

Paul Bouvier<sup>1,2</sup>, André Rougemont<sup>1</sup>

<sup>1</sup> Institute of social and preventive medicine, University of Geneva

<sup>2</sup> Service de Santé de la Jeunesse, Genève

## Breast-feeding in Geneva: Prevalence, duration and determinants

### Summary

A telephone survey was carried out with the objective of measuring the prevalence, duration and determinants of breast-feeding in the canton of Geneva, between August and December 1993. The participants were 278 out of 320 families with a telephone number in Geneva, from a random sample of families in which a child had been born in Geneva in the preceding 15 months. Prevalence of breast-feeding at 1 day of life was 93.3%, at 3 months 62.5%, at 4 months 51.1%, at 6 months 28.1%; median duration was 4.2 months. For complete (exclusive or predominant) breast-feeding, results were: 1 day 87.3%, 3 months 37.5%, 4 months 19.4%, 6 months 3.8%; median duration 2.4 months. Initial prevalence of breast-feeding was significantly higher in girls (97.2%) than in boys (89.4%,  $p < 0.01$ ). Duration of breast-feeding was shorter in children of women who smoked ( $p < 0.001$ ). Relative risks for no breast-feeding at 4 months were 1.53 (95% confidence limits 1.20–1.96) for less than 15 cigarettes per day during pregnancy, and 3.65 (2.19–6.09) for 15 cigarettes or more. Duration of breast-feeding was shorter if the mother worked as an employee. Prevalence and duration were higher if the mother was originally from Africa, Asia, Middle-East or Latin American countries. Although the initial prevalence of breast-feeding was relatively high, only half of children were breast-fed at 4 months. Promotive efforts are needed to increase the duration of breast-feeding, in particular by legislation on maternal protection. Further studies are required to clarify gender differences in breast-feeding.

due to the confounding effect of other factors, in particular cigarette smoking<sup>3</sup>.

Although breast-feeding is the most natural mode of feeding babies, attempts to find alternatives have been made since the beginning of time<sup>4</sup>. When the first adapted milks appeared at the end of the 19th century<sup>5</sup>, the frequency and duration of breast-feeding began to decrease in the industrialised countries<sup>1</sup>. This trend began to reverse in the 1970s, in the USA, in Australia, then in Europe<sup>5-7</sup>. Since then, thanks to an increased awareness of the importance of breast-feeding for child survival and health, efforts have been made to promote breast-feeding in many industrialised countries. Although these efforts have led to an increase in the prevalence of breast-feeding, it remains low in some European countries<sup>5,6</sup>. For instance, the proportion of breast-fed infants in the first day of life was only 65% in Great-Britain in 1990<sup>8</sup>, and 36% in Scotland<sup>9</sup>.

In Switzerland, following WHO guidelines, it is recommended that all infants be completely breast-fed during the first 4 months, and that breast-feeding should continue as long as possible<sup>10</sup>. Unfortunately, data on the prevalence of breast-feeding are rare in this coun-

Breast milk is the ideal food for babies. Until the age of 4 to 6 months, it perfectly meets their nutritional needs<sup>1</sup>. Unlike artificial feeding, it brings important elements of protection, minimising infectious risks, and offers the best conditions for reinforcing the

mother-child links. Furthermore, breast-feeding decreases the risks for the mother for some health problems<sup>2</sup>. Some epidemiological studies suggest breast-feeding has a protective effect against the sudden infant death syndrome (SIDS), but this relationship may be in part

try<sup>11–13</sup>. This lack of data gives little credibility to the promotion of breast-feeding, and makes its evaluation impossible.

The objectives of this study were to measure the prevalence of breast-feeding in the infant population of Geneva, together with other risk factors for the sudden infant death syndrome, such as prone sleeping position and tobacco smoking by parents. Results concerning these behaviours are presented elsewhere<sup>14</sup>.

