exist between the frequency of consumption of foods from each food group, at both ages, and the two context variables selected, which were the primary mode of childcare provision and the socio-economic status of the family. Overall, the relationships observed were the same at both ages. For this reason, the results reported in this section concern children who were 2½ years old.

Dairy products and breads and cereals

Given that just about all of the children (98%) consumed dairy products at least twice a day, there

was no reason to verify the presence of a relationship between context variables and this food category. As for breads and cereals, no association was found. Thus, the consumption frequency for this type of food showed no significant association with childcare arrangements or with family socio-economic status.

Fruits and fruit juices/drinks

As for dairy products, a sizeable proportion (at least 80%) of children consumed fruit and fruit juices/drinks at least twice a day, such that no variation was evident using the social variables selected. When we look at fruit consumption alone (excluding the fruit juices/drinks analyzed in the next section), we nevertheless see that the proportion of children who did not have fruit daily was higher among children who were not in childcare or who received childcare at home than those who received childcare outside the home, whether in childcare centres or at someone else's home (Table 4.9). The data in Table 4.9 also revealed that, compared with other children of the same age, children from socio-economically disadvantaged families (quintile 1) were more likely not to eat fruit every day (40% as opposed to between 21% and 27%).

Table 4.9

Distribution of children about 29 months of age by frequency of fruit consumption (excluding fruit juices/drinks), primary mode of childcare, and family socio-economic status, Québec, 2000

	Less than once a day	Once a day	Twice a day or more	Total	χ^2
	%				
Primary mode of childcare					
Children not receiving childcare or receiving it in their own homes	30.8	31.5	37.7	100.0	p < 0.01
Children going to childcare centres	22.2	31.8	46.0	100.0	
Children receiving childcare at someone else's home	23.2	36.9	39.9	100.0	
Socio-economic status					
Quintile 1 (Disadvantaged)	40.4	29.2	30.4	100.0	p < 0.001
Quintile 2	25.2	40.4	34.3	100.0	
Quintile 3	26.8	36.9	36.3	100.0	
Quintile 4	20.6	31.5	47.9	100.0	
Quintile 5 (Privileged)	21.5	27.9	50.6	100.0	
Total	26.8	33.4	39.8	100.0	

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

It should be emphasized that fruit consumption was also associated with certain child eating behaviours. For example, children who were picky eaters and those who ate at irregular times were more likely than others (38% as opposed to 25%, and 35% as opposed to 26%) to eat fruit less than once a day (data not shown).

Vegetables

As was true for fruit, the consumption frequency of vegetables was associated with family socio-economic status. As can be seen in Table 4.10, the proportion of children who ate vegetables at least twice a day ranged from 35% among the most disadvantaged families to 61% among the most well-off. By contrast, children who did not receive childcare or who

received childcare at home showed no significant differences from other children in this respect. Still, a detailed examination of the data reveals that children who did not receive childcare were more likely not to consume this type of food daily than were children in childcare, whatever the childcare arrangements (25% as opposed to 19%) (data not shown).

Here again, the consumption frequency of vegetables was related to certain child eating behaviours. For instance, all things considered, children considered to be picky eaters (40% as opposed to 18%) and those who ate at irregular times (40% as opposed to 19%) were relatively more likely than others not to eat vegetables daily (Figure 4.4).

Table 4.10

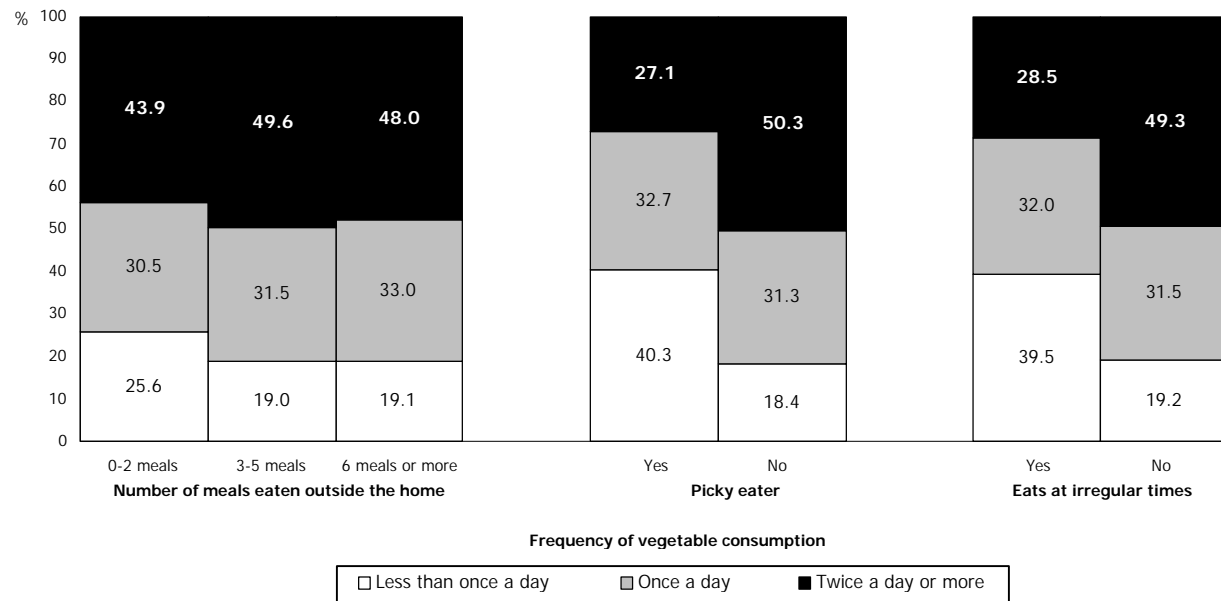
Distribution of children about 29 months of age by frequency of vegetable consumption, primary mode of childcare, and family socio-economic status, Québec, 2000

	Less than once a day	Once a day	Twice a day or more	Total	χ^2
	%				
Primary mode of childcare					
Children not receiving childcare or receiving it in their own homes	24.0	31.5	44.5	100.0	Not signif.
Children going to childcare centres	21.8	28.1	50.1	100.0	
Children receiving childcare at someone else's home	18.4	33.1	48.5	100.0	
Socio-economic status					
Quintile 1 (Disadvantaged)	33.0	31.7	35.3	100.0	p < 0.001
Quintile 2	24.6	33.1	42.3	100.0	
Quintile 3	19.7	34.8	45.5	100.0	
Quintile 4	19.4	30.7	49.9	100.0	
Quintile 5 (Privileged)	12.9	25.9	61.3	100.0	
Total	21.8	31.5	46.7	100.0	

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

Figure 4.4

Distribution of children about 29 months of age by frequency of consumption of vegetables, the number of meals eaten outside the home (during the 7 days before the survey), and certain eating behaviours, Québec, 2000



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

It would seem that children who did not eat vegetables daily, who often came from socio-economically disadvantaged families, were also more inclined not to consume either fruits and fruit juices/drinks or meats and meat substitutes on a daily basis. They were also more likely to eat breads and cereals once a day or less (39% and 26%) rather than twice or more a day (19%) (data not shown).

