

## COHORT PROFILE

# Cohort Profile: Steps to the Healthy Development and Well-being of Children (the STEPS Study)

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The STEPS Study aims to search for the precursors and causes of problems in child health and well-being by using a multidisciplinary approach. The cohort consists of all mothers (Finnish or Swedish speaking) who had live deliveries in the Hospital District of Southwest Finland from January 2008 to April 2010 and their children ( $n = 9811$  mothers,  $n = 9936$  children). Of these, 1797 mothers and their 1827 children were recruited to an intensive follow-up group during the first trimester of pregnancy or soon after delivery. Information about the whole study cohort is based on pregnancy follow-up data from maternity clinics, National Longitudinal Census Files and child welfare clinics. Data from multiple sources are used to obtain a picture of the overall well-being of the child and the family. After birth, study visits include several clinical examinations. Collaboration is encouraged, and access to the data will be available when the data set is complete.

## Why was the cohort set up?

Currently, the major health problems of children in developed countries are obesity, recurrent respiratory tract infections,<sup>1</sup> allergic disorders, asthma, problems of cognition, mental well-being and language development.<sup>1–4</sup> Previous studies of these disorders have often been mechanistic, not taking into full consideration both biological variables and the interaction of the children with their environment.<sup>5,6</sup> Ideally, child development should be seen as a bidirectional transactional process in which genetic and environmental influences continuously alter each other in a dynamic

manner.<sup>7</sup> Various contexts such as parenting, social network and poverty interact with each other and with genetic expression to create long-lasting consequences for development.<sup>8</sup>

Many studies on the health and adjustment of children and adolescents are initiated in either preschool or school age, leaving undocumented the crucially important first years. Moreover, these domains are often studied separately, in distinct studies and research traditions. It is still unclear why some children develop emotional and behavioural problems whereas others do not, or why some children are not affected negatively by environmental risks, such as poverty,

whereas others are. Furthermore, an open question is whether several simultaneous risks, environmental and biological, act cumulatively and which accumulative factors should be taken into account.<sup>9,10</sup>

The life courses of children involve a number of transitions where the environment, family, social milieu or society strongly affects outcomes. In fact, the well-being of children is to a large extent determined by their parents' choices,<sup>11</sup> which in turn are influenced by public policies.<sup>12,13</sup> Hence, a longitudinal perspective is quintessential for the study of the life conditions and well-being of children.

The present study represents a variety of disciplines and measures of well-being that no previous Finnish studies on child development, and few in the world, have addressed.<sup>14-20</sup> Furthermore, many of the previous studies were started decades ago.<sup>21</sup> As the developmental environments are changing rapidly and families and societies face new challenges, new studies are needed to gain an understanding of child development in the present millennium.

The overall objective is to contribute to a comprehensive integrated view of healthy development: to

improve the understanding of the early development of children and their health and well-being beginning from the prenatal period up to school age, and also to determine the long-term effects of their early development later on in life. The STEPS Study endeavours to especially shed light on how various areas of development are interrelated during the first years of life (Figure 1).

This study was set up in south-western Finland in collaboration with several universities (the University of Turku, Abo Akademi University), polytechnics (Turku University of Applied Sciences, Novia Polytechnic) and Turku University Hospital. The researchers and organizations are financially committed to the project at least until the children reach school age.

### Who is in the cohort?

The study population of this study is as follows: (i) cohort group ( $n=9811$  mothers,  $n=9936$  children), and out of this study population cohort (ii) intensive

