

## Breastfeeding duration, social and occupational characteristics of mothers in the French 'EDEN mother-child' cohort.

Mercedes Bonet, Laetitia Marchand, Monique Kaminski, Anne Fohran, Aisha Betoko, Marie-Aline Charles, Béatrice Blondel

► **To cite this version:**

Mercedes Bonet, Laetitia Marchand, Monique Kaminski, Anne Fohran, Aisha Betoko, et al.. Breast-feeding duration, social and occupational characteristics of mothers in the French 'EDEN mother-child' cohort.. Maternal and Child Health Journal, Springer Verlag, 2013, 17 (4), pp.714-22. <10.1007/s10995-012-1053-4>. <inserm-00912770>

**HAL Id: inserm-00912770**

**<http://www.hal.inserm.fr/inserm-00912770>**

Submitted on 6 May 2014

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## **Breastfeeding duration, social and occupational characteristics of mothers in the French ‘EDEN mother-child’ cohort**

**Mercedes Bonet<sup>a</sup> MD PhD, Laetitia Marchand<sup>a</sup> MSc, Monique Kaminski<sup>a</sup> MSc, Anne Forhan<sup>b</sup> MPH, AishaBetoko<sup>b</sup> MPH, Marie-Aline Charles<sup>b</sup> MD MPH, Béatrice Blondel<sup>a</sup> PhD, and the “EDEN Mother-Child Cohort Study Group”**

a)INSERM, UMR S953, Epidemiological Research Unit on Perinatal Health and Women’s and Childrens’ Health, Hôpital Cochin, F-75014, Paris, France; UPMC, Univ Paris 06, Paris, France.

b) INSERM, UMR 1018, Centre for Research in Epidemiology and Population Health, Lifelong Epidemiology of Diabetes, Obesity and Chronic Kidney Disease, Villejuif, France; University Paris-Sud, Faculty of Medicine, Kremlin-Bicêtre, France.

**EDEN mother–child cohort study group** MA Charles, M de Agostini, A Forhan, B Heude, P Ducimetière (UMR 1018), M Kaminski, MJ Saurel-Cubizolles, P Dargent, X Fritel, B Larroque, N Lelong, L Marchand, C Nabet (INSERM U953), I Annesi-Maesano (INSERM U707), R Slama (INSERM U823), V Goua, G Magnin, R Hankard, (Poitiers University Hospital), O Thiebaugeorges, M Schweitzer, B Foliguet (Nancy University Hospital), N Job-Spira (ANRS)

### **Full postal addresses**

a)INSERM U953, Hôpital Saint Vincent de Paul, Batiment Lelong, 82 Avenue Denfert-Rochereau, 75014 Paris, France

b)INSERM, UMR 1018, 16 Avenue Paul Vaillant-Couturier, 94807 Villejuif Cedex, France

Corresponding author

M. Bonet, INSERM U953

Hôpital Saint Vincent de Paul, Batiment Lelong, 82 Avenue Denfert-Rochereau, 75014 Paris, France

Tel +33 1 42 34 55 70. Fax: +33 1 43 26 89 79.

E-mail: [mercedes.bonet-semenas@inserm.fr](mailto:mercedes.bonet-semenas@inserm.fr)

## **Acknowledgements**

We thanks the participating families, our midwife research assistants (L Douhaud, S Bedel, B Lortholary, S Gabriel, M Rogeon, M Malinbaum) for data collection and P Lavoine, J Sahuquillo and G Debotte for checking, coding and data entry. We thank Y Akoli-Kodou, B de Lauzon-Guillain, and N Regnault for their collaboration with the construction of breastfeeding variables.

## **Abstract**

Socio-demographic characteristics of mothers have been associated with exclusive breastfeeding duration, but little is known about the association with maternal full- and part-time employment and return to work in European countries.

**Objective:** To study the associations between breastfeeding, any and almost exclusive (infants receiving breast milk as their only milk) breastfeeding, at 4 months of infant's age and the socio-demographic and occupational characteristics of mothers.

**Methods:** We used the EDEN mother-child cohort, a prospective study of 2002 singleton pregnant women in two French university hospitals. We selected all mothers (n=1339) who were breastfeeding at discharge from the maternity unit. Data on feeding practices were collected at the maternity unit and by postal questionnaires at 4, 8 and 12 months after the birth.

**Results:** Among infants breastfed at discharge, 93% were still receiving any breastfeeding (83% almost exclusive breastfeeding) at the 3<sup>rd</sup> completed week of life, 78% (63%) at 1<sup>st</sup> completed month, and 42% (20%) at 4<sup>th</sup> completed month. Time of return to work, was a major predictor for stopping breastfeeding: the sooner the mothers return to work, the less they breastfed their babies at 4 months of infant's age, independently of full-time or part-time employment. The association was stronger for almost exclusive breastfeeding mothers than for any breastfeeding ones.

**Conclusion:** In a society where breastfeeding is not the norm, women may have difficulties to combine work and breastfeeding. Specific actions need to be developed and assessed among mothers who return to work and among employers.