## Methods

### Population and procedures

A telephone survey was carried out in 1993 on a random sample of 550 families in which a child had been born in the preceding 12 months in the canton of Geneva. The list of families was drawn up in August 1993, and the families were interviewed between August and December 1993. As the list only included the child's and parents' names and address, telephone numbers were obtained from printed and computer directories. 320 families had a telephone number in Geneva, and constituted the study population (only about 1% of families living in Geneva have no telephone). Most other families with a child born in Geneva were probably living in other cantons or in neighbouring areas of France. Collected data included the parents' profession, country of origin and tobacco use during and after pregnancy, and the baby's birthweight, sex, and usual sleeping position. Two sets of questions dealt with the infant's feeding: firstly, feeding during the first four weeks of life; any food received, the main food, and the recommendations given at the maternity ward. Secondly, the duration of breast-feeding, and that of predominant breast-feeding.

The study protocol was approved by the Ethics Committee for research in epidemiology and public health in the Faculty of Medicine.

### Definition of variables

Following WHO recommendations<sup>15,16</sup>, we used the following definitions: breast milk (BM) includes milk expressed or from a wet nurse. Exclusive breast-feeding: only BM, with nothing else than drops or syrups with vitamins, minerals or medicines. Predominant breast-feeding: BM is the predominant source of nourishment, and the child receives some water, water-based drinks, juices or oral rehydration salts. Complementary feeding: BM together with any other food or liquid. Bottle-feeding: any liquid or semi-solid from a bottle. Complete breast-feeding includes exclusive and predominant breast-feeding. Breast feeding (any mode) includes complete and complementary breast-feeding.

Mothers' professional activities were classified in four socio-professional classes<sup>17</sup>: I. Professional, administrative. II. Clerical and skilled manual. III. Unskilled workers. IV. No paid occupation.

### Statistical analyses

Prevalence estimates of breast-feeding modes at different ages were computed by survival analyses using the product-limit method of Kaplan-Meier, applied to the retrospective data on the duration of breast-feeding. 95% confidence limits for these rates, median duration and percentiles were derived using the same methods, after smoothing the data with moving averages according to WHO recommendations<sup>16</sup>. The proportional hazards model of Cox was used for the study of the determinants of breast-feeding<sup>18</sup>. Statistical significance of the effects was based on the likelihood ratio statistic. The analyses were carried out

with the SAS/STAT 6.10<sup>19</sup> and Egret<sup>20</sup> software.

## Results

### Population

Out of 320 families with telephone in Geneva, 278 (87%) participated in the study; 24 (7.5%) refused to participate; other reasons for non-participation were either the inability to understand French, German, Spanish, Italian or English language (n = 5), or no answer to repeated telephone calls (n = 12). One questionnaire was excluded because the child's age was higher than 18 months. The 278 participant families included 6 pairs of twins. Infants ages ranged from 0.3 to 15.5 months, with a mean age of 8.43 ( $\pm 3.66$ ) months. Age distributions were similar in both sexes.

### Foods in the first weeks

91.9% of the infants had received breast milk during their first four weeks of life, either exclusively, or with other foods (Table 1). Around 16% received an adapted formula or a special milk (such as hypo-allergenic milks). One infant had received soya milk. For 85.6%, breast milk had been the principal food during this time period. 45% of the mothers declared they had received no recommendations about feeding the child in the maternity ward.