Meats and meat substitutes

Children from socio-economically disadvantaged families were more likely than other children to eat meats and meat substitutes at least twice a day (Table 4.11). As was the case for vegetables, however, no significant difference was observed in relation to childcare arrangements. When we compare children who received childcare, without regard for childcare arrangements, with other children, we do, however, find that a higher percentage of the former ate meats or meat substitutes at least twice a day (7% as opposed to 4%) (data not shown).

It should be emphasized that about half (56%) of children considered picky eaters ate meats and meat substitutes less than once a day, whereas the proportion that applied to other children was 44% (data not shown).

Fats and sugars

Children who did not receive childcare or children who received childcare at home were more likely than other children to eat fats and sugars daily (36% as opposed to 25% among those in childcare centres and 29% among those who received childcare in a family setting). The daily consumption of this food type was also more frequent among children from less economically privileged families (Table 4.12).

Finally, compared with other children, those considered picky eaters (41% as opposed to 30%) or those who ate at irregular times (48% as opposed to 30%) were relatively more likely to eat this type of food at least once a day (data not shown).

Table 4.11

Distribution of children about 29 months of age by frequency of meat and meat substitutes consumption, primary mode of childcare, and family socio-economic status, Québec, 2000

	Less than once a day	Once a day	Twice a day or more	Total	χ^2
	%				
Primary mode of childcare					
Children not receiving childcare or receiving it in their own homes	44.7	48.7	6.6	100.0	Not signif.
Children going to childcare centres	44.8	49.4	5.7 **	100.0	
Children receiving childcare at someone else's home	47.9	48.8	3.3 *	100.0	
Socio-economic status					
Quintile 1 (Disadvantaged)	50.3	40.4	9.3 *	100.0	p < 0.01
Quintile 2	43.8	49.8	6.4 *	100.0	
Quintile 3	46.0	49.3	4.6 **	100.0	
Quintile 4	45.8	50.5	3.7 **	100.0	
Quintile 5 (Privileged)	42.9	54.6	2.5 **	100.0	
Total	45.8	48.9	5.3	100.0	

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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

Table 4.12

Distribution of children about 29 months of age by frequency of fat and sugar consumption, primary mode of childcare, and family socio-economic status, Québec, 2000

	Less than once a day	Once a day or more	Total	χ^2
	%			
Primary mode of childcare				
Children not receiving childcare or receiving it in their own homes	64.1	35.9	100.0	p < 0.001
Children going to childcare centres	74.8	25.2	100.0	
Children receiving childcare at someone else's home	70.8	29.2	100.0	
Socio-economic status				
Quintile 1 (Disadvantaged)	63.7	36.3	100.0	p < 0.001
Quintile 2	60.2	39.8	100.0	
Quintile 3	69.5	30.5	100.0	
Quintile 4	70.6	29.4	100.0	
Quintile 5 (Privileged)	76.0	24.0	100.0	
Total	68.1	31.9	100.0	

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

4.4 Consumption of certain types of liquids

In the case of young children, it is important to analyze the total consumption of liquids (other than water), since it is easy both to consume many calories

in this form and to reduce the consumption of other foods at meal times, which reduces the diversity of the foods and nutrients ingested. Between 1 and 2 years of age, children must consume about 725 ml of whole milk (3.25%) a day, and not less than

600 ml if they are eating other dairy products. Likewise, children at this age should daily be offered about 90 ml of fruit juice enriched with vitamin C (Doré and Le Hénaff, 1997).

The total quantity of liquids taken in the form of milk (including chocolate milk) and in the form of fruit juices/drinks was evaluated when the children were about 1½ years old, whereas the consumption frequency of sweetened beverages such as soft drinks and fruit drinks was recorded when the children were about 2½ years old. When children were about 17 months old, their mothers had to indicate the quantity of milk (including chocolate milk) and fruit juices/drinks that their children had drunk on average, per day, during the week preceding the survey. In the case of soft drinks and fruit drinks, mothers were instead to indicate the frequency with which their children, then about 29 months old, had consumed them during the week preceding the survey.

4.4.1 Consumption of milk and fruit juices/drinks around age 1½ years

According to the data presented in Table 4.13, children drank on average 630 ml of milk (including

chocolate milk) and 274 ml of fruit juices/drinks per day. When these two kinds of liquids were combined, the average was 902 ml per day.

As can also be seen in Table 4.13, the average quantity of fruit juices/drinks and total liquids consumed daily by children varied by socio-economic status. Overall, children from disadvantaged families on average consumed greater quantities of fruit juices/drinks and of all liquids together (milk/chocolate milk and fruit juices/drinks) than did children from better-off families (Table 4.13). To be more precise, statistically significant differences were found among all the consumption averages for fruit juices/drinks except when comparisons were made between quintile 2 and quintile 3 and between quintile 4 and quintile 5. On average, children from more disadvantaged families also consumed greater quantities of all liquids together (milk/chocolate milk and fruit juices/drinks) than did children from better-off families (Table 4.13). It should nevertheless be emphasized that no significant difference was observed among socio-economic status categories concerning milk consumption.

Table 4.13

Mean daily consumption of milk (including chocolate milk) and of fruit juices/drinks among children about 17 months of age, by primary mode of childcare and family socio-economic status, Québec, 1999

	Milk/chocolate milk	Fruit juices/drinks	Total
	ml		
Primary mode of childcare ¹			
Children not receiving childcare or receiving it in their own homes	627	287	912
Children going to childcare centres	626	258	885
Children receiving childcare at someone else's home	635	261	893
Socio-economic status ²			
Quintile 1 (Disadvantaged)	650	351	998
Quintile 2	637	315	949
Quintile 3	632	289	919
Quintile 4	622	219	839
Quintile 5 (Privileged)	607	200	805
Total	630	274	902

1. No mean is statistically different from the others at the 5% level of significance.

2. Some means are statistically different from others at the 5% level of significance; see text.

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

It should be noted that children who had fruit or fruit juices/drinks at least twice a day drank less milk on average than other children (626 ml among the two-or-more-times-per-day group as opposed to 735 ml for the once-a-day group and 646 ml for the less-than-once-a-day group) (data not shown).

