

# Additional File 1: Supplementary Tables

## For manuscript:

Duration of Breastfeeding, Age at Introduction of Solid Foods and Allergy Related Diseases: A Prospective Cohort Study

Louise Ekelund, Inga Gloppen, Torbjørn Øien, Melanie Rae Simpson

## Table of contents

Supplementary Table S1. Relationship between income and other common measures of socio-economic status or behaviours associated with socio-economic status .....	2
Supplementary Table S2. Characteristics of included participants, excluded participants and those lost to follow up.....	3
Supplementary Table S3. Breastfeeding duration versus age at introduction of complementary foods.....	4
Supplementary Table S4. Relation between breastfeeding duration and allergy related diseases when symptomatic children before six months of age are excluded .....	5
Supplementary Table S5. Relation between breastfeeding duration with maximum one year recall and allergy related diseases .....	6
Supplementary Table S6. Interaction between duration of breastfeeding and supplementary with infant formula and allergy related diseases.....	7
Supplementary Table S7. Relation between age at introduction to complementary foods and allergy related diseases when symptomatic children before six months of age are excluded.....	8
Supplementary Table S8. Relation between breastfeeding / complementary food introduction overlap and allergy related diseases .....	9

**Supplementary Table S1. Relationship between income and other common measures of socio-economic status or behaviours associated with socio-economic status**

	n <sup>b</sup>	Total	Income quartiles based on estimated incomes <sup>a</sup>			
			Q1	Q2	Q3	Q4
<b>Maternal smoking<sup>c</sup>, %</b>	6727	19.5	24.5	22.4	16.1	16.1
<b>Paternal smoking<sup>c</sup>, %</b>	6395	21.9	27.8	23.8	19.0	18.5
<b>Maternal or paternal smoking<sup>c</sup>, %</b>	6753	30.2	36.7	33.3	26.1	26.0
<b>Indoor smoking<sup>c</sup>, %</b>	6756	3.3	4.8	4.2	2.2	2.2
<b>Mothers education, years, mean</b>	3018	15.7	15.4	15.2	16.0	15.8
<b>Fathers education, years, mean</b>	2991	15.1	14.7	14.6	15.4	15.4
<b>Maternal age, years, mean</b>	6771	29.9	29.3	29.6	30.5	30.2
<b>Homeownership<sup>c</sup>, %</b>	6790	89.2	82.6	91.9	91.8	90.2
<b>Family allergy, %</b>	6773	73.6	71.5	74.4	73.0	75.3

a: Income estimated based on average income in postcode of residence with participating families divided into quartiles.

b: The numbers vary because of missing data.

c: Smoking habits and homeownership at any time during the first two years of life.

**Supplementary Table S2. Characteristics of included participants, excluded participants and those lost to follow up.**

Characteristics	Included participants (n = 6802)		Excluded participants (n = 3703) <sup>a</sup>		Lost to follow up (n = 3094) <sup>b</sup>	
	n <sup>c</sup>		n <sup>c</sup>		n <sup>c</sup>	
<b>Duration of breastfeeding, months, mean (SD)</b>	6795	11.0 (5.7)	1345	8.9 (4.9)	3028	10.6 (5.6)
<b>Breastfeeding ≥ 6 months, n (%)</b>	6796	5695 (83.8)	1348	1010 (75.0)	3093	2560 (82.8)
<b>Age at introduction to complementary foods, months, mean (SD)</b>	3814	4.6 (1.3)	1254	4.5 (1.3)	1468	4.6 (1.2)
<b>Introduced to solid foods ≥ 6 months of age, n (%)</b>	3814	996 (26.1)	1254	290 (23.1)	1468	352 (24.0)
<b>Maternal age at birth, years, mean (SD)</b>	6771	29.9 (4.5)	2731	29.2 (4.7)	3076	29.5 (4.7)
<b>Maternal education, n (%)</b>	3018		886		869	
< 12 years (less than high school)		179 (5.9)		68 (7.7)		54 (6.21)
12-16 years (up to 4 years University)		1535 (50.9)		445 (50.2)		454 (52.2)
> 16 years (more than 4 years University)		1304 (43.2)		373 (42.1)		361 (41.5)
<b>Mean income<sup>b</sup>, NOK, mean (SD)</b>	6524	254527 (29477)	3298	250843 (32378)	2913	251915 (30694)
<b>Family history of allergy<sup>c</sup>, n (%)</b>	6773	4987 (73.6)	3676	2467 (67.1)	3081	2263 (73.5)
<b>Older sibling, n (%)</b>	4680	2648 (56.6)	3605	1813 (50.3)	1848	1017 (55.0)
<b>Maternal smoking, n (%)</b>						
During pregnancy	2336	147 (6.3)	2048	196 (9.6)	835	55 (6.6)
During child's first 2 years	6722	1279 (19.0)	2294	379 (16.5)	3054	640 (20.1)
<b>Paternal smoking, n (%)</b>	6395	1402 (21.9)	3377	784 (23.2)	2871	654 (22.8)
<b>Child exposed to smoke during first 2 years<sup>d</sup>, n (%)</b>	6776	1965 (29.0)	2349	672 (28.6)	3077	940 (30.6)
<b>Pets<sup>e</sup>, n (%)</b>	6802	1408 (20.7)	3703	475 (12.8)	3094	651 (21.0)
<b>Birth weight, gram, mean (SD)</b>	6703	3585 (582)	2341	3570 (586)	3039	3590 (600)
<b>Birth weight &lt;2500g, n (%)</b>	6703	244 (3.6)	2341	95 (4.1)	3039	127 (4.2)
<b>Sex, male, n (%)</b>	6800	3381 (49.7)	2800	1427 (51.0)	3092	1531 (49.5)
<b>Lower respiratory tract infection within first year<sup>f</sup>, n (%)</b>	3829	411 (10.7)	1264	139 (11.0)	1475	169 (11.5)
<b>Antibiotic treatment within first year, n (%)</b>	4447	919 (20.7)	2286	346 (15.1)	1738	360 (20.7)
<b>Introduced to formula &lt;6 months of age, n (%)</b>	6723	1940 (28.9)	1562	640 (41.0)	3051	927 (30.4)