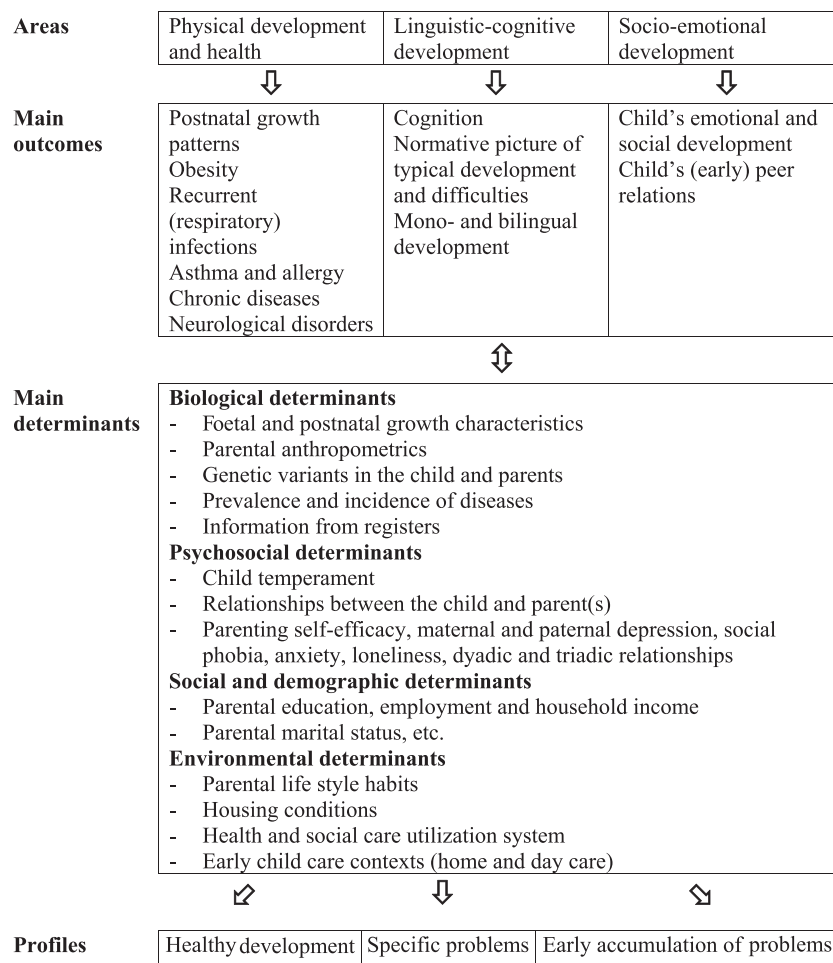
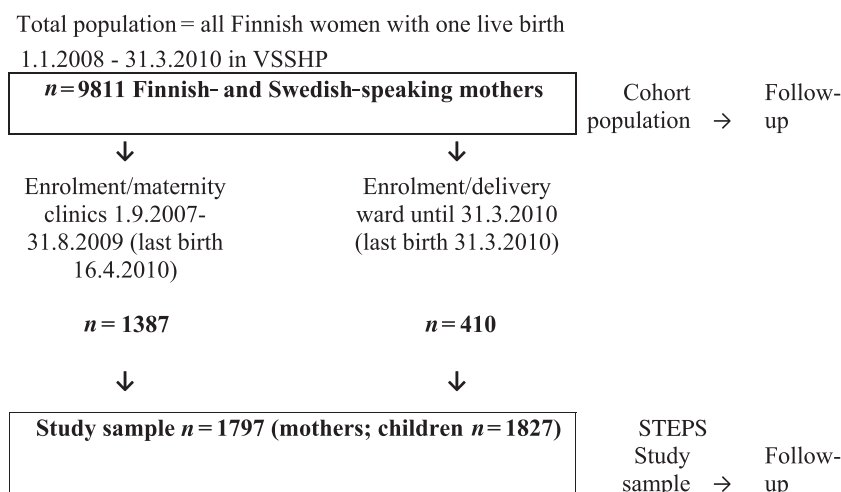


Figure 1 The main outcomes and determinants of the STEPS Study



**Figure 2** Flow chart of the STEPS Study

follow-up group ( $n = 1797$  mothers,  $n = 1827$  children) (Figure 2). The cohort group consist of all children born in the Hospital District of Southwest Finland between January 2008 and April 2010 and their mothers (Finnish- or Swedish-speaking). The mothers were recruited to an intensive follow-up from the same cohort during the first trimester of pregnancy or after delivery.

The flowchart shows that the recruitment process to the intensive follow-up group consists of two stages (Figure 2). In all municipalities of the Hospital District of Southwest Finland, the midwives asked the families to participate when they visited the maternity health care clinic for the first time. To increase participation, after delivery the families were offered a second opportunity to participate at the maternity wards of Turku University Hospital or Salo Regional Hospital, or by a letter mailed to the mothers soon after delivery. These two hospitals are the only delivery hospitals in the District. The recruitment material and the questionnaires were available in both national languages, Finnish and Swedish. Of the eligible cohort population ( $n = 9811$ ), 1797 pregnant mothers and 1658 spouses decided to participate. To these parents, 1827 children (30 pairs of twins) were born. Even before birth, special attention was paid to collecting information also from the fathers and/or partners in the intensive follow-up group because no register data are available from partners at the time of birth.