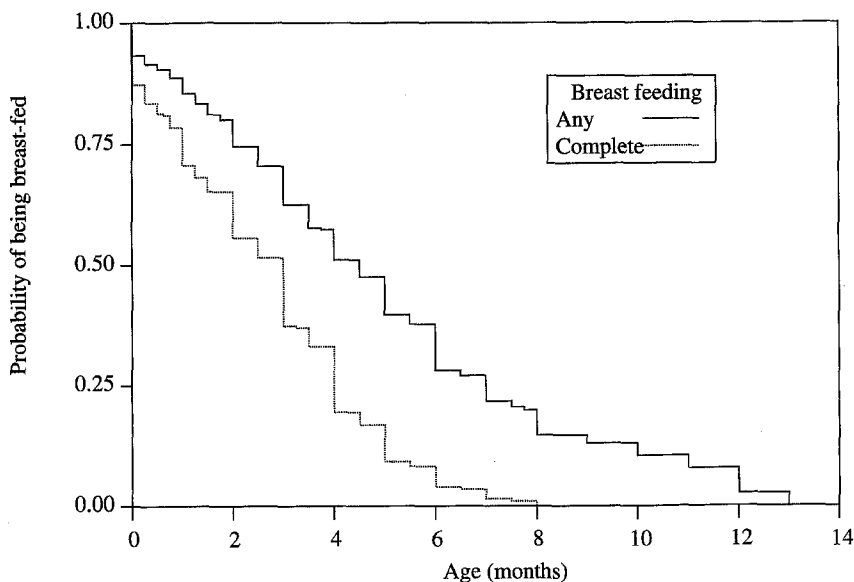
### Duration of breast-feeding

Figure 1 shows the plots of the probability of being breast-fed and of complete breast-feeding as functions of the child's age. More than 93% of infants had been breast-fed at least once, and 87.3% had been breast-fed completely during their first day of life (Table 2). The median duration was 4.2 months for breast-feeding, and 2.4 months for complete breast-feeding. At the

	All	Boys	Girls
<b>Foods received</b>			
<b>Any</b>			
breast milk	91.9	87.2	96.5***
formula	15.8	19.9	11.9*
other milks	6.7	5.7	7.7
<b>Main</b>			
breast milk	85.6	80.6	90.6*
formula	11.2	16.5	5.8
other milks	3.2	2.9	3.6
<b>Recommended</b>			
breast milk	45.5	48.9	42.1
formula	5.8	9.5	2.1
other milks	3.2	2.9	3.6
none	45.5	38.7	52.1
N	284	141	143

Note: P-value (chi square test) for the differences between sexes: \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01.

**Table 1.** Foods received and main foods received during the first 4 weeks, and foods recommended in the maternity ward.



**Figure 1.** Probability of any breast-feeding and probability of complete breast-feeding, according to child's age: Kaplan-Meier survival analysis.

age of 4 months, 19.4% of children were completely breast-fed.

Child's sex and breast-feeding

The proportion of infants who had received breast milk during the first four weeks of life was about 10% higher for girls than for boys (p = 0.004) (Table 1). The proportion bottle-fed was higher for boys (p = 0.06). Data on the duration of breast-feeding confirmed these gender differences (Figure 2): between the first and the third month of life, the proportion of breast-fed girls was significantly higher than that of boys (p < 0.01) (Table 3). These findings remained unchanged when statistically adjusting for the effect of low birth-weight in the Cox regression model. Similar differences were observed for complete breast-feeding, up to the age of 3 months. No differences between sexes were found for other infant care practices and behaviours, such as sleep position or tobacco smoking by parents.

Tobacco use

Whereas the initial proportion of breast-feeding was identical in children of smoking and non-smoking mothers, the mean duration of breast-feeding was significantly shorter for infants of smoking mothers. In that group, the proportion breast-fed decreased faster from the second month of life (Figure 3). Both maternal tobacco smoking during pregnancy and smoking in the 2 weeks before the interview were significantly associated with the duration of complete breast-feeding (P < 0.001), as well as with that of breast-feeding (P < 0.05). No significant difference was observed with fathers' smoking habits. The relative risks of weaning before the age of 4 months for children whose mothers smoked during pregnancy, compared to children whose

Breast-feeding		Any	Complete
Prevalence			
First day	%	93.3 (90.4–96.2)	87.3 (83.5–91.2)
3 months	%	62.5 (56.7–68.2)	37.5 (31.7–43.2)
4 months	%	51.1 (45.0–57.2)	19.4 (14.6–24.2)
6 months	%	28.1 (22.2–34.0)	3.8 (1.3–6.4)
12 months	%	1.2 (0.0–7.0)	0.0
Duration			
75 percentile	months	6.6 (6.0–7.7)	3.8 (3.5–4.2)
Median	months	4.2 (3.7–4.8)	2.4 (2.1–2.8)
25 percentile	months	2.0 (1.6–2.4)	0.9 (0.7–1.2)
Mean (S.E.)	months	4.9 (±0.23)	2.7 (±0.12)

**Table 2.** Prevalence (percent) and duration (months) of breast-feeding: Kaplan-Meier estimates and 95% confidence limits.