a: Participants which have provided at least one lifestyle questionnaire with characteristic information but have missing information on both breastfeeding duration and age at solid food introduction (n = 2339) or have provided no health questionnaire (n = 1364). See Figure 1.

b: Participants lost to follow up because of missing health questionnaire at six years of age.

c: The numbers vary because of missing data.

d: Yearly income in Norwegian kroner based on postcode.

e: Mother, father or common child with parental reported asthma, ARC or AD.

f: Parental or indoor smoking.

g: Reported cat, dog or other furry pets.

h: Pneumonia or bronchitis.

**Supplementary Table S3. Breastfeeding duration versus age at introduction of complementary foods**

Duration of any breastfeeding	Age at introduction of complementary foods		Total
	≥ 6 months	< 6 months	
≥ 6 months	933	2269	3202
< 6 months	60	546	606
<b>Total</b>	993	2815	3808

**Supplementary Table S4. Relation between breastfeeding duration and allergy related diseases when symptomatic children before six months of age are excluded**

Disease and age	Duration of any breastfeeding (N = 6796)				Odds ratio <sup>a</sup> (95 % CI)	
	≥ 6 months (n = 5695)		< 6 months (n = 1101)		Crude	Adjusted <sup>c</sup>
	n <sup>b</sup>	n (%)	n <sup>b</sup>	n (%)		
<b>Asthma</b>						
<b>2 years (ever)</b>	4365	204 (4.7)	801	50 (6.2)	0.74 (0.54 - 1.01)	0.81 (0.57 - 1.15)
<b>6 years (current)</b>	2724	94 (3.5)	497	19 (3.8)	0.89 (0.54 - 1.49)	0.97 (0.56 - 1.69)
<b>ARC</b>						
<b>2 years (ever)</b>	4033	157 (3.9)	732	55 (7.5)	0.50 (0.36 - 0.69)	0.61 (0.43 - 0.87)
<b>6 years (ever)</b>	2541	241 (9.5)	458	58 (12.7)	0.72 (0.53 - 0.98)	0.72 (0.52 - 1.02)
<b>Eczema</b>						
<b>2 years (ever)</b>	4255	437 (10.3)	775	72 (9.3)	1.12 (0.86 - 1.45)	1.18 (0.89 - 1.57)
<b>6 years (current)</b>	2686	279 (10.4)	489	43 (8.8)	1.20 (0.86 - 1.68)	1.31 (0.90 - 1.90)
<b>6 years (ever)</b>	2670	383 (14.3)	487	61 (12.5)	1.17 (0.88 - 1.56)	1.24 (0.91 - 1.71)

a: For duration of any breastfeeding for six months or more versus less than six months.

b: The numbers vary because of missing data.

c: Adjusted for sex, maternal age, mean income, first degree relative with allergy, maternal smoking during the child's first two years and birth weight.