The participating families differ from the whole cohort population with regard to family background (Table 1). Participating mothers are, on average, 7 months older than in the whole cohort population. Their child is most likely their first (54.3% vs 43.4%). They are more likely married (59.2% vs 53.5%) and live more often in an urban area (city of Turku; 42.7% vs 36.6%). Their occupational status is also somewhat higher.

During pregnancy, all three questionnaires were well received, with response rates between 74% and 100% (Table 2). After the birth, the response rates dropped to 73% (mothers) and 66% (partners) for the 4-month questionnaires. When the child was 8 months of age, the response rates were 70, 64 and 70%, and at 13 months of age, the response rates were 66, 58 and 66%, respectively, for the mother-, father/partner- and child-related questionnaires. Response rates for the first study visit at 13 months of age were for the child 67%, for the mother 66% and for the father/partner 60%. In total, 107 families decided to cancel their participation by the time the child reached the age of 13 months.

There were no differences between dropouts and non-dropouts (Table 3). However, National Census Files indicate some differences between responders and non-responders at the 13-month data collection point. The responding mothers are, on average, 1.5 years older than the non-responders. It is more likely their first pregnancy (55.9% vs 50.2%) and their first child (43.8% vs 43.4%). They are also more likely married (62.6% vs 51.0%) and more likely live in urban areas (44% vs 38.8%), and their occupational status is higher (Table 3).

## Ethical issues

The Ministry of Social Affairs and Health and the Ethics Committee of the Hospital District of Southwest Finland have approved the STEPS Study (27 February 2007). The parents gave written informed consent. They were informed of their right to withdraw from the study at any point. The description of the scientific data file is formulated according to the standards given by the Office of the Data Protection Ombudsman. The data are stored under lock and key in computers at the Turku Institute for Child and Youth Research (CYRI), University of Turku.

**Table 1** National Birth Register characteristics of the mothers and children in the STEPS Study ( $n=9811$ ). Comparison between participants (intensive follow-up group) and non-participants based on the chi-square test and % for categorical variables and  $t$ -test and mean (SD) for numerical variables

Variable	Total ( $n=9811$ )	Non-participants ( $n=8014$ )	Participants ( $n=1797$ )	<i>P</i>
<b>Mothers</b>				
Age in years, mean (SD)	30.2 (5.1)	30.1 (5.2)	30.8 (4.6)	<0.0001
BMI before pregnancy, mean (SD)	24.5 (4.8)	24.5 (4.8)	24.3 (4.8)	0.2241
Gestational days at birth, mean (SD)	278 (13.2)	278 (13.4)	279 (12.6)	0.1280
No previous births, %	45.4	43.4	54.3	<0.0001
No previous pregnancies, %	33.9	32.2	41.2	<0.0001
Abortions, %	13.9	14.3	12.2	0.0226
Living in urban area (city of Turku), %	37.7	36.6	42.7	<0.0001
Marital status married, %	54.6	53.5	59.2	<0.0001
Occupational class at least professional, % <sup>a</sup>	19.7	19.0	22.8	0.0003
<b>Children</b>				
Sex, boys, %	51.3	51.1	52.2	0.3930
Premature birth (max 37 gestation weeks), %	6.1	6.2	5.3	0.1315
Birth weight (g), mean (SD)	3512 (563)	3511 (566)	3516 (547)	0.7430
Birth length (cm), mean (SD)	50.6 (2.5)	50.6 (2.5)	50.7 (2.5)	0.3237
Head circumference (cm), mean (SD)	35.0 (1.6)	35.0 (1.6)	35.1 (1.5)	0.1191
Apgar-points (5 min), mean (SD)	9.0 (1.0)	9.0 (1.0)	9.0 (0.9)	0.5319

<sup>a</sup>Classification: Professionals (in high positions, e.g. managerial, but also in intermediate positions, such as nurses) vs others [blue-collar workers (in industry or agriculture) and service (e.g. clerical and sales workers)].