**Key words:** breastfeeding duration, employment, socioeconomic status, France

## **Background**

Exclusive or full breastfeeding rates at 3-4 months varied widely in Europe in 1998-2002, from 70-60% in Scandinavian countries to 35% in the Netherlands(1) and 16% (at 3-5 months) in the UK(2), and any breastfeeding rates ranged from 90-75%, to 47%(1) and 30%(2) respectively. In France, no reliable national data on breastfeeding duration is available but several studies suggest that breastfeeding rates are low.(3) Any breastfeeding rates of 15% at 3-4 months (in 2000) have been reported in the literature(1) and studies based on small samples in the 1990's suggested a median duration of any breastfeeding of around 10 weeks.(3) Any breastfeeding rates at the maternity unit were also lower in France than in other European countries(1) in the early 2000's, though they had significantly increased from 53% in 1998 to 62% in 2003 and 69% in 2010(4).

Socio-demographic characteristics of mothers have been associated with exclusive breastfeeding duration in Scandinavian(5-6) and other European(7-8) countries. These studies have shown that mothers who are older, married, multiparae, from a high social class or non-smokers breastfeed longer. Maternal occupational characteristics might also affect breastfeeding duration. In the early 2000's, studies in the UK(9)(10)(8) and the Netherlands(7) showed that maternal employment, specially full-time employment, was negatively associated with breastfeeding. Little is known about the independent effect of maternal occupational characteristics, particularly the time of maternal return to work and the full/part-time employment status, on exclusive breastfeeding duration.

Differences in parenthood and labour policies in European countries might have an impact on both breastfeeding practices and maternal employment(11). France, the UK and the Netherlands had a relatively high percentage of working mothers (not including mothers on maternity or parental leave) with children less than 3 years of age: 47%, 52% and 65% respectively in 2006(12). However, maternity leave systems differ across these countries in their eligibility criteria for maternity leave payments and maximum duration. For instance, maternity leave maximum duration is 16 full paid weeks (up to 2773 euros per month in 2006) for the 1<sup>st</sup> and for the 2<sup>nd</sup> child and 26 weeks for subsequent children in France; 16 full paid weeks in the Netherlands; and 26 paid weeks in the UK (90% of average weekly earnings for the first 6 weeks and a statutory maximum of GBP108.85 per week (in 2006) for the following weeks) followed by 26 unpaid weeks. Some European countries also offer the possibility to prolong the leave period(12), such as France where mothers also have the opportunity to take a parental leave for 3 years or to reduce the number of working hours.

The French situation concerning breastfeeding and maternal work was particularly interesting in the mid-2000's, as breastfeeding rate was relatively low(1) and maternal employment high(12). Our aim was to study the associations between any and almost exclusive breastfeeding practices at 4 months of infant's age and socio-demographic and occupational characteristics of the mothers (time of maternal return to work and full-time employment), in a French mother-child cohort.

## **Methods**

### **Data collection**

The EDEN (Etude des Déterminants pré et postnatals précoces du développement et de la santé de l'ENfant) is a prospective mother-child cohort in two French university hospitals. Its primary aim is the study of prenatal and early postnatal nutritional, environmental, and social determinants of children's development and health(13). This cohort was not specifically designed to study breastfeeding practices. Pregnant women were recruited before 24 weeks of gestation from the maternity wards of Poitiers and Nancy University hospitals between 2003 and 2006. Recruitment periods lasted 27 months in each centre.

The EDEN cohort included 2002 women (969 in Poitiers, 1033 in Nancy) and represented an estimated 55% of the eligible women giving birth in the two centres. The EDEN study received approval from the ethics committee (CCPPRB) of Kremlin Bicêtre on 12 December 2002. Files have been declared to the 'National Committee for Processed Data and Freedom' (CNIL). Written consent was obtained from the mother for herself at inclusion and for her newborn child after delivery.

An interview was carried out by a midwife during pregnancy to collect data on maternal characteristics: age, parity, educational level, family income, family origin, partnership status (marital status and living with a partner), tobacco consumption, employment (yes/no) and full-time or part-time employment during pregnancy. Medical records were used to extract data on mode of delivery, infant's characteristics at birth and during hospital stay (gestational age, birth weight and sex) and mode of infant feeding at discharge. Parents answered postal questionnaires at 4, 8 and 12 calendar months to collect data on infant feeding, partnership status, tobacco consumption, date of return to work after birth, and full-time or part-time employment.

Partnership status at 4 months after birth related to marital status (married or not) and whether the woman was living with a partner. Educational level referred to the highest

diploma obtained: less than high-school, high school diploma, some university (at least a 2-year university degree) and university degree (at least a 3-year university degree). Family origin distinguished two groups: mother, father or a grand-parent born in France (French), or one of these family members born abroad (foreign). Smoking at 4 months after the birth was classified as follows: non-smoker before pregnancy, smoker before pregnancy but non-smoker at 4 months, and smoker before pregnancy and at 4 months after birth. Return to work after birth referred to time of return to work (at 4 months after birth or before, between 5 and 8 months after birth, after 8 months). Full-time or part-time employment was known during pregnancy and at 12 months.

In each postal questionnaire, mothers described the infant's consumption of breast milk, formula, cow's milk, bottled water (up to 3 completed months of age), tap water, other fluids, and solids. At 4 months, infant feeding information was collected for the first week, the 2<sup>nd</sup> to 4<sup>th</sup> weeks of life and then for each month between the 1<sup>st</sup> and 3<sup>rd</sup> months of infant age. At 8 and 12 months, mothers retrospectively answered the question: "How old was your baby when you introduced the following foods regularly: formula, cow's milk, tap water and solids?". In the three questionnaires, mothers answered the question: "Do you still breastfeed your infant?" and if they answered "No", they were asked to give the date when they had stopped.