The quantity of fruit juices/drinks consumed daily per child was also associated with the consumption frequency for certain other food groups. For example, children who ate vegetables once a day or less drank on average more fruit juices/drinks than did others. Likewise, compared with other children, those who had fruit less than twice a day drank on average more fruit juices/drinks. Conversely, we found that the average quantity of fruit juices/drinks consumed daily was higher among children who consumed fats and sugars at least once a day than among others (Figure 4.5).

The total average consumption of liquids (milk/chocolate milk and fruit juices/drinks) was also associated with the frequency of consumption of fruits and of fats and sugars; no significant difference, however, was observed for vegetable consumption (Figure 4.6).

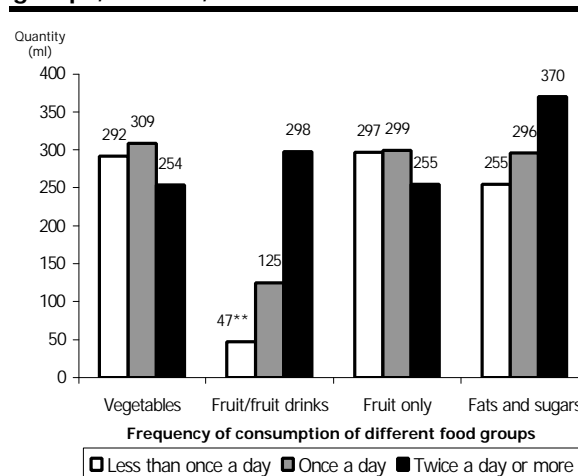
4.4.2 Consumption frequency of sweetened drinks around 2½ years of age

Around 59% of children of about 2½ years of age had not consumed soft drinks or fruit drinks during the week before the survey, 22% had consumed them 1 to 3 times during that week, 5.5% 4 to 6 times, and 14% every day⁵ (data not shown).

Children who daily drank soft drinks or other types of sweetened drinks were compared with those who drank them less frequently. The data show that the proportion of children who drank them every day was higher among children who did not receive childcare or who received childcare at home (17%) than among other children. The proportion of children who drank soft drinks or fruit drinks daily was also higher among children from the most disadvantaged families (22% or quintile 1 as opposed to between 5% and 12% for quintiles 3, 4, or 5) (Table 4.14).

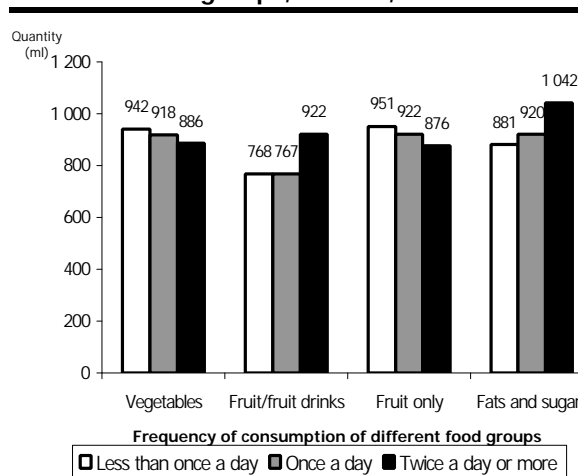
5. Grouped together here are children who consumed soft drinks or fruit drinks "once a day", "twice a day", "three times a day", and "four or more times a day".

Figure 4.5
Daily average consumption of fruit juices/drinks by children 17 months of age by frequency of consumption of various food groups, Québec, 1999



** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.
Source: Institut de la statistique du Québec, QLSCD 1998-2002.

Figure 4.6
Daily average consumption of milk/chocolate milk and fruit juices/drinks by children 17 months of age by frequency of consumption of various food groups, Québec, 1999



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

Table 4.14

Distribution of children about 29 months of age by frequency of soft drink and fruit drink consumption, primary mode of childcare, and family socio-economic status, Québec, 2000

	Less than once a day	Once a day or more	Total	χ^2
	%			
Primary mode of childcare				
Children not receiving childcare or receiving it in their own home	83.1	16.9	100.0	
Children going to childcare centres	92.0	8.0 *	100.0	p < 0.001
Children receiving childcare at someone else's home	88.4	11.6	100.0	
Socio-economic status				
Quintile 1 (Disadvantaged)	78.5	21.5	100.0	
Quintile 2	82.2	17.8	100.0	
Quintile 3	87.8	12.2	100.0	p < 0.001
Quintile 4	88.6	11.4 *	100.0	
Quintile 5 (Privileged)	94.8	5.2 *	100.0	
Total	86.4	13.7	100.0	

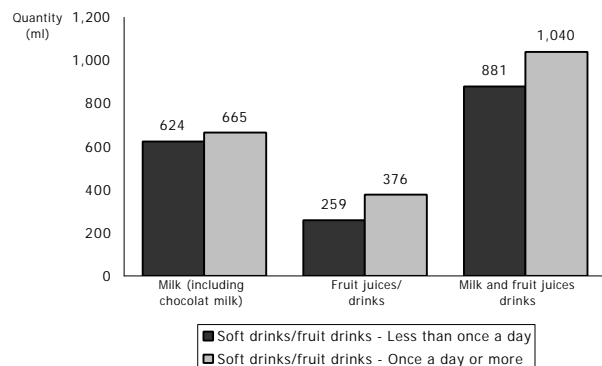
* Coefficient of variation between 15% and 25%; interpret with caution.
Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

At this age children who ate at irregular times were also more likely than the others to take sweetened drinks daily (20% as opposed to 13%) (data not shown).

As was the case for the consumption of other liquids, the daily consumption of sweetened drinks was closely related to the rest of the diet. Children who had soft drinks and/or fruit drinks daily were more likely to consume fruit (excluding juice and drinks) (36% as opposed to 25%) or milk and dairy products (3% as opposed to 1%) less than once a day, and to have vegetables less than twice a day (63% as opposed to 52%). They were, however, relatively more likely to eat meats and meat substitutes (9% as opposed to 5%) and fats and sugars (15% as opposed to 5%) (data not shown).

Finally, children who consumed sweetened drinks daily around 2½ years of age had on average drunk a greater total quantities of liquids (milk and fruit juices/drinks combined) or of fruit juices/drinks a year earlier (Figure 4.7).

Figure 4.7

Daily average consumption of various drinks among children at about 17 months of age by frequency of consumption of soft drinks/fruit drinks when about 29 months of age, Québec, 1999 and 2000

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

4.5 The influence of food insecurity before 1½ years of age on the diet of children

The results of the analyses presented in the preceding sections indicate that the diets of children are closely linked to family socio-economic status. But more precisely, what is the nature of the relationship between food insecurity caused by poverty and the diets of toddlers? To shed some light on this question, children from families in which food insecurity had

affected them between birth and about 1½ years of age were compared with others according to several characteristics. These analyses should allow us to identify some of the factors associated with food insecurity in the family and to understand better how such situations might influence the diets of young children.