**Supplementary Table S5. Relation between breastfeeding duration with maximum one year recall and allergy related diseases**

Disease and age	Duration of any breastfeeding (N = 3859)				Odds ratio <sup>a</sup> (95 % CI)	
	≥ 6 months (n = 3196)		< 6 months (n = 663)		Crude	Adjusted <sup>c</sup>
	n <sup>b</sup>	n (%)	n <sup>b</sup>	n (%)		
<b>Asthma</b>						
<b>2 years (ever)</b>	2646	152 (5.7)	527	41 (7.8)	0.72 (0.50 - 1.03)	0.84 (0.57 - 1.24)
<b>6 years (current)</b>	1981	91 (4.6)	383	15 (3.9)	1.18 (0.68 - 2.06)	1.35 (0.74 - 2.49)
<b>Wheeze</b>						
<b>2 years (ever)</b>	2564	619 (24.1)	517	147 (28.4)	0.80 (0.65 - 0.99)	0.94 (0.74 - 1.18)
<b>6 years (current)</b>	1959	197 (10.1)	382	50 (13.1)	0.74 (0.53 - 1.03)	0.81 (0.56 - 1.16)
<b>ARC</b>						
<b>2 years (ever)</b>	2422	129 (5.3)	484	43 (8.9)	0.58 (0.40 - 0.83)	0.69 (0.46 - 1.02)
<b>6 years (ever)</b>	1859	231 (12.4)	356	47 (13.2)	0.93 (0.67 - 1.31)	0.91 (0.63 - 1.31)
<b>Eczema</b>						
<b>2 years (ever)</b>	2576	414 (16.1)	510	75 (14.7)	1.11 (0.85 - 1.45)	1.18 (0.89 - 1.58)
<b>6 years (current)</b>	1944	266 (13.7)	377	45 (11.9)	1.17 (0.83 - 1.64)	1.11 (0.78 - 1.59)
<b>6 years (ever)</b>	1934	380 (19.7)	376	66 (17.6)	1.15 (0.86 - 1.53)	1.15 (0.84 - 1.56)

a: For duration of any breastfeeding for six months or more versus less than six months.

b: The numbers vary because of missing data.

c: Adjusted for sex, maternal age, mean income, first degree relative with allergy, maternal smoking during the child's first two years and birth weight.

**Supplementary Table S6. Interaction between duration of breastfeeding and supplementary with infant formula and allergy related diseases**

Disease and age	Duration of breastfeeding						Adjusted odds ratio (95 % CI)	
	≥ 6 mo. breastfeeding without supplementation with formula		≥ 6 mo. breastfeeding supplemented with some formula feeding		< 6 mo. breastfeeding formula before 6 mo.		≥ 6 mo. breastfeeding without supplementation with formula vs less than 6 mo. of any breastfeeding	≥ 6 mo. breastfeeding supplemented with some formula feeding vs less than 6 mo. of any breastfeeding
	n <sup>b</sup>	n (%)	n <sup>b</sup>	n (%)	n <sup>b</sup>	n (%)		
Asthma								
<b>2 years (ever)</b>	4197	262 (6.2)	877	53 (6.0)	959	82 (8.6)	0.79 (0.59 - 1.05)	0.74 (0.51 - 1.10)
<b>6 years (current)</b>	2600	121 (4.7)	506	20 (4.0)	559	32 (5.7)	0.79 (0.51 - 1.23)	0.70 (0.38 - 1.28)
Wheeze								
<b>2 years (ever)</b>	4076	1050 (25.8)	850	225 (26.5)	934	284 (30.4)	0.91 (0.77 - 1.09)	0.94 (0.75 - 1.17)
<b>6 years (current)</b>	2566	265 (10.3)	504	45 (8.9)	558	76 (13.6)	0.72 (0.53 - 0.97)	0.63 (0.42 - 0.95)
ARC								
<b>2 years (ever)</b>	3847	209 (5.4)	790	56 (7.1)	867	86 (9.9)	0.61 (0.46 - 0.82)	0.78 (0.54 - 1.15)
<b>6 years (ever)</b>	2413	275 (11.4)	473	72 (15.2)	513	74 (14.4)	0.74 (0.55 - 1.01)	1.04 (0.71 - 1.51)
Eczema								
<b>2 years (ever)</b>	4087	685 (16.8)	851	160 (18.8)	931	144 (15.6)	1.13 (0.91 - 1.40)	1.32 (1.02 - 1.73)
<b>6 years (current)</b>	2558	359 (14.0)	502	75 (14.9)	550	69 (12.6)	1.12 (0.83 - 1.51)	1.24 (0.85 - 1.79)
<b>6 years (ever)</b>	2543	503 (19.8)	501	107 (21.4)	548	97 (17.7)	1.14 (0.88 - 1.48)	1.29 (0.93 - 1.78)

b: The numbers vary because of missing data.

c: Adjusted for sex, maternal age, mean income, first degree relative with allergy, maternal smoking during the child's first two years and birth weight.