	Boys	Girls
Breast-feeding		
one day	89.4	97.2 ***
1 month	80.8	90.2 **
2 months	69.0	80.1 **
3 months	55.9	68.9 **
4 months	47.1	55.0
6 months	29.7	26.5
Complete breast-feeding		
one day	83.0	91.6 **
1 month	66.5	74.8 *
2 months	50.3	61.0 *
3 months	35.4	39.5
4 months	18.5	20.3
6 months	4.6	3.0

Note: P-values (likelihood ratio statistic test) for the differences between sexes: \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01.

**Table 3.** Prevalence of breast-feeding, according to child's sex: Kaplan-Meier estimates and significance level, for various ages.

mothers did not smoke, was 1.53 (95% confidence limits: 1.20–1.96) for less than 15 cigarettes per day, and 3.65 (2.19–6.09) for 15 cigarettes or more per day. Corresponding results for maternal smoking after pregnancy were 1.49 (1.18–1.89) for 1 to 14 cigarettes per day, and 1.99 (1.43, 2.77) for 15 or more.

#### Other determinants

Breast-feeding was associated with the mother's occupational status. Both the initial prevalence and the duration of breast-feeding were higher in children from class I (professional and administrative), compared with others (p = 0.025).

Compared to class I, the risk of weaning was significantly increased in class II (clerical and skilled manuals): relative risk = 1.80 (1.11–2.91, p = 0.017), and non-significantly increased in classes III and IV.

Prevalence of breast-feeding was higher, and its duration longer, in children whose families came from continents other than Europe, North America or Australia (p = 0.02).