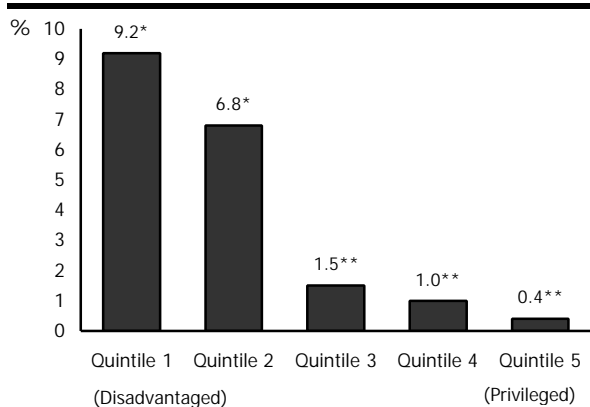
According to data from the QLSCD, 3.8% of the children of around 1½ years of age lived in families where at some point after birth they had once not had enough food because money was lacking. Among these families, about 16% acknowledged having lacked food regularly or every month, 7% more than once a month, 13% only during certain months, and 63% occasionally (data not shown).⁶ When this situation arose, these families adopted various strategies: 51% of mothers said that the family had to eat the same food several days in a row, 27% declared that adults skipped meals or ate less, and 2.5% indicated that children other than the child under study skipped meals or ate less. When asked about the kinds of help sought, about 39% of families indicated that they asked for help from relatives, 12% from friends, and 8% from their *Centre local de services communautaires* (Local Community Service Centres (CLSC)). In addition, about 20% of these families resorted to food banks to make up for food shortfalls (data not shown).

Food insecurity is closely associated with the work situation of the parents and with the poverty that it may breed. As can be seen in Figure 4.8, compared with other children of about 1½ years of age, those who had known instances of food insecurity were more likely to come from socio-economically disadvantaged families. Children whose mothers were immigrants and relatively young (20 years old or younger), as well as those who were third in birth order or later – characteristics that are often overrepresented among the economically disadvantaged – were also relatively more likely to have experienced food insecurity after birth (data not shown).

6. In order to evaluate the percentage of children about 1½ years old who had once experienced food insecurity, we asked mothers whether they or a member of their families had not eaten adequately because food or the money to buy food was lacking after the birth of their children. Since the prevalence of food insecurity was low at this age, associations considered statistically significant under chi-square tests should not be interpreted as having other than suggestive value.

Compared with others, children who had been exposed to situations of food insecurity had stopped having infant formulas at a younger age (62% as opposed to 41% before the age of 9 months) and had been given cow's milk earlier (50% as opposed to 35% before the age of 9 months). They were also more likely than others to have begun to eat complementary foods (purees and juices) (75% as opposed to 61%) prematurely (before the age of 4 months) (data not shown).

Figure 4.8
Proportion of children about 17 months of age living in families that have known food insecurity at some point after child's birth, by family socio-economic status, Québec, 1999



p < 0.001.
* Coefficient of variation between 15% and 25%; interpret with caution.
** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.
Source: *Institut de la statistique du Québec, QLSCD 1998-2002.*

Furthermore, these children were relatively more likely than others not to eat fruit daily (apart from fruit juices/drinks) towards the age of 1½ years (34% as opposed to 16% of children having never known food insecurity) or towards the age of 2½ years (data not shown). In addition, 40% of them were perceived by their mothers as often eating too much or too fast around the age of 2½; at that age this behaviour was reported among only 22% of the other children (data not shown). This behaviour might be attributable to the situations of food insufficiency to which children who had known food insecurity had been exposed, whether directly or not. It could be, for example, that some of these children ate more quickly because they were hungrier at mealtimes. It is just as possible, however, that children from families

that had known food insecurity often might have been perceived as eating too much because of their parents' limited means for purchasing food.

4.6 Diet, health, and the physical development of children

This section discusses the relationship between diet and certain aspects of child health and physical development, namely, the perceived state of children's health, the frequency of infections and the use of antibiotics among children, and their height and weight.

4.6.1 *The relationship between diet and the perception of health*

During each round of the QLSCD, the person who best knew the child was asked what his or her perception of the general state of health of the child was, whether "excellent", "very good", "good", "fair", or "poor".

Whatever their age, the majority of children were perceived as being in excellent health. In fact, more than six children out of ten (63% at 1½ years of age and 64% at 2½ years of age) were described as being in excellent health and slightly more than a quarter (26% at 1½ years and 2½ years) were declared in very good health. In all, about half the children were judged in excellent health at both ages, whereas around a fourth were considered in less than excellent health both at 1½ years and at 2½ years⁷ (data not shown).

The perceived health of children was associated with the consumption of certain food groups. For example, at 1½ years of age, children who ate vegetables at least twice a day were more likely than other children to be judged in excellent health (68% as opposed to 56%). Moreover, at this age children whose health was considered excellent daily drank, on average, less fruit juice/drinks than did other children (261 ml as opposed to 298 ml) (data not shown). At 1½ years as at 2½ years, children who did not eat fruit daily (41% at 1½ years and 40% at 2½ years) were relatively more likely than those who did eat fruit at

least twice a day (34% at 1½ years and 32% at 2½ years) to be in a state of health not considered excellent. In addition, the proportion of children aged 2½ whose health was considered less than excellent was higher among children who ate fats and sugars at least twice a day (44%) than among those who did not consume them daily (34%) (data not shown).

Perceived health was also associated with food behaviour. Thus, children who were picky eaters (44%) or who ate at irregular times (47%) were more likely than those not having these types of behaviour (34% for both types) to be in a state of health that was not considered excellent (data not shown).

Perceived health at age 2½ also varied as a function of foods eaten at age 1½. Children who had not eaten vegetables daily at 1½ years of age (42%) were more likely than those who had eaten them at least twice a day (32%) to be in a state of health considered less than excellent at 2½ years. The same was true for children who had not consumed fruits and fruit juices/drinks on a daily basis at 1½ years (62%) or fruits at 1½ years (42%) (as opposed to 35% and 37% respectively, for daily consumption). Moreover, children who had known situations of food insecurity at a given point between birth and age 1½ were more likely than other children to be in a state of health considered other than excellent at 2½ years (49% as opposed to 35%) (data not shown).

Perceived health at 2½ years of age was also associated with the consumption of certain liquids at 1½ years of age. For example, children whose health was considered less than excellent at 2½ years had drunk daily, on average, more milk (including chocolate milk) (652 ml) and more fruit juices/drinks (293 ml) when one year younger than did children considered as being in excellent health (618 ml and 264 ml respectively) (data not shown).