Almost exclusive breast infants received breast milk as their only source of milk, but they could have received other liquids or food. Any breastfeeding included all infants receiving breast milk: almost exclusive breastfeeding infants and those receiving partial breastfeeding (breast milk and formula).

### **Statistical analysis**

All mothers (n=1339) breastfeeding at discharge from the maternity unit (71% of the 1889 women with feeding status information at discharge) were selected. Data on infant feeding at 4 months of infant's age was available for 92% (n=1233) of the infants receiving any breastfeeding at discharge.

We considered any and almost exclusive breastfeeding at discharge as breastfeeding during the first week of life, because the average length of stay in maternity unit was 5.1 days in Nancy and 4.4 days in Poitiers. We then calculated breastfeeding rates at the 3<sup>rd</sup> completed week of life, and then at each completed month from 1 to 12 months of the infant's age.

Factors associated with breastfeeding at 4 completed months of infant's age (5<sup>th</sup> month of life) were studied. We chose this age because about half of breastfeeding mothers (44%) had returned to work then: 15% before 4 months after the birth and 29% during the 4<sup>th</sup> month. In addition, changes in the French recommendations on breastfeeding duration, from 4 to 6 months(14), were quite recent when we started recruiting the cohort.

The influence of the time of return to work and full- or part-time employment status at 12 months were studied, in the sub-sample of mothers who worked during pregnancy (n=979). As full- or part-time employment status was unknown at the time of return to work, we also studied the association between breastfeeding and employment status during pregnancy. Maternal occupation was strongly correlated with time of return to work and full or part-time employment, and therefore was not included in our analysis. Mothers with professional or intermediate occupations tended to return to work before 4 months and were more likely to work full-time at 12 months. In contrast, manual workers and shopkeepers tended to return to work later and to work part-time.

Pearson's  $\chi^2$  tests were used for bivariable analyses. Logistic regression models were used to study the associations between breastfeeding at 4 months of infant's age and variables significantly associated, at  $p < 0.20$ , with breastfeeding in bivariable analysis. Statistical analysis was performed using SAS 9.2 (SAS Institute Inc., Cary, NC, USA).

## **Results**

At discharge, 91.9% (n=1230) of infants included in our analysis were almost exclusive breastfed and 8.1% (n=109) were receiving mixed feeding (breast milk and formula).

Any breastfeeding decreased slowly between discharge and the 3<sup>rd</sup> completed week after birth (Figure 1), and continued to decrease steadily between the 1<sup>st</sup> and the 3<sup>rd</sup> months of infant's age. Decreases were more marked for almost exclusive breastfeeding: the proportion of infants almost exclusive breastfed decreased by 17% in the first weeks after discharge and by around 20% each month between the 1<sup>st</sup> and 3<sup>rd</sup> completed months. At 4 months of infant's age 42% of the mothers breastfeeding at discharge were giving any breastfeeding and 20% almost exclusive breastfeeding.

Breastfeeding rates at 4 months of infant's age, both any and almost exclusive breastfeeding rates, were higher among older women, multiparae, those with a higher educational level and those with a foreign family origin (Table 1). Smoking women were less likely to breastfed



than women who did not smoke at 4 months. Rates of any breastfeeding were high among both low- and high-income women, and those who did not return to work before 4 months. Almost exclusive breastfeeding was high among low-income women, but very low among women who had returned to work before 4 months. Girls were breastfed longer than boys. Breastfeeding at 4 months was not statistically associated with mode of delivery, gestational age, birthweight, or study centre.

After adjustment for all factors in Table 1, women were more likely to continue any or almost exclusive breastfeeding if they had a university degree, foreign family origin, a low family-income, had not returned to work at or before 4 months after birth and did not smoke before pregnancy. Girls were breastfed for longer than boys.

Table 2 shows breastfeeding rates at 4 months for women who worked during pregnancy. Any breastfeeding at 4 months of infant's age was higher among women returning to work after 4 months. Almost exclusive breastfeeding at 4 months increased significantly with a later return to work. Rates did not differ between women working full-time or part-time after birth. Few mothers returning to work in the first year after delivery combine breastfeeding and work: 58% had stopped breastfeeding before returning to work and 11% stopped during the month they returned to work.

After adjustment, women were more likely to continue breastfeeding if they returned to work later, had a high level of education or had a low family-income. There were no statistical differences according to full- or part-time employment at 12 months or during pregnancy (data not shown for the employment status during pregnancy). No statistical differences were found when mothers working part-time during pregnancy and at 12 months were compared to mothers working full-time. Figure 2 shows a rapid decrease in any breastfeeding in the first months after birth for women who returned to work earlier (at 4 months after birth or before), but a slower decrease for women returning to work more than 4 months after birth.