**Table 2** Proportion (%) of returned questionnaires and study visits in the STEPS Study for children up to 13 months of age

	Questionnaires							Study visits	
	10–15 gestational weeks	20 gestational weeks	30 gestational weeks	Birth <sup>a</sup>	1 month	4 months	8 months	13 months	13 months
Mother	1387 (100)	1234 (90)	1147 (83)	410 (100)	1499 (83)	1314 (73)	1273 (71)	1194 (66)	1194 (66)
Partner		1132 (82)	1031 (74)			1194 (66)	1143 (64)	1081 (60)	994 (60)
Child							1284 (70)	1218 (67)	1216 (67)

<sup>a</sup>Questionnaires to those recruited at delivery.

## How often have they been followed-up?

The STEPS Study involves a systematic follow-up of a cohort of children born during a 2-year period, beginning at pregnancy and ending when the children are in early adulthood. Table 4 gives an overview of the types of information collected at each stage of the STEPS Study. Data from multiple sources are systematically used. Information stored in electronic health records is available from maternity and child welfare clinics in the study area.

Data from the intensive follow-up group deepen those from the whole cohort. Questionnaires were answered

at the 10th–15th (only mothers), 20th (both parents henceforth) and 30th gestation weeks (Table 4). The questionnaires were/will be collected when the child is at age 0, 4, 8, 13, 18 and 24 months, and thereafter once a year. During the first 4 years, data will also be collected using a structured diary, where the parents document the health conditions, medications, physician visits, nutrition and developmental skills of the child. Symptoms of infectious diseases are recorded in the diary daily during 0–2 years of age and weekly during 2–4 years of age.

Biological samples include sequential blood samples, nasal swabs and cheek swabs from the mouth, and faecal and breast milk samples (Table 4). The child

**Table 3** National Birth Register characteristics of the mothers and children in the intensive study group ( $n = 1797$ ). Comparison of (i) dropouts and non-dropouts and (ii) non-responders and responders at 13 months (questionnaires or visit) based on the chi-square test and % for categorical variables and  $t$ -test and mean (SD) for numerical variables

Variables	Dropouts ( $n = 107$ )	Non-dropouts ( $n = 1690$ )	$P$	Non-responders ( $n = 519$ )	Responders ( $n = 1278$ )	$P$
<b>Mothers</b>						
Age in years, mean (SD)	30.3 (4.8)	30.8 (4.6)	0.3456	29.7 (4.9)	31.2 (4.4)	<0.0001
BMI before pregnancy, mean (SD)	23.8 (4.5)	24.4 (4.8)	0.2461	24.4 (4.6)	24.3 (4.9)	0.8973
Gestational days at birth, mean (SD)	276.9 (13.7)	278.6 (12.5)	0.1944	277.3 (15.2)	278.9 (11.3)	0.0304
No previous births/first child, %	50.0	54.6	0.3711	50.2	55.9	0.0304
No previous pregnancies, %	33.3	41.7	0.0948	34.8	43.8	0.0006
Abortions, %	11.8	12.2	0.8877	14.6	11.3	0.0536
Living in urban area (city of Turku), %	40.2	42.9	0.5968	38.8	44.3	0.0367
Marital status married, %	60.8	59.2	0.7491	51.0	62.6	<0.0001
Occupational class, at least professional, % <sup>a</sup>	22.6	22.8	0.9500	17.6	24.9	0.0011
<b>Children</b>						
Sex, boys, %	50.0	52.3	0.6492	53.4	51.7	0.5201
Premature births (max 37 gestation weeks), %	7.8	5.1	0.2319	7.0	4.6	0.0415
Birthweight (g), mean (SD)	3482 (567)	3518 (546)	0.5113	3492 (614)	3526 (518)	0.2810
Birthlength (cm), mean (SD)	50.7 (2.50)	50.7 (2.48)	0.8709	50.6 (2.8)	50.7 (2.3)	0.3309
Head circumference (cm), mean (SD)	34.9 (1.7)	35.1 (1.5)	0.4103	35.0 (1.6)	35.1 (1.5)	0.6163
Apgar-points (5 min), mean (SD)	9.1 (0.9)	9.0 (1.0)	0.3775	9.0 (1.1)	9.0 (0.9)	0.4074

<sup>a</sup>Classification: Professionals (in high positions, e.g. managerial, but also in intermediate positions, such as nurses) vs others [blue-collar workers (in industry or agriculture) and service (e.g. clerical and sales workers)].

and their parents first visit the study clinic when the child is 13 months of age and thereafter once a year. During the visits, several examinations are made.