7. Grouped together here are children whose perceived health status was "very good", "good", "fair", and "poor".

4.6.2 The relationship between diet and infections

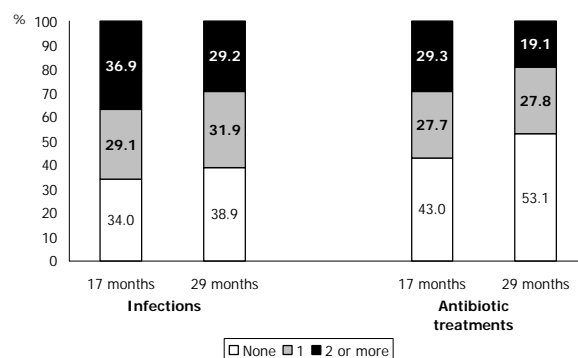
At 1½ and 2½ years, mothers were to indicate the frequency with which their children had fallen sick during the three months before the survey. The conditions this question was designed to reveal were gastrointestinal infections, otitis, respiratory infections with fever, or other infections (ex.: urinary). Mothers were also supposed to mention the frequency with which their children had had antibiotic treatments during the six months before the survey.

In spite of the fact that children were generally perceived as being in excellent health, a significant proportion of them had experienced at least one infectious episode during the three months before the survey and about half had undergone at least one antibiotic treatment during the six months before the survey (Table 4.15).

More specifically, more than six children out of ten had had at least one infectious disease – whether a single infection (29% and 32%) or two or more infections (37% and 29%) – at both ages. This led more than a quarter of the children (28%) to be given antibiotics once at both ages, and 29% and 19%, respectively, to take them at least twice during the six months preceding both occasions of data collection (Figure 4.9).

When results are analyzed for the same children, they reveal that about 15% of the children had had two infections or more (during the three months before the survey) at both ages, whereas about half (49%) had had fewer than two. In addition, about 10% of the children had had at least two antibiotic treatments (during the six months before the survey) at both ages, whereas 61% had had less than two (data not shown).

Figure 4.9
Distribution of children about 17 months and 29 months of age, by frequency of infections (during the 3 months before the survey) and antibiotic treatments (during the 6 months before the survey), Québec, 1999 and 2000



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

Children who attended childcare were more likely to have had two infections or more or to have taken antibiotics twice or more than were other children; this was the case for both ages. The differences observed, when children were 1½ years of age, between those who did not receive childcare or those who received childcare at home and those who received childcare at someone else's home, became less distinct at 2½ years of age (Table 4.16).

The data reveal a variety of relationships between the aspects of diet under study and the health of children. Figure 4.10 illustrates the relationship between various breast-feeding durations and the use of antibiotics at 2½ years. For example, children aged 2½ years who had been breast-fed for at least three months were less likely than those not breast-fed or those breast-fed less than three months to have received at least one antibiotic treatment.

Table 4.15

Distribution of children about 17 and 29 months of age, by frequency of infections (during the 3 months before the survey) and antibiotic treatments (during the 6 months before the survey), Québec, 1999 and 2000

		17 months	29 months
		%	
Infections			
Frequency with which children had had gastrointestinal infections	Not at all	76.3	78.6
	Once	20.9	19.4
	Twice	2.1*	1.8*
	3 times	0.5**	0.2**
	4 or more times	0.2**	-
Frequency with which children had had ear infections (otitis)	Not at all	68.5	80.5
	Once	22.6	15.3
	Twice	5.8	3.2
	3 times	1.3*	0.7**
	4 or more times	1.8*	0.4**
Frequency with which children had had respiratory infections with fever	Not at all	57.2	58.7
	Once	29.4	32.1
	Twice	9.4	6.9
	3 times	2.4	1.5*
	4 or more times	1.6*	0.8**
Frequency with which children had had infections other than those mentioned	Not at all	94.9	92.4
	Once	4.7	7.0
	Twice	0.2**	0.5**
	3 times	0.1**	-
	4 or more times	-	0.1**
Antibiotics			
Frequency with which children had received antibiotic treatments	Not at all	43.0	53.1
	Once	27.7	27.8
	Twice	14.9	11.6
	3 times	6.2	4.1
	4 or more times	8.2	3.4

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

** Coefficient of variation greater than 25%; imprecise estimate for descriptive purposes only.

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

Table 4.16

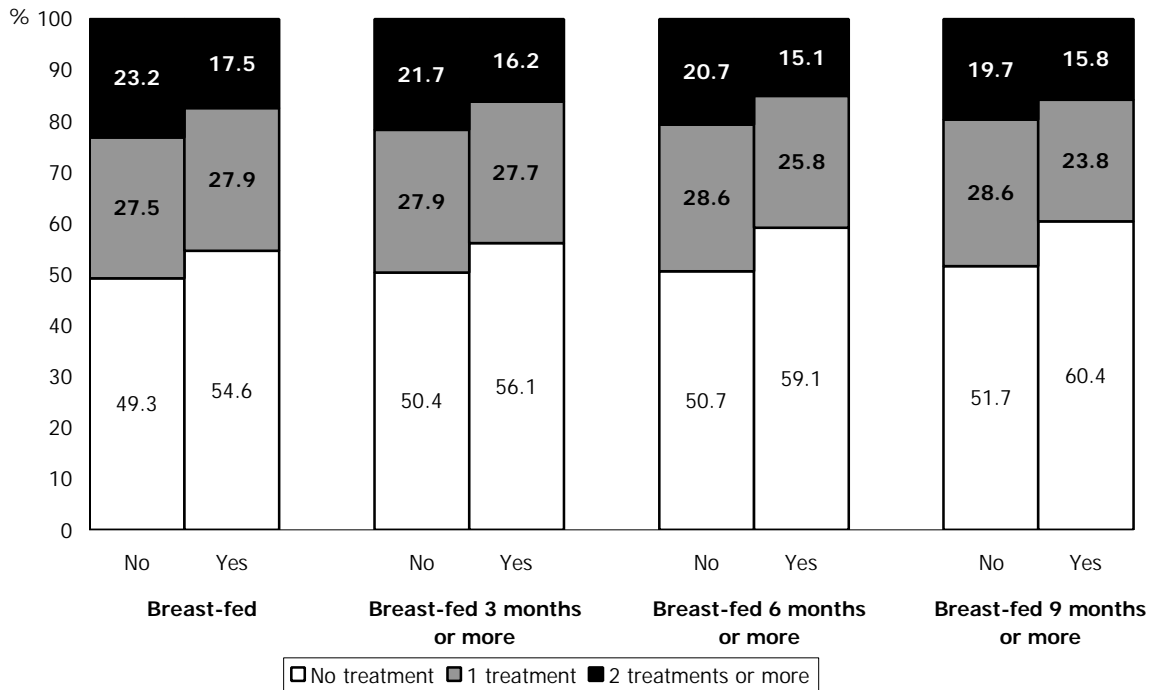
Proportion of children about 17 and 29 months of age having had at least 2 infections (during the 3 months before the survey) or at least 2 antibiotic treatments (during the 6 months before the survey), by primary mode of childcare and family socio-economic status, Québec, 1999 and 2000