## **Discussion**

Any breastfeeding decreased slowly in the first weeks after discharge from the maternity unit, and continued to decrease steadily between the 1<sup>st</sup> and 3<sup>rd</sup> completed months of infant's age. Decreases were more marked for almost exclusive breastfeeding compared to any breastfeeding, particularly between discharge and the 3<sup>rd</sup> completed week after birth. Women were more likely to breastfeed, both any or almost exclusive breastfeeding, at 4 months if they had a university degree, a low family-income or did not smoke. Women who returned to

work before 4 months of infant's age were less likely to continue to breastfeed than women who returned to work later, independently of being full- or part-time workers. The association was stronger for almost exclusive breastfeeding mothers than for any breastfeeding ones.

The EDEN cohort is not representative of the French population of newborn infants. Compared to the national sample of births in the National Perinatal Surveys of 2003 and 2010(4), women in the present cohort were more educated, but it is difficult to know how the higher social level of the cohort could have affected our results. Nevertheless the associations between maternal socio-demographic characteristics and breastfeeding at the maternity unit in this cohort (data available at request) were similar to those observed at national level(15). Using the EDEN cohort we obtained high quality data on infant feeding. Data were verified by cross-checking infant feeding information obtained at four different points during the first year of life; missing values at 4 months were completed using subsequent questionnaires; recall periods of infant feeding were short as mother reported infant feeding practices every 4 months, and provide valid and reliable estimate of breastfeeding duration(16). Finally recruitment occurred during pregnancy and is not likely to be related to the maternal infant feeding choices during the four months after birth.

The breastfeeding rate at the maternity unit was higher in Nancy (82%), but not in Poitiers (60%), than the rates in the last National Perinatal Surveys in 2003 (63%) and 2010 (69%)(4). This reflects wide breastfeeding variations between centres. Actually, a breastfeeding promotion programme with a lactation consultant had been implemented in the early 2000's in Nancy centre and could partly explain the higher breastfeeding rate at discharge in this centre.

The percentage of any breastfeeding decreased slowly in the first 3 weeks after discharge, suggesting that returning home after discharge did not strongly influence any breastfeeding. Breastfeeding decrease was less marked in our cohort than those reported in previous French studies in the 1990's(17-18), but close to those reported in recent studies UK(9) or US(4, 19). Breastfeeding support after discharge from the maternity unit, such as home visits or peer support are not systematically proposed to all women in France and might be rare in our cohort. This lack of support during the first weeks after birth might contribute to the higher cessation of almost exclusive breastfeeding.

Socio-demographic factors related to breastfeeding initiation were also related to breastfeeding at 4 months of infant's age. The effect of these factors were quite similar for

any or almost exclusive breastfeeding. Infants with a foreign family origin were more likely to be mainly breastfed at 4 months than infants of French origin. The same trend has been shown previously for foreign mothers in France(15) and Sweden(20), and among ethnic minorities in the UK(9). These results support the hypothesis that the cultural background of the mother is an important predictor in both initiation and duration of breastfeeding.

We used maternal education and family income as indicators of the social situation of women. Our results are consistent with the literature that showed that women with a higher educational level breastfed longer(8, 19, 21-22). In contrast, associations between breastfeeding duration and income are not consistent. If most of the studies had found higher breastfeeding duration among high income women(8, 19), some studies found higher odds among poor women breastfeeding for long periods (12 months)(20) or a non significant association(22). Probably, women with low income prefer breastfeeding because of the cost of formula. A British survey showed that few women choose breastfeeding for this reason, but low-income women in the UK receive tokens to buy baby milk or infant formula(9). Finally, our findings might result from the selection of a very particular sample of low-income women who had accepted to participate in the study and the follow-up.

Maternal employment at birth was not significantly associated with breastfeeding initiation in our cohort, after adjustment for confounding factors (data not shown). This result is in accordance to previous findings in France(15). However, breastfeeding was longer among mothers who did not work before birth or return to work later. These findings are consistent with some studies(10, 23), but not all(8). The present study provides additional evidence, showing that early return to work had a greater negative effect on almost exclusive breastfeeding than on any breastfeeding. These results could be partly explained by mothers who start introducing formula or stop breastfeeding in anticipation of their return to work.

Maternal leave provisions may impact the time of return to work, but their influence in breastfeeding duration is not easy to assess(11). For example, in the mid-2000's, British women benefited from a longer maternity leave compared to Dutch women(12). However, breastfeeding rates at 3-4 months of infant's age were higher in the Netherlands than those in the UK(1), suggesting an important influence of economic, social and cultural factors(11). Furthermore the impact of recent policies towards extension of maternity leaves varied according to country. In UK this policy had little influence in the proportion of breastfeeding mothers who stopped breastfeeding before 6 months(9), whereas in Canada, extension of maternity leave, from a maximum of approximately 6 months to about 1

year, might have contributed to significant increases in the duration of any and exclusive breastfeeding(24).

We found no significant association between breastfeeding at 4 months and full- or part-time employment. This finding is in contrast with previous studies in Europe, which showed that women who worked part-time breastfed longer than women who worked full-time(8, 10), particularly for exclusive breastfeeding(7). In addition, once mothers in our cohort had returned to work, few combined breastfeeding and work when compared with data from the UK(9)or the US(23). It seems that, in general, women in France do not feel comfortable combining employment and breastfeeding or are unable to do so. In this context, the time mothers spend at work does not influence their ability to maintain breastfeeding.