## What has been measured?

The data are collected using a variety of methods, including registers, questionnaires, follow-up diaries, study visits and biological samples. Pregnancy follow-up data from maternity clinics include overall health and the mother's lifestyle habits, weight gain, urinary protein and glucose, blood pressure, blood values, possible morbidity [with third edition of the Finnish version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) codes] and vision of early interaction with their own infant. The following data are available from the National Longitudinal Census Files: mother (occupation, place of residence, nationality, marital status, previous pregnancies, births and abortions and current pregnancy follow-up), birth situation (maternity hospital, best estimate of the duration of the pregnancy, mode of delivery, birth diagnoses and

possible complications) and newborn [date of birth, sex, the number of foetuses, birth weight and length, head circumference, 1-min and 5-min Apgar score, cord blood pH, the child's diagnosis at the age of 7 days (ICD-10 codes) and length of hospital stay].

Child welfare clinics regularly follow child growth, vision, hearing, health status, neurological and cognitive development, parental use of alcohol and smoking habits, psychological and linguistic development and early interactions between the child and mother/father, as well as the health education needs of the family.

Data from multiple sources are used to obtain a more complete picture of the overall well-being of the child and the family. An important feature of the main outcomes is that they cover maladjustment and well-being, in other words, both the negative and positive sides of health and well-being.

The detailed questionnaires (Table 5) are filled in at the intensive follow-up group by the mothers, their partners and, from 1 year of age, the staff of the day-care facility when appropriate. Questionnaires given at the gestational weeks 10–15, 20 and 30 focus on the socio-economic circumstances of the family, health



**Table 4** Overview of data collection frequency and source for children up to the age of 3 years in the STEPS Study

Time point	Years	STEPS Study ( <i>n</i> = 1797)		
		Cohort data ( <i>n</i> = 9811)	Questionnaires	Study visits
First trimester	2007–2009	Visits at 7–11, 10–12 and 12–14 gestational weeks	Questionnaire for the mother	Biological samples
Second trimester	2007–2009	Visits at 16–17, 20 and 22–24 gestational weeks	Separate questionnaires for the mother and partner (father of the child)	
Third trimester	2008–2010	Visits at 26–28, 30–32, 36–37 and 38–41 gestational weeks, 1 week and 5–12 weeks from delivery	Separate questionnaires for the mother and partner	
Delivery	2008–2010	Longitudinal Census Files	Questionnaire for the mother	Cord blood for DNA analysis (child)
Child 1 month <sup>a</sup>	2008–2010	Visits at child age of 1–4 weeks	Separate questionnaires for the mother and partner	
Child 3–4 months	2008–2010	4–6 weeks 2 months 3 months 4 months	Separate questionnaires for the mother (including questions about the child) and partner	Breast milk sample (mother). Faecal sample (child)
Child 8 months	2008–2010	5 months 6 months 8 months	Separate questionnaires for the mother, partner and child related	
Child 13 months	2009–2011	Visits at child age of 12 months	Separate questionnaires for the mother, partner and child	Child, mother, partner: health status, length/height and weight Blood and serum sample (child, parents serum cholesterol, HDL cholesterol). Cheek swabs (child). Faecal sample (child). Nasal swabs (child)
Child 18 months	2009–2011	Visits at child age of 18 months	Separate questionnaires for the mother, partner and child	
Child 24 months	2010–2012	Visits at child age of 2 years	Separate questionnaires for the mother, partner and child related Questionnaires for day-care professionals	Child, mother, partner: health status, length/height and weight, body composition, blood pressure, waist Blood and serum sample (child). Nasal swabs (child)

(continued)

Table 4 Continued

Time point	Years	STEPS Study ( <i>n</i> = 1797)			
		Cohort data ( <i>n</i> = 9811)	Questionnaires	Study visits	Biological samples
Child 0–24 months	Visits at child age of 3 years	Follow-up diary (child): nutrition, infectious diseases etc. reported in detail			
Child 36 months	2011–2013	Separate questionnaires for the mother, partner and child related. Questionnaires for the day-care professionals		Child, mother, partner: health status, length/height and weight, body composition, blood pressure, waist	Blood and serum sample (child)
Child 24–36 months		Follow-up diary (child): infectious diseases, nutrition, physical and social development reported in detail			

<sup>a</sup>Questionnaires to those recruited at delivery.