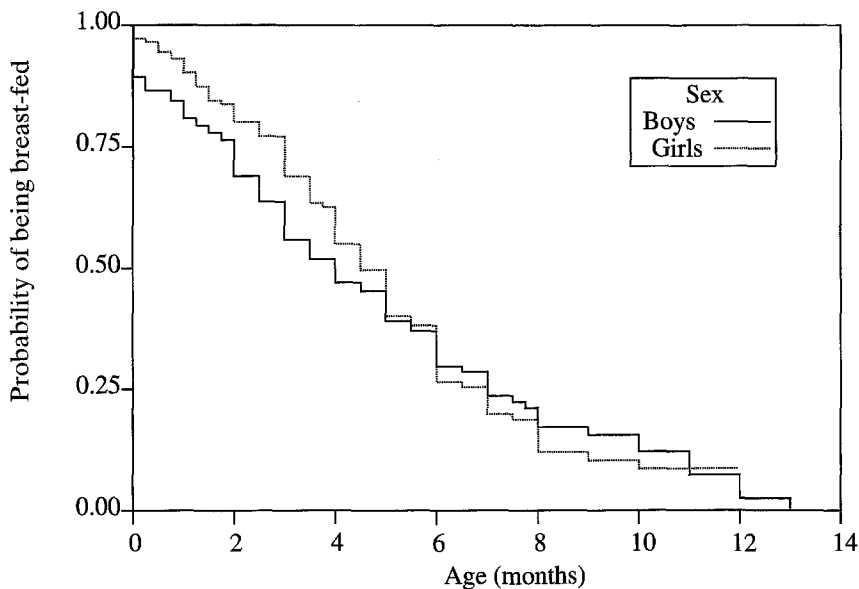
## Discussion

### Participation

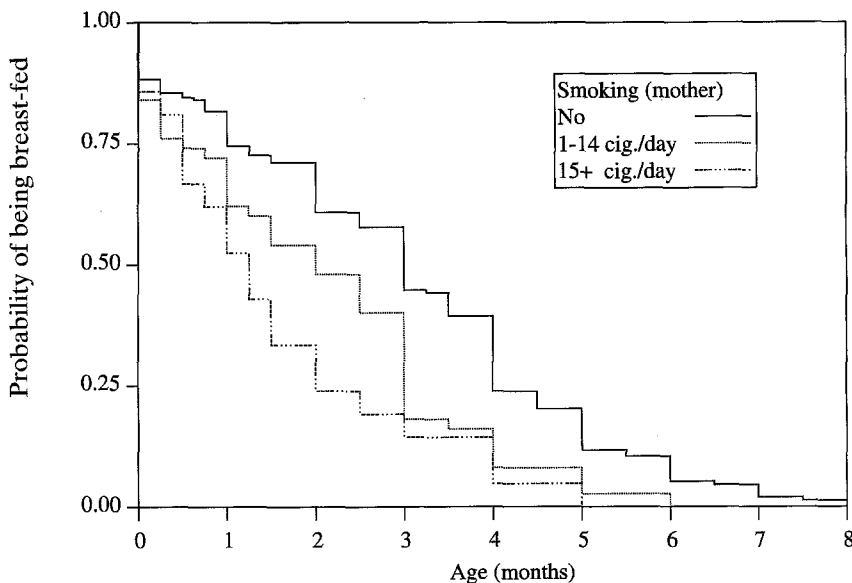
The participation in this study was very good amongst the families who were contacted by telephone. However, for a substantial number of families from the initial sample no telephone number in Geneva could be found. Although some of these families could have been contacted by post, it was decided not to do so because some of the questions about the sudden infant death syndrome were considered delicate.

### Prevalence of breast-feeding

The prevalence rate of total breast-feeding on the first day in Geneva is comparable to that observed in 1978 in the north-east region of Switzerland, and close to that observed in 1954 in Zurich and 1994 in various cantons of the country (Table 4). It is also close to the rates observed recently in Sweden and in Austria, but much higher than available rates from Spain, Italy, France and the United Kingdom. Prevalence rates at 3 and 6 months of age in Geneva were higher than those of the two former studies in Switzerland, as well than those observed in Sweden and Austria. However, these data come from studies carried out nearly 10 years ago.



**Figure 2.** Probability of breast-feeding according to child's age and sex.



**Figure 3.** Probability of complete breast-feeding according to maternal smoking at the time of the study.

**Breast-feeding and child's sex**

The prevalence of breast-feeding in the first 3 months of life was strongly associated with the infant's sex. The 4 sources of information used – main food and any foods in the first month, duration of breast-

feeding and duration of complete breast-feeding – were consistent with this observation. Furthermore, no such gender differences were present in the other practices studied. Although the question of selection bias could be raised, because of the significant number

of families from the initial sample with no telephone address in Geneva, it is hard to understand how such bias could act differentially depending on the infant's sex. We know of no other studies in developed countries with similar findings. We see no obvious explanation for such gender differences from the known determinants of breast-feeding. It may be that, for some parents, breast-feeding is perceived as a female attribute and that bottle feeding is seen as more compatible with a male role. Alternatively, bottle feeding may be preferred for boys because of the belief that it is more modern or technical, and therefore more appropriate for them. Hypotheses similar to these have been recently raised by studies in West Africa, and may reflect some kind of gender discrimination whose health effect could be the reverse of the parents' expectations<sup>21</sup>.

Differential breast-feeding may be an important factor related to many health problems and, in any case, a crucial confounding factor that should be taken into account in epidemiological studies. For instance, this effect could contribute to the known higher incidence of the sudden infant death syndrome in boys. Other studies would be needed to clarify this association and study its mechanisms.