There is a need to support mothers who wish to combine breastfeeding and work. In most European countries, legislation relating to breastfeeding for working mothers does not meet the minimum standards recommended by the International Labour Organization (ILO) 183 Convention(25). For example, in France and the UK, there is no specific legislation for job protection and non-discrimination for breastfeeding mothers or standards regarding paid breastfeeding breaks. We do not know to what extent mothers in our cohort and their employers were aware of breastfeeding mothers' rights in the workplace in France(26) and whether mothers took lactation breaks, or had access to facilities to breastfeed or to express milk at work. Different strategies to combine work and breastfeeding have been described in the literature(27),such as pumping at the workplace, child care available on site, allowing the mother to leave work to go to breastfeed the infant, and having the infant brought to the work site. However, no randomized trial was carried out to assess the effectiveness of workplace interventions, such as lactation breaks, and physical and childcare facilities, to promote breastfeeding(28). Nevertheless, observational studies suggest that workplace interventions (time off for baby's illness, flexible time, part-time work)(9) contribute to breastfeeding among working mothers. In addition, lactation support at work have been recognised as cost-effective by employers, decreasing for example absenteeism and staff turnover(29).

In a society where breastfeeding is not the norm, it is difficult to support working mothers who wish to continue breastfeeding. In France, recent proposals in relation to breastfeeding have sought to enable more women to combine work and breastfeeding and to promote breastfeeding in childcare settings(30-31). Recent attempts to increase maternity leave entitlements have failed(32). Increasing the length of maternity leave in France could allow more mothers who initiate breastfeeding to continue and could promote mother-infant

bonding for all mothers, whether they are breastfeeding or not. However, it might not be easy to implement a longer maternity leave without adverse effects on mothers' professional careers or without increasing social disparities between women who need to return to work for financial reasons and those who can choose to extend their maternity leave.

## **Conclusion**

Breastfeeding at 4 months of infant's age was low in this study and failed to meet international(33) and French(14) breastfeeding duration recommendations. Socio-demographic characteristics of the mothers had a similar effect on any or almost exclusive breastfeeding duration. Return to work was a major predictor for stopping breastfeeding before 4 months, particularly for almost exclusive breastfeeding. In a society where breastfeeding is not the norm, it might be difficult to support working mothers who wish to continue breastfeeding. Specific actions need to be developed among mothers who return to work in the first months after their child's birth and among employers and co-workers.

**Funding:** Sources of funding for the EDEN study: Fondation pour la Recherche Médicale (FRM), French Ministry of Research: IFR programme, INSERM Human Nutrition National Research Programme, and Diabetes National Research Programme (through collaboration with the French Association for Diabetes Research (ARD)), French Ministry of Health, French Agency for Environment Security (AFFSET), French National Institute for Population Health Surveillance (INVS), Paris–Sud University, French National Institute for Health Education (INPES), Nestlé, Mutuelle Générale de l'Éducation Nationale (MGEN), French speaking association for the study of diabetes and metabolism (ALFEDIAM), National Agency for Research (ANR non-thematic programme), National Institute for Research in Public health (IRESP: TGIR cohorte santé 2008 programme). Statistical analyses were carried out in complete independence of funders.