	At least 2 infections				At least 2 antibiotic treatments			
	17 months		29 months		17 months		29 months	
	%	χ^2	%	χ^2	%	χ^2	%	χ^2
Primary mode of childcare								
Children not receiving childcare or receiving it in their own home	32.3		25.6		22.7		16.0	
Children going to childcare centres	49.3	p < 0.001	38.8	p < 0.001	52.4	p < 0.001	30.7	p < 0.001
Children receiving childcare at someone else's home	40.4		29.9		32.7		18.0	
Socio-economic status								
Quintile 1 (Disadvantaged)	36.1		29.2		27.1		18.5	
Quintile 2	35.3		28.7		27.7		19.4	
Quintile 3	40.4	Not signif.	28.5	Not signif.	32.3	Not signif.	20.5	Not signif.
Quintile 4	37.1		30.7		28.6		16.9	
Quintile 5 (Privileged)	35.1		28.5		29.4		19.6	

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

Figure 4.10

Distribution of children about 29 months of age by frequency of antibiotic treatments (during the 6 months before the survey) and various breast-feeding durations, Québec, 1998, 1999 and 2000



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

Similarly, children who had consumed cow's milk or certain solid foods at an earlier age were more likely to present infectious episodes at 1½ years than were those who had received these products at a later age. This relationship became less marked, however, at 2½ years, except for those children who had had cow's milk introduced before age 1. These latter were relatively more likely than others to have had at least one antibiotic treatment both at 1½ years (59% as opposed to 53%) and at 2½ years (50% as opposed to 41%) (data not shown).

Certain relationships can also be seen in connection with the current diets of children. For example, among children of about 1½ years of age, 41% of those who consumed breads and cereals less than twice a day had had two infectious episodes by this age, whereas this situation was reported only among 35% of children who ate breads and cereals at least twice a day. Children who had eaten vegetables less often (less than twice a day) at 1½ years were more likely to have been given one (50% as opposed to 44%) or two antibiotic treatments (22% as opposed to 16%) at 2½ years (data not shown).

Children of 1½ years of age who drank greater quantities of milk per day were more susceptible to infections than those who had drunk less. Thus, children who were given antibiotic treatments twice or more consumed on average more milk (656 ml) per day than did children who had not been given any (616 ml) (data not shown).

4.6.3 The relationship between diet, height, and weight in children around 2½ years old

The height and weight of children were reported by mothers when the children were 1½ and 2½ years old. Given the high non-response rate for 1½-year-old, only data obtained for children at 2½ years were analyzed. Although the height and weight reported by mothers were less accurate than anthropometrical measurements made under a standardized protocol, the data obtained did allow classifying children relative to each other. These data were analyzed according to growth charts in use in Québec (Chagnon Decelles *et al.*, 1997). These growth charts made it possible to classify each child relative to the average for the reference population

for children of the same age and the same sex, by weight for age, height for age, and weight as a function of height (or weight for height). Children were thus ranked according to the percentile in which they fell on the growth charts. For example, a child of 28 months who weighed about 11 kg would be assigned a ranking of 3. In other words, if this child had belonged to the reference population, and if this reference population had been ranked according to weight and age, this child would have ranked third in relation to other children. Weight-for-height analyses were done for underweight children (i.e., those who fell in the bottom decile [10th percentile or less] in the reference population), and for overweight children (i.e., those in the highest decile [90th percentile or higher] in the reference population). Note that after having assigned a weight-for-height percentile rank to the children, 6.2% of the data were missing. Mothers who did not report the height and weight for their 2½-year-old children in general turned out to be of lower socio-economic status. It is thus possible that relationships mediated by socio-economic status were not picked up with the analyses.

In this study, 20% of children were overweight and 7% were underweight for their ages. As for height, 12% fell in the 90th percentile or higher and 9% fell in the 10th percentile or lower for their ages. If weight for height is considered, 24% were overweight⁸ and 13% were underweight (data not shown).

Continuing our weight-for-height analyses, we note that, curiously, a higher proportion of children who ate fewer fats and sugars were overweight. Of those who ate them once a day or more, 21% were overweight, whereas this was the case for 26% of the children who did not eat them every day (data not shown). It could well be that this type of food was not the only one responsible for weight gain in toddlers. For example, the data from the QLSCD reveal that children who were overweight at 2½ years had drunk on a daily basis at 1½ years more milk (including chocolate milk) (670 ml) or more fruit juices/drinks (299 ml) on average than did other children (618 ml and 263 ml respectively). As a

consequence, the total consumption of these liquids at 1½ years was higher among children who were overweight at 2½ years (Figure 4.11). Conversely, children who were underweight at 2½ years had drunk less milk on average (580 ml) than had other children (638 ml) (data not shown).

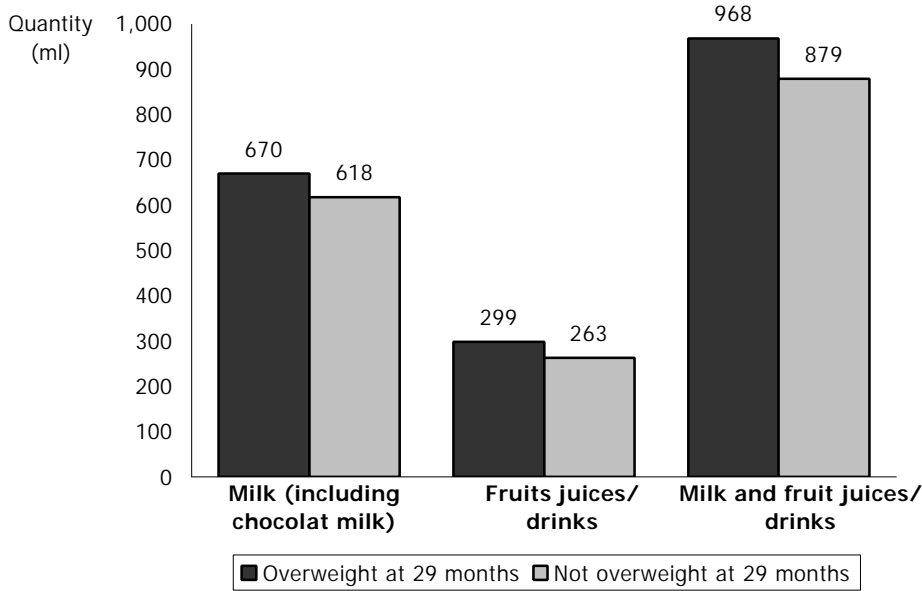
The weight of children was also associated with food behaviour. For example, children who ate too much or too fast were more likely than others to be overweight (33% as opposed to 22%) and less likely to be underweight (9% as opposed to 14%) (data not shown).