The black line indicates the time point for completed data collection rounds.

history, life style, physical activities, chronic illnesses and history of recurrent or severe infections as well as family functioning, parental relationships and mental health and familial accumulative risk for language and learning problems. After birth, questionnaires tap indicators of well-being and family contexts (somatic and mental health, living conditions, socio-economic factors, family functioning and interaction and parenting) and the development of the child (temperament, cognitive and language development, gestures, play behaviour, socio-emotional development and eating behaviour). Families keep a diary of developmental milestones, acute infections and allergies and other illnesses of the child, and the introduction of new foods into the diet. Moreover, several specific instruments were and are used at different study points. These include the Revised Dyadic Adjustment Scale (RDAS),<sup>22</sup> the McMaster Family Assessment Device (FAD),<sup>23</sup> the Edinburgh Postnatal Depression Scale (EPDS),<sup>24</sup> the Beck Depression Inventory (BDI-II),<sup>25</sup> the Pregnancy-Related Anxiety Scale (PRAQ-R),<sup>26</sup> the Social Phobia Inventory (SPIN),<sup>27</sup> the Revised UCLA Loneliness Scale,<sup>28</sup> the Self-Efficacy for Parenting Tasks—Toddler Scale (SEPTI-TS),<sup>29</sup> the Index of Diet Quality (IDQ),<sup>30</sup> the Three Factor Eating Questionnaire (TFEQ-R18),<sup>31</sup> the Food Neophobia (FNS),<sup>32</sup> the Child Feeding Questionnaire (CFQ)<sup>33</sup> for adults, and for children the Multisource Assessment of Children's Social Competence Scale (MASCS),<sup>34</sup> the Child Eating Behaviour Questionnaire (CEBQ),<sup>35</sup> the Child Food Neophobia (CFNS),<sup>36</sup> the MacArthur Communicative Developmental Inventory (MCDI),<sup>37</sup> the Infant Sleep Problems,<sup>38</sup> the Brief Infant–Toddler Social and Emotional Assessment (BITSEA)<sup>39</sup> and the International Study of Asthma and Allergies in Childhood Questionnaires (ISAAC).<sup>40</sup> Moreover, the families were asked to evaluate the amount and quality of the services in the maternity health care clinics.<sup>41</sup>

After birth, study visits include several clinical examinations. Growth is defined in terms of height, weight, relative height and relative weight using the growth curves of Finnish children. Waist circumference is measured at every visit starting when the child is 13 months old. In addition to these, growth records from the well-baby clinics are used. Body composition is measured when the child is 2 years of age and annually thereafter for all children and parents. The blood pressure of the children is measured throughout the study, and the blood pressure of the parents is also measured annually. Biological samples include cord blood, cheek-swab samples and yearly blood samples from the child and the parents, breast milk from the mothers and faeces from the children, as well as nasal swab samples from the children. Genetic innate immunological, metabolic and microbiologic determinants of infections, allergic diseases, obesity and other conditions threatening the healthy development of the child will be studied.

The health records include detailed data collected from official registers: health records information





from maternity health care clinics and well-baby clinics, the National Birth Register of Finland, the Patient-Specific National Database on Institutional Health Care and the Longitudinal Census Files on pregnancies, deliveries and the health of neonates and children up to 7 years of age.

## What has it found?

The child outcomes of the intensive follow-up group do not differ from those of the cohort population (Table 1). In Finland, the socio-economic differences between participating mothers and others are less because of the generally good level of education, good health services and low immigration.<sup>42,43</sup>

Preliminary results show that marital satisfaction as a solo factor did not predict the quality of mother's and/or father's attachment representation about the unborn child and future relationship with the child, but if both parents were unsatisfied with their marital relationship and had depressive symptoms, the mutual risk for unbalanced prenatal representations was significantly accentuated.<sup>44–46</sup> Mothers who had used combined maternity and child health care services were more satisfied with the service than mothers who had used separate services. In general, fathers were more critical in their expectations of the maternity clinic services than mothers. Most challenging were those fathers who expected support neither from their own parents nor the clinic. They had the most negative attitude towards the support the clinics could give, and their parenting competence was low. We have also shown that maternal pre-pregnancy overweight increases the risk of hyperglycaemia in late pregnancy and increases infant size at birth and 13 months, possibly predisposing the infant to health risks later in life.<sup>47</sup> Moreover, the breast milk of overweight women compared with normal weight women contained more saturated fatty acids.<sup>48</sup> Parents with food neophobia offer new and uncommon foods less frequently to their children than less neophobic parents, who were likely to offer new solid foods to children at the age of 1 year.<sup>49</sup> A further finding of everyday relevance is that among young children, genetic variations in the host may have specific effects on the viral–bacterial interactions in the pathogenesis of these infections.