**Supplementary Table S7. Relation between age at introduction to complementary foods and allergy related diseases when symptomatic children before six months of age are excluded**

Disease and age	Introduction to solid foods (N = 3814)				Odds ratio <sup>a</sup> (95 % CI)	
	≥ 6 months (n = 996)		< 6 months (n = 2818)		Crude	Adjusted <sup>c</sup>
	n <sup>b</sup>	n (%)	n <sup>b</sup>	n (%)		
<b>Asthma</b>						
<b>2 years (ever)</b>	718	31 (4.3)	1971	91 (4.6)	0.93 (0.61 - 1.41)	0.98 (0.62 - 1.53)
<b>6 years (current)</b>	560	23 (4.11)	1482	47 (3.2)	1.31 (0.79 - 2.17)	1.56 (0.91 - 2.69)
<b>ARC</b>						
<b>2 years (ever)</b>	668	21 (3.1)	1817	82 (4.5)	0.69 (0.42 - 1.12)	0.78 (0.47 - 1.28)
<b>6 years (ever)</b>	526	54 (10.3)	1391	134 (9.6)	1.07 (0.77 - 1.50)	1.24 (0.87 - 1.76)
<b>Eczema</b>						
<b>2 years (ever)</b>	695	62 (8.9)	1926	181 (9.4)	0.94 (0.70 - 1.28)	0.99 (0.72 - 1.36)
<b>6 years (current)</b>	548	43 (7.9)	1459	147 (10.1)	0.76 (0.53 - 1.08)	0.76 (0.53 - 1.11)
<b>6 years (ever)</b>	546	60 (11.0)	1450	204 (14.1)	0.75 (0.56 - 1.02)	0.76 (0.55 - 1.04)

a: For introduction to solid foods at six months or older versus younger than six months.

b: The numbers vary because of missing data.

c: Adjusted for sex, maternal age, mean income, first degree relative with allergy, maternal smoking during the child's first two years and birth weight.



**Supplementary Table S8. Relation between breastfeeding / complementary food introduction overlap and allergy related diseases**

Disease and age	Overlap (N = 3485)				Odds ratio <sup>a</sup> (95 % CI)	
	≥ 2 months (n = 2837)		< 2 months (n = 648)		Crude	Adjusted <sup>c</sup>
	n <sup>b</sup>	n (%)	n <sup>b</sup>	n (%)		
<b>Asthma</b>						
<b>2 years (ever)</b>	2530	145 (5.7)	529	39 (7.4)	0.76 (0.53 - 1.10)	0.85 (0.57 - 1.25)
<b>6 years (current)</b>	1676	77 (4.6)	377	14 (3.7)	1.25 (0.70 - 2.23)	1.43 (0.76 - 2.70)
<b>Wheeze</b>						
<b>2 years (ever)</b>	2452	603 (24.6)	515	133 (25.8)	0.94 (0.75 - 1.16)	1.09 (0.86 - 1.38)
<b>6 years (current)</b>	1656	164 (9.9)	377	48 (12.7)	0.75 (0.53 - 1.06)	0.82 (0.56 - 1.18)
<b>ARC</b>						
<b>2 years (ever)</b>	2313	127 (5.5)	489	37 (7.6)	0.71 (0.49 - 1.04)	0.83 (0.55 - 1.24)
<b>6 years (ever)</b>	1566	198 (12.6)	348	49 (14.1)	0.88 (0.63 - 1.24)	0.87 (0.61 - 1.26)
<b>Eczema</b>						
<b>2 years (ever)</b>	2463	397 (16.1)	512	75 (14.7)	1.12 (0.86 - 1.46)	1.17 (0.88 - 1.56)
<b>6 years (current)</b>	1645	224 (13.6)	370	43 (11.6)	1.20 (0.85 - 1.70)	1.14 (0.79 - 1.64)
<b>6 years (ever)</b>	1637	323 (19.7)	368	65 (17.7)	1.15 (0.85 - 1.54)	1.14 (0.83 - 1.56)

a: For overlap between breastfeeding and introduction to solid foods for two months or more versus less than two months.

b: The numbers vary because of missing data.

c: Adjusted for sex, maternal age, mean income, first degree relative with allergy, maternal smoking during the child's first two years and birth weight.