It should be emphasized that no relationship was observed between breast-feeding and weight for height (whether underweight or overweight). The same held true for the consumption of soft drinks and fruit drinks (data not shown). By contrast, a relationship was noted between the proportion of underweight children at 2½ years and the socio-economic level of the family (quintile 2 as opposed to quintile 1 and quintile 5) (Figure 4.12), whereas overweight children were almost evenly distributed across all socio-economic levels (data not shown).

8. This proportion may seem high. Let us remember, however, that height and weight measurements were reported by parent respondents. Moreover, the American charts used were for a population of children with characteristics (ex.: ethnic origin, socio-economic status) different from those of children in Québec.

Figure 4.11

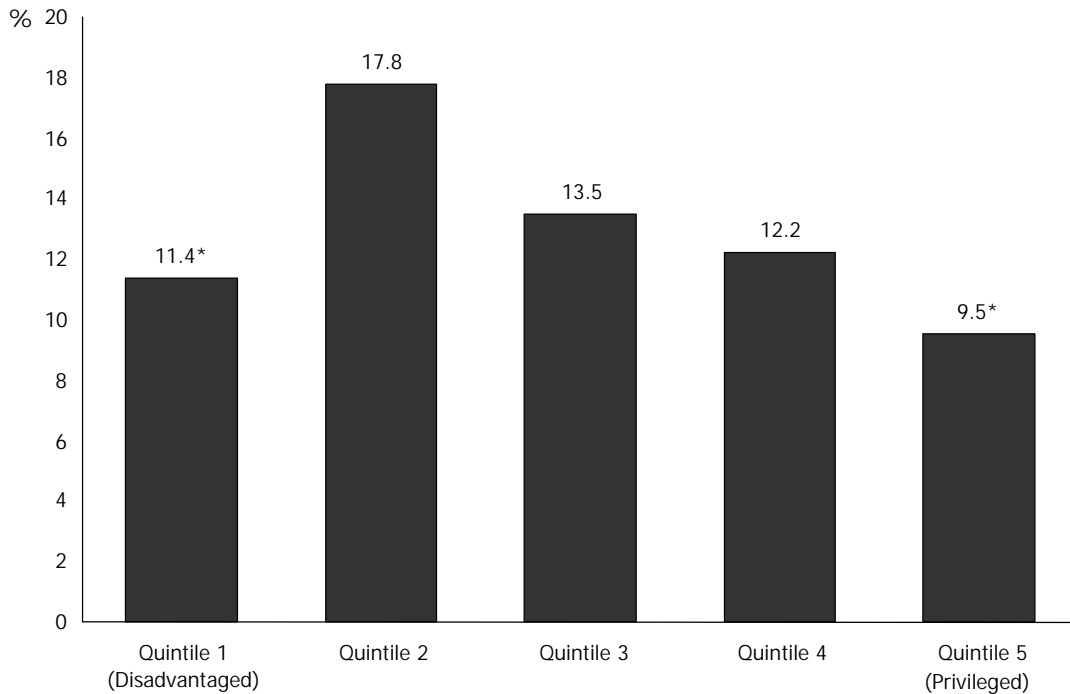
Average daily consumption of milk (including chocolate milk) and fruit juices/drinks when about 17 months of age by child weight status at about 29 months of age, Québec, 1999 and 2000



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

Figure 4.12

Proportion of underweight children about 29 months of age, by family socio-economic status, Québec, 2000



* Coefficient of variation between 15% and 25%; interpret with caution.
Source: Institut de la statistique du Québec, QLSCD 1998-2002.

5. Discussion

The first year of life of a child is riddled with new food experiences: learning to nurse at mother's breast or to drink from a baby bottle and to eat a variety of pureed and then solid cut foods, and adjusting to changes in the type of liquid nourishment taken. The results of this study bring out the diversity of practices associated with the diet of children under 3 years old. They clearly illustrate the fact that only a small number of children are fed in accordance with public health recommendations concerning infant feeding (Table 4.3).

For instance, these recommendations advocate the exclusive breast-feeding of children – without other complementary foods or liquids (and no water or bottle) – during the first 6 months of life, and the continuation of breast-feeding until age 1. Yet fewer than a third of the children in Québec studied under the QLSCD were being breast-fed – for the most part not exclusively – until 6 months of age, and only a tenth of them until age 1.

Moreover, despite recommendations that call for introducing cow's milk only after the ninth month of life, around a fourth of the children had already been given it by six months of age. Similarly, the majority of children (86%) had already eaten pureed foods by 4 months of age and about 40% of them began to eat solid cut food between 6 and 9 months. These proportions are high, given the recommendation that purees be introduced at about 6 months of age and that solid cut food be introduced around the child's first birthday. Likewise, at about 1½ years of age, around 8 children out of 10 no longer ate baby cereal (more than a third had stopped by age 1), even though it should be eaten for its iron content until age 2.

Beginning at 1 year of age, children should be offered the same food that other family members eat. Certain factors limit family control over the foods children eat, since already at 2½ years of age a sizeable proportion of children take some of their meals outside the home. Only one-fifth of children ate all their meals at home during the week whereas 3 out of 10 had between 3 and 5 meals outside the home, and a similar proportion had 6 or more. Taking meals

outside the home was associated with the socio-economic status of the family, and most of these meals were eaten in childcare settings. Yet having meals away was also positively associated with the frequency of consumption of certain food categories such as fruits and vegetables.

The dietary consumption of toddlers also depended on certain aspects of temperament. This study found that children who ate more often outside the home were less likely to be "difficult" or to eat in "irregular" ways. The presence of a daily routine among children who go to childcare might also be a contributing factor here. It could also be that children who receive childcare are exposed to a greater variety of foods, which makes them less "picky" about food. This is important because children who are picky eaters and who eat all day long also less frequently eat vegetables, fruits, and meats and meat substitutes and more often consume fats and sugars. These children, moreover, drink greater quantities of fruit juices/drinks during the day. Let us recall that a third of the children who ate at irregular times were also considered "picky" eaters by their mothers. It would, however, be interesting to be able to separate out the interactions of these various factors in order to verify whether, for example, the consumption of certain categories of foods or certain food behaviours were linked to childcare arrangements even after adjusting for family socio-economic status.