**Breast-feeding and cigarette smoking**

Whereas breast-feeding duration was strongly reduced in children whose mothers smoked, its initial prevalence was identical to that of children of non-smoking mothers. Similar observations have been made in Sweden<sup>22</sup> and in Israel<sup>23</sup>. In another study in Israel, smoking was found to be associated with both the initial prevalence and the duration of breast-feeding<sup>24</sup>. In a Canadian study, as in our own, a dose-effect relationship was ob-

Reference	Country	Region	Year	1 day	3 months	6 months
This study	Switzerland	Geneva	1993	93 %	63 %	28 %
13	Switzerland	Various regions	1994	92 %	62 %	11 %
12	Switzerland	North, East	1978	92 %	50 %	20 %
11	Switzerland	Zurich	1954	89 %	39 %	11 %
11	Sweden	National	1984	92 %	47 %	23 %
11	Austria	National	1985	90 %	41 %	
29	Spain	National	1991	74 %	17 %	
30	Spain	Catalonia	1991	72 %		
11	Italy	12 cities	1983	72 %	32 %	19 %
31	France	National	1984	55 %		
6	UK	England, Wales	1985	65 %	26 %	22 %
32	UK	England, Wales	1990	64 %		21 %
6	UK	Scotland	1985	48 %	22 %	19 %
9	UK	Scotland	1990–1	36 %		

**Table 4.** Prevalence of breast-feeding: Results of studies in Switzerland and some recent data from Europe.

served between the quantity of cigarettes smoked and the prevalence of breast-feeding<sup>25</sup>.

The mechanisms of this association remain unclear. Early weaning may be associated with the resumption of smoking after the childbirth, because mothers fear the danger of nicotine and other toxic substances in their milk for their child. It may also be that both the smoking habits and early weaning are determined by another common factor, such as the resumption of a professional activity. Indeed, breast-feeding was more frequent and of longer duration in children of the higher socio-economic group, and shortest for those of women working as employees. This fact may be related both to differences in health-related behaviours between social classes, and to deficiencies of the current legislation on maternal care in Switzerland, which may have important consequences to the health of mothers and children. In the population of Geneva, with a high proportion of persons coming from abroad, the prevalence and duration of breast-feeding were higher in children whose parents came from African, Asian or

South-American countries. This probably reflects the practices of these countries, where breast-feeding has remained more widespread than in Europe.

More than 55 % of mothers did not remember having received any recommendations in favour of breast-feeding. Yet one of the keys to promotion of breast-feeding is the training of health professionals, and the counselling and support for breast-feeding offered in the maternity wards<sup>26</sup>. A recent meta-analysis confirms the importance of explicit policies in favour of breast-feeding in maternity wards, as well as that of the advice delivered in these services<sup>27</sup>. The continuous presence of the child beside the mother (rooming-in) and guidance for mothers about breast-feeding during their stay in the maternity ward have a beneficial effect on breast-feeding. Unfortunately, many hospitals hesitate to become engaged in this, and to formulate a clear policy to promote breast-feeding. The initiative for "Baby Friendly Hospital", launched by WHO and UNICEF in 1990, encourages hospitals to give mothers adequate and complete

information on the advantages of breast-feeding and on how to put it into practice<sup>28</sup>.

This study shows that, although a significant proportion of mothers begin breast-feeding, only about 20 % of children are completely breast-fed at 4 months, in accordance to the current recommendations<sup>10</sup>. Efforts should be made to increase the duration of breast-feeding. This implies, in Switzerland, developing the legal protection of maternity, the training of professionals and midwives in the practice of breast-feeding, and developing programmes and services to inform and support pregnant women and breast-feeding mothers.