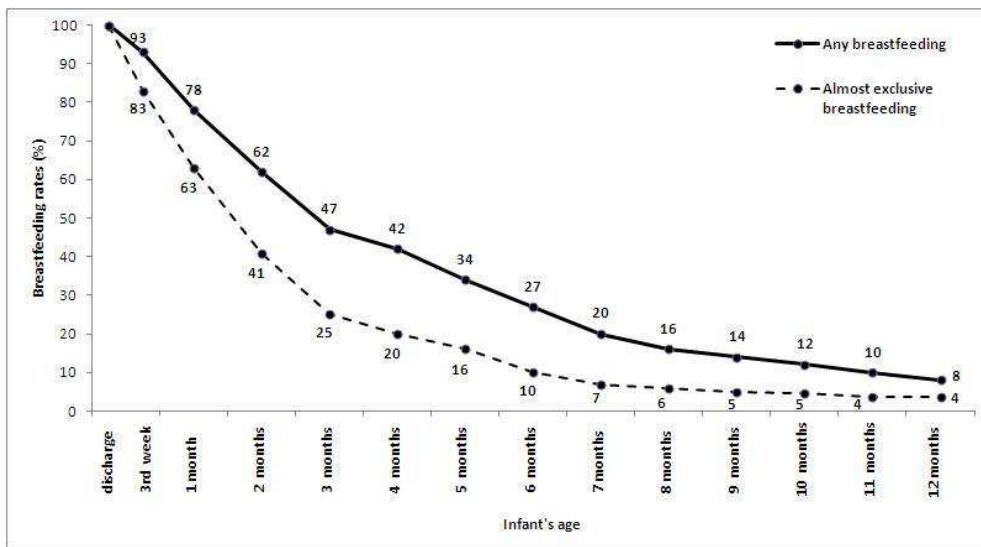
## References

1. Cattaneo A, Yngve A, Koletzko B, Guzman LR. Protection, promotion and support of breast-feeding in Europe: current situation. *Public Health Nutr.* 2005 Feb;8(1):39-46.
2. Hamlyn B, Brooker S, Oleinikova K, Wands S. *Infant Feeding 2000*. London,UK: Stationery Office; 2002.
3. Castetbon K, Duport N, Hercberg S. [Drawlines for the surveillance of breastfeeding in France]. *Rev Epidemiol Sante Publique.* 2004 Oct;52(5):475-80.
4. Blondel B, Kermarrec M. *Enquête Nationale Périnatale 2010: les naissances en 2010 et leur évolution depuis 2003*. Paris, France, 2011.[http://www.sante.gouv.fr/IMG/pdf/Les\\_naissances\\_en\\_2010\\_et\\_leur\\_evolution\\_depuis\\_2003.pdf](http://www.sante.gouv.fr/IMG/pdf/Les_naissances_en_2010_et_leur_evolution_depuis_2003.pdf)[Last accessed October 2011] [in French]
5. Lande B, Andersen LF, Baerug A, Trygg KU, Lund-Larsen K, Veierod MB, et al. Infant feeding practices and associated factors in the first six months of life: the Norwegian infant nutrition survey. *Acta Paediatr.* 2003;92(2):152-61.
6. Ludvigsson JF, Ludvigsson J. Socio-economic determinants, maternal smoking and coffee consumption, and exclusive breastfeeding in 10205 children. *Acta Paediatr.* 2005 Sep;94(9):1310-9.
7. Lanting CI, Van Wouwe JP, Reijneveld SA. Infant milk feeding practices in the Netherlands and associated factors. *Acta Paediatr.* 2005 Jul;94(7):935-42.
8. Skafida V. Juggling Work and Motherhood: The Impact of Employment and Maternity Leave on Breastfeeding Duration: A Survival Analysis on Growing Up in Scotland Data. *Matern Child Health J.* 2011 Jan 28.
9. Bolling K, Grant C, Hamlyn B, Thornton A. *Infant Feeding Survey 2005*. London: The Information Centre Part of the Government Statistical Service 2007.
10. Hawkins SS, Griffiths LJ, Dezateux C, Law C. The impact of maternal employment on breast-feeding duration in the UK Millennium Cohort Study. *Public Health Nutr.* 2007 Sep;10(9):891-6.
11. Galtry J. The impact on breastfeeding of labour market policy and practice in Ireland, Sweden, and the USA. *Soc Sci Med.* 2003 Jul;57(1):167-77.
12. OECD Family database.[http://www.oecd.org/document/4/0,3343,en\\_2649\\_34819\\_37836996\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/4/0,3343,en_2649_34819_37836996_1_1_1_1,00.html). [Last accessed October 2011]
13. Drouillet P, Forhan A, De Lauzon-Guillain B, Thiebaugeorges O, Goua V, Magnin G, et al. Maternal fatty acid intake and fetal growth: evidence for an association in overweight women. The 'EDEN mother-child' cohort (study of pre- and early postnatal determinants of the child's development and health). *Br J Nutr.* 2009 Feb;101(4):583-91.

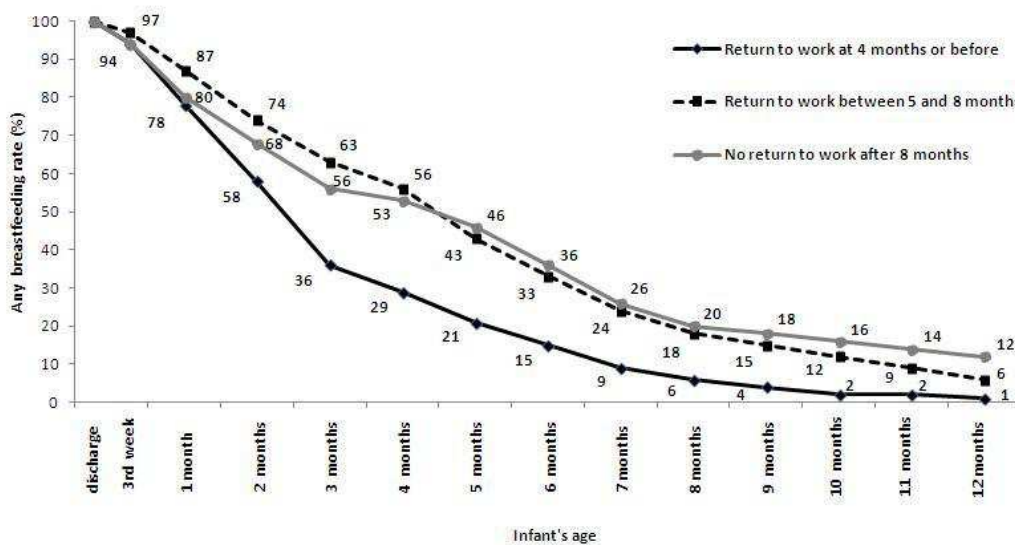
14. Agence Nationale d'Accréditation et d'Evaluation en Santé. Breast feeding: implementation and continuation through the first six months of life. Recommendations (May 2002). *Gynecol Obstet Fertil.* 2003 May;31(5):481-90. [in French]
15. Bonet M, Kaminski M, Blondel B. Differential trends in breastfeeding according to maternal and hospital characteristics: results from the French National Perinatal Surveys. *Acta Paediatr.* 2007 Jul 31;96(9):1290-5.
16. Li R, Scanlon KS, Serdula MK. The validity and reliability of maternal recall of breastfeeding practice. *Nutr Rev.* 2005 Apr;63(4):103-10.
17. Labarere J, Dalla-Lana C, Schelstraete C, Rivier A, Callec M, Polverelli JF, et al. Initiation and duration of breastfeeding in obstetrical hospitals of Aix-Chambery (France). *Arch Pediatr.* 2001 Aug;8(8):807-15.[in French]
18. Branger B, Cebron M, Picherot G, de Cornulier M. Factors influencing the duration of breast feeding. A study of 150 women. *Arch Pediatr.* 1998 May;5(5):489-96.[in French]
19. Li R, Darling N, Maurice E, Barker L, Grummer-Strawn LM. Breastfeeding rates in the United States by characteristics of the child, mother, or family: the 2002 National Immunization Survey. *Pediatrics.* 2005 Jan;115(1):e31-7.
20. Wallby T, Hjern A. Region of birth, income and breastfeeding in a Swedish county. *Acta Paediatr.* 2009 Nov;98(11):1799-804.
21. Lande B, Andersen LF, Veierod MB, Baerug A, Johansson L, Trygg KU, et al. Breast-feeding at 12 months of age and dietary habits among breast-fed and non-breast-fed infants. *Public Health Nutr.* 2004 Jun;7(4):495-503.
22. Forste R, Hoffmann JP. Are US mothers meeting the Healthy People 2010 Breastfeeding Targets for initiation, duration, and exclusivity? The 2003 and 2004 National Immunization Surveys. *J Hum Lact.* 2008 Aug;24(3):278-88.
23. Guendelman S, Kosa JL, Pearl M, Graham S, Goodman J, Kharrazi M. Juggling work and breastfeeding: effects of maternity leave and occupational characteristics. *Pediatrics.* 2009 Jan;123(1):e38-46.
24. Baker M, Milligan K. Maternal employment, breastfeeding, and health: evidence from maternity leave mandates. *J Health Econ.* 2008 Jul;27(4):871-87.
25. Cattaneo A, Burmaz T, Arendt M, Nilsson I, Mikiel-Kostyra K, Kondrate I, et al. Protection, promotion and support of breast-feeding in Europe: progress from 2002 to 2007. *Public Health Nutr.* 2010 Jun;13(6):751-9.
26. Herzog-Evans M. Aspects juridiques de l'allaitement maternel en France. *RD sanit soc.* 2001;37(2):223-40. [in French]
27. Fein SB, Mandal B, Roe BE. Success of strategies for combining employment and breastfeeding. *Pediatrics.* 2008 Oct;122 Suppl 2:S56-62.