In the case of children who often ate too much or too fast around the age of 2½ years, the survey showed that they were somewhat more likely to have been exposed to situations of food insecurity (i.e., to live in a family that had not had enough to eat at some point because of a lack of money) before the age of 1½ years. It could well be that these children, some of whom still did not have adequate access to food, were hungrier at mealtimes. Being able to follow these children across time will allow us to determine whether these behaviours persist at other ages or are only transitory. In addition, it would be interesting to compare food behaviours and other types of child behaviours to find out whether observed food behaviour is a good indicator of general child behaviour, given that the former affords children

occasions for expressing themselves several times a day with their parents.

Analyzing the consumption frequencies for various types of foods brought it to our attention that breads and cereals as well as dairy products were eaten twice a day or more by the majority of children. The consumption of vegetables posed greater problems given that the proportion of children who ate them less than once a day increased between 1½ and 2½ years of age, at which point it encompassed one-fifth of the children. This tendency is all the more important because of the negative relationship observed between vegetable consumption and infections. Similarly, more than a third of children aged 1½ years and about half of those at 2½ years ate meats and meat substitutes less than once a day. We would do well to recall that a third of children had fats and sugars daily. These empty calories may reduce the appetite for other, more healthful foods, especially since the caloric needs of small children are low. Half of the children had eaten these products every day both at age 1½ and at age 2½.

It should be emphasized that the daily consumption of fruits and vegetables was positively associated with socio-economic status, whereas the consumption of fats and sugars was inversely related to it.

In the case of young children, it is also important to analyze the total consumption of liquid (other than water), because it is easy to take in large amounts of calories in this form and to reduce the consumption of other foods at mealtimes. Let us recall that between 1 and 2 years of age, children must consume about 725 ml of 3.25% milk per day, and no less than 600 ml if they are given other dairy products, a level that seemed adequate in the survey. Similarly, children at this age should daily be given about 90 ml of fruit juice containing vitamin C, a quantity sufficient to meet their needs. In this case, children drank much larger quantities of fruit juices/drinks than the amounts recommended, the average consumption among children of about 1½ years being 274 ml. This average rose to 351 ml in disadvantaged families. In these settings, the total daily consumption of liquid (other than water) could even reach 1L (1,000 ml).

Such quantities of liquids make up more than half of children's daily caloric needs, which leaves little place for solid foods. It does indeed seem that the high levels of consumption for these liquids are associated with reductions in the frequency of consumption of fruits and vegetables and are accompanied by the increased consumption of fats and sugars, which once again signals possible problem areas, particularly concerning the total number of calories that are consumed daily. The same kinds of tendencies are evident in the consumption of sweetened drinks at age 2½.

In general, children living in socio-economically privileged families had better diets. Still, a disturbing proportion of children have been exposed from early infancy to a situation of food insecurity at least once. If experienced repeatedly, such situations could have negative impacts on the health and development of children.

This is all the more true given that certain aspects of the diets of toddlers were associated with perceived health, frequency of infection, and weight among children. For example, the daily consumption of fruits and vegetables was associated with better health status and lower frequencies of infection and antibiotic use. Conversely, consuming more liquids or fats and sugars negatively affected children's health status (i.e., more frequent infections and antibiotic treatments and less favourable perceptions of health status) at both 1½ and 2½ years of age. Let us recall that at 2½ years, 24% of children were already overweight and that these children had drunk on average around age 1½ greater quantities of milk (including chocolate milk) or fruit juices/drinks than had others.

It is therefore important to strive to understand the disparity between dietary recommendations and common dietary practices in order to be able to intervene successfully with the groups most at risk.

6. Conclusion

The results of this study highlight the importance of collecting more complete data so that the nutritional value of the diets of preschool-aged children may be assessed, which will be done with the QLSCD children when they are 4 years old. It is at preschool age that dietary tastes and habits develop, and the healthful development of children to a great extent comes about through eating properly. Indeed, children who do not get all the nutritional elements essential for their development may find themselves affected both on the physical level and in their cognitive and behavioural development. For example, children who have nutrition-related problems may not do as well in school or may be more restless than those who are adequately nourished. Moreover, since preschool-aged children spend a good deal of their time in formal and informal childcare settings, it appears to be equally relevant to focus on the efficient measurement of what these children eat in these settings, which will be done when the children are 4 years old.

Québec accords great importance to child development as part of its short- and long-term vision for the health and well-being of its people. Various programs have been put in place to encourage Québec families to make the best dietary choices possible. This policy orientation makes understanding different aspects of eating and diet essential for tailoring programs to the needs of the social groups that stand to benefit the most from them, and in so doing help reduce health inequalities in the years to come.

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Glossary

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

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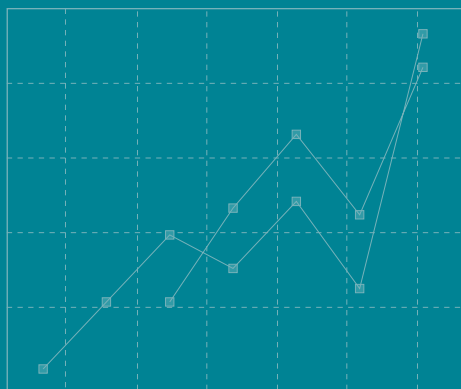
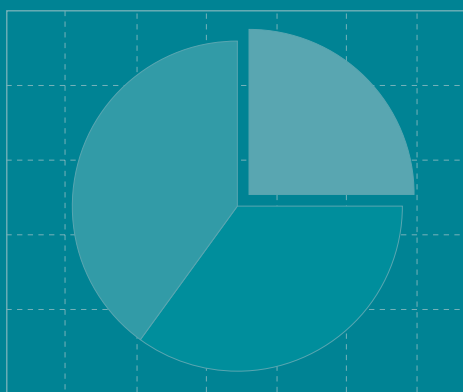
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The data presented in this issue have to do with various aspects of the diets of Québec children under three years old. This information makes it possible, for the first time, to examine feeding practices among preschool – aged children throughout the province. This issue looks at information on the total duration of breast-feeding and on the introduction of cow's milk, infant formula, and solid foods among infants. Other aspects of the feeding of toddlers also receive attention, such as the weekly frequency of meals taken outside the home, certain child eating behaviours and the consumption of certain groups of foods and liquids, as related to family socio-economic status and the settings where children receive childcare. Finally, the data analyses deal with the food insecurity experienced in the most disadvantaged families, as well as aspects of child health and physical development that may be affected by diet, such as perceived health status, height and weight, and the frequency of infections and antibiotic use. In addition to presenting aspects of children's diets at different ages, data that were collected in more than one round of the survey are examined longitudinally.



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