## Zusammenfassung

### Stillen in Genf: Prävalenz, Dauer und Determinanten

Das Stillverhalten wurde mittels telefonischer Befragung der im Kanton Genf wohnhaften Familien untersucht, von August bis Dezember 1993. Unter den Familien mit einer Geburt in den 15 vorangehenden Monaten und mit einer Telefonnummer in Genf, wurden deren 320 zufällig ausgewählt. Von ihnen beteiligten sich 278 Familien an der Umfrage. Die Prävalenz des Stillens betrug am ersten Lebenstag 93,3%, mit 3 Monaten 62,5%, mit 6 Monaten 28,1%; die Mediane liegt bei 4,2 Monaten. Für ausschliesslich oder überwiegend voll gestillt war die Prävalenz am 1. Tag 87,3%, mit 3 Monaten 37,5%, mit 6 Monaten 3,8%; die Mediane liegt bei 2,4 Monaten. Die Prävalenz des Stillens zu Beginn war bei den Mädchen signifikant höher (97,2%) als bei den Knaben (89,4%,  $p < 0,001$ ). Die Stilldauer war kürzer bei den Kindern rauchender Mütter ( $p < 0,001$ ), mit einem Relative Risk von 1,53 (Vertrauensintervall von 95% 1.20–1.96) mit 4 Monaten nicht zu stillen für weniger als 15 Zigaretten pro Tag während der Schwangerschaft, und einem Relative Risk von 3.65 (2.19–6.09) bei 15 und mehr Zigaretten pro Tag. Die Stilldauer war kürzer bei Frauen, die als Angestellte arbeiteten. Die Prävalenz und die Dauer des Stillens waren höher, wenn die Mutter aus Afrika, aus Asien, aus dem mittleren Osten oder aus Lateinamerika stammte. Wenn auch die Prävalenz des Stillens am Anfang verhältnismässig hoch war, wurde dennoch nur die Hälfte der Kinder mit 4 Monaten noch gestillt. Zur Förderung des Stillens müssen vor allem Anstrengungen für eine Verbesserung des Schutzes der Mütter unternommen werden. Weitere Studien wären nötig, um den Unterschied je nach Geschlecht des Kindes zu klären.

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**Résumé****Allaitement maternel à Genève: prévalence, durée et déterminants**

La prévalence, la durée et les déterminants de l'allaitement maternel ont été mesurés par une enquête téléphonique auprès de familles vivant dans le canton de Genève, entre août et décembre 1993. 278 familles ont participé à l'étude, sur 320 familles ayant un numéro de téléphone à Genève et provenant d'un échantillon aléatoire de familles ayant eu une naissance dans les 15 mois précédents. La prévalence de l'allaitement maternel au premier jour de vie était de 93.3%; à 3 mois, 62.5%; à 4 mois 51.1%, à 6 mois 28.1%. La durée médiane était 4.2 mois. Pour l'allaitement complet (exclusif ou prédominant), les résultats étaient: 1 jour 87.3%, 3 mois 37.5%, 4 mois 19.4%, 6 mois 3.8%; durée médiane 2.4 mois. La prévalence initiale de l'allaitement maternel était significativement plus élevée chez les filles (97.2%) que chez les garçons (89.4%,  $p < 0.01$ ). La durée de l'allaitement était plus brève chez les enfants dont la mère fumait ( $p < 0.001$ ), avec des risques relatifs de non-allaitement à 4 mois de 1.53 (intervalles de confiance à 95% 1.20–1.96) pour moins de 15 cigarettes par jour durant la grossesse, et 3.65 (2.19–6.09) pour 15 cigarettes ou plus. La durée de l'allaitement était plus brève si la mère travaillait comme employée. La prévalence et la durée étaient plus élevées si la mère était originaire d'Afrique, d'Asie, du Moyen-Orient, ou d'Amérique Latine. Bien que la prévalence initiale de l'allaitement maternel était relativement élevée, la moitié seulement des enfants étaient allaités à 4 mois. Des efforts de promotion sont nécessaires pour augmenter la durée de l'allaitement, en particulier par une protection maternelle. D'autres études seraient nécessaires pour clarifier les différences d'allaitement entre les sexes.

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**Address for correspondence**

Dr. Paul Bouvier  
Institute of social  
and preventive medicine  
CMU  
1, rue Michel-Servet  
CH-1211 Genève 4