28. Abdulwadud OA, Snow ME. Interventions in the workplace to support breastfeeding for women in employment. *Cochrane Database Syst Rev.* 2007(3):CD006177.
29. Shealy K, Li R, Benton-Davis S, Grummer-Strawn L. *The CDC Guide to Breastfeeding Interventions.* Atlanta: Centers for Disease Control and Prevention 2005.
30. Boyer V. Rapport parlementaire sur la prévention de l'obésité In: Mission sur la prévention de l'obésité, editor: Assemblée Nationale, 2008. <http://www.assemblee-nationale.fr/13/rap-info/i1131.asp> [Last accessed October 2011] [in French]
31. Salle B. L'alimentation du nouveau né et du nourrisson. In: Groupe de travail Nutrition EdCeRA, editor: Académie de Médecine, 2009. <http://www.academie-medecine.fr/detailPublication.cfm?idRub =26&idLigne= 1507>[Last accessed October 2011][in French]
32. Assemblée Nationale. Proposition de loi relative à la modernisation du congé maternité en faveur de la protection de la santé des femmes et de l'égalité salariale et sur les conditions d'exercice de la parentalité. *N° 1468*, 2009. <http://www.assemblee-nationale.fr/13/propositions/pion1468.asp> [Last accessed October 2011]
33. WHO. Indicators for assessing infant and young child feeding practices. Part 1, Definitions. Conclusions of a consensus meeting held 6-8 November 2007. Washington, DC, 2008:26.





**Figure 1- Any and almost exclusive breastfeeding between discharge from maternity unit and 12 months of infant's age.** Includes 1339 any breastfeeding and 1230 almost exclusive breastfeeding mothers who were breastfeeding at discharge from the maternity unit. Infant's age in completed weeks or months.



**Figure 2- Any breastfeeding between discharge from maternity unit and 12 months of infant's age among women who worked during pregnancy.** Includes 979 mothers who worked during pregnancy and who were breastfeeding at discharge from the maternity unit. Infant's age in completed weeks or months.

**Table 1. Factors associated with breastfeeding at 4 months of infant's age among mothers breastfeeding at discharge from maternity unit (n=1339)**

	N	Any breastfeeding				Almost exclusive breastfeeding			
		%	p	aOR	(95% CI)	%	p	aOR	(95% CI)
<b>Maternal age, years</b>									
<=24	164	26.8	<0.001	0.6	(0.4, 0.9)	14.0	0.006	0.7	(0.4, 1.4)
25-34	869	43.2		1		19.0		1	
>=35	200	52.0		1.2	(0.8, 1.7)	27.0		1.2	(0.8, 1.9)
<b>Parity</b>									
Primipara	580	39.7	0.005	1		15.3	<0.001	1	
1	431	41.1		0.9	(0.7, 1.3)	19.7		1.2	(0.9, 1.8)
>=2	221	52.0		1.1	(0.7, 1.6)	30.8		1.4	(0.9, 2.3)
<b>Partnership status at 4mo after birth</b>									
Married	685	46.3	0.02	1		21.5	0.35	1	
Cohabiting	449	38.1		1.0	(0.8, 1.3)	18.0		1.1	(0.8, 1.6)
Single	39	48.7		1.8	(0.8, 4.2)	17.9		0.9	(0.3, 2.2)
<b>Maternal education level</b>									
Lower than high school	265	29.4	<0.001	1		15.8	0.22	1	
High school diploma	208	37.0		1.7	(1.1, 2.6)	18.3		1.3	(0.8, 2.3)
Some university	279	45.2		2.6	(1.7, 4.0)	20.8		2.0	(1.2, 3.4)
University degree	461	51.0		3.4	(2.2, 5.3)	21.9		2.0	(1.4, 3.8)
<b>Family origin<sup>a</sup></b>									
France	968	40.2	0.004	1		17.5	<0.001	1	
Foreign	247	50.2		1.3	(1.0, 1.9)	27.5		1.6	(1.1, 2.3)
<b>Family income during pregnancy, euros</b>									
<=1500	154	44.8	0.03	1		26.0	0.05	1	
1501-2300	336	36.9		0.5	(0.3, 0.8)	16.1		0.5	(0.3, 0.9)
2301-3000	348	41.1		0.4	(0.2, 0.6)	21.6		0.6	(0.2, 1.1)
>=3001	389	47.3		0.4	(0.2, 0.6)	18.5		0.4	(0.2, 0.7)
<b>Employment and return to work at 4mo after birth</b>									
Not employed before birth	251	41.8	<0.001	2.3	(1.6, 3.5)	27.9	<0.001	7.1	(4.1, 12.3)
Employed before birth, not returned to work	521	53.9		3.2	(2.3, 4.4)	26.3		5.4	(3.4, 8.7)
Employed before birth, returned to work	433	28.9		1		6.5		1	
<b>Maternal smoking at 4mo after birth</b>									
Non-smoker before pregnancy	823	47.8	<0.001	3.2	(2.1, 4.9)	22.8	<0.001	2.6	(1.5, 4.4)
Smoker before pregnancy, non-smoker at 4 mo	196	42.9		2.4	(1.5, 3.9)	16.3		1.5	(0.8, 2.9)
Smoker before pregnancy and at 4 mo	205	22.4		1		10.7		1	
<b>Infant sex</b>									
Boy	640	40.0	0.07	1		18.3	0.22	1	
Girl	593	45.0		1.5	(1.1, 1.9)	21.1		1.4	(1.0, 2.0)
<b>Centre</b>									
Poitiers	514	41.4	0.56	1		19.3	0.78	1	
Nancy	719	43.1		1.0	(0.7, 1.2)	19.9		1.1	(0.8, 1.5)

p: Pearson's Chi-squared test for univariate analyses; aOR: adjusted ORs controlled for all variables in the table; CI: confidence intervals.

<sup>a</sup>Family origin includes whether parents and maternal grand-parents were born in France, or one of the family members (mother, father or a grand-parent) was born abroad (foreign).

**Table 2. Factors associated with breastfeeding at 4 months of infant's age among women working during pregnancy and breast feeding at discharge from the maternity unit (n=979)**

	N	Any breastfeeding			Almost exclusive breastfeeding		
		%	p	aOR (95% CI)	%	p	aOR (95% CI)
<b>Return to work after birth</b>							
Return to work at 4mo or before / full-time	246	27.2	<0.001	1	6.5	<0.001	1
Return to work at 4mo or before / part-time	127	34.7		1.5 (0.9, 2.5)	7.9		1.3 (0.5, 3.1)
Return to work between 5 and 8mo / full-time	122	58.2		3.5 (2.1, 5.8)	22.1		4.2 (2.0, 8.6)
Return to work between 5 and 8mo / part-time	129	56.6		3.4 (2.0, 5.8)	22.5		4.4 (2.1, 9.3)
No return to work at 8mo	233	52.4		4.7 (3.0, 7.6)	32.2		10.6 (5.4, 20.7)
<b>Maternal education level</b>							
Lower than high school	170	29.4	<0.001	1	12.9	0.33	1
High school diploma	154	35.7		1.5 (0.8, 2.7)	16.2		1.2 (0.6, 2.6)
Some university	236	44.9		2.9 (1.7, 5.1)	18.2		2.4 (1.2, 4.8)
University degree	408	49.3		3.8 (2.2, 6.5)	19.1		3.1 (1.5, 6.3)
<b>Family income during pregnancy, euros</b>							
<=1500	60	55.0	0.04	1	26.7	0.11	1
1501-2300	255	38.8		0.4 (0.2, 1.0)	14.5		0.4 (0.2, 0.9)
2301-3000	309	38.8		0.3 (0.1, 0.7)	19.1		0.4 (0.2, 1.0)
>=3001	351	45.9		0.3 (0.1, 0.7)	16.2		0.3 (0.1, 0.7)

p: Pearson's Chi-squared test for univariate analyses; aOR: Adjusted ORs controlled for all variables in the table and maternal age, parity, partnership status, family origin, maternal smoking at 4 months after the birth, infant sex, and centre; CI: confidence intervals.