Several thousand nasal swab samples taken from the children by their parents and transported by mail to the laboratory have been studied virologically. Sensitivity for the detection of respiratory viruses is similar or better in samples taken at home compared with samples taken at study visits. Parents reported mild nasal bleeding in fewer than 3% of nasal swab sampling at home, and generally their satisfaction with the home sampling has been good. One of the sub-studies demonstrates that nasal swab sampling by parents is feasible in the investigation of the household transmission of influenza.<sup>50,51</sup>

Data collection and analysis are ongoing, and manuscripts for the publication of early results are currently in preparation. The analyses of antenatal data and those from the child's first 2 years of life are in progress. Answers to many study questions are not available until the entire cohort has reached a certain age, in other words, when a 2-year data collection phase is completed for each age-specific research question.

## What are the main strengths and weaknesses?

The main strength is a life course approach to child development and the interdisciplinary nature of this approach, even if disciplines have their own study traditions. The sample size is large enough and provides sufficient power to disentangle the co-morbidity between determinants of the development through a simultaneous analysis of overlapping, confounding or competing determinants. A further strength is the combination of population-based methods (questionnaire data from the study cohort and register data from the population cohort) with clinical methods as well as the versatility of information collected from the whole family. By using the birth cohort data, we have been able to carry out a careful dropout analysis to clarify the possible bias in our data.

The wealth of developmentally appropriate information, especially the multiple indicators and outcomes, provides a unique possibility to analyse the child's early development. Complex developmental models integrating a variety of risk factors, from child factors to environmental factors reflecting parental and familial circumstances, may then be compared for their predictive validity. The validity of the questionnaire data can be ascertained with register data, e.g. from the National Birth Register, which decreases bias and permits a thorough non-participant analysis.

Although the diversity of aims is first and foremost a strength, it also has a disadvantage. Researchers from various scientific backgrounds want to measure determinants that fit their hypotheses. This may limit the possibility to measure several aspects in depth because each such measure puts a burden on the study participants. Despite our efforts to constrain the size of questionnaires, they still became extensive from the parents' point of view. It is a challenge to motivate all participants to continue active involvement in the study. However, the diaries that were thoroughly completed daily from birth to 2 years of age are a tremendous undertaking and commitment to the study on the part of the parents. A weakness of the study may be that some important determinants of pathology that operate early in life, such as possible prenatal complications, have been assessed only with questionnaires or registers.

Another challenge of the study is that the recruitment of families has taken a prolonged amount of

time. Many stages of the study are being conducted simultaneously. Complete data on children at any specific age will not, therefore, be available until the entire cohort has reached that age. An advantage of the long recruitment period is that short-term variation in external factors, such as epidemiologically occurring infections, even out. However, the recruitment process was not easy: the midwives at mother health care centres were busy, and they did not present the study to all pregnant women and their spouses. Moreover, the study protocol is extensive and requires participation over several years, which might alienate a number of parents. Indeed, only 18.3% of the cohort decided to participate. Health distribution among participants might decrease generalizability of prevalence estimates, but this effect is still not satisfactorily described.<sup>52</sup> Close inspection of Tables 1 and 3 raises the possibility that non-response at 13 months followed a similar pattern to non-participation in the intensive follow-up study. This means that responders in the sub-cohort are becoming more heavily selected over time. The access to register data means that the study will have a better opportunity to handle the possible differences between participants and non-participants than most other birth cohort studies.

### Can I get hold of the data? Where can I find out more?

The STEPS Study is conducted at the Turku Institute for Child and Youth Research, University of Turku, which coordinates the collection, management and distribution of the data. Collaboration is encouraged,

but the data are still being collected and are not currently available for access by other researchers. Once the data sets are ready, our intention is to allow data sharing. The conditions are still under discussion. The STEPS Study has a website, mainly focused on information for the participants of the study and the general public, at [www.utu.fi/cyri/tutkimus/hka/](http://www.utu.fi/cyri/tutkimus/hka/) (in Finnish). The contact information (in English) can be found also at the study website: [www.utu.fi/cyri/en/research/steps/](http://www.utu.fi/cyri/en/research/steps/). More information is available from the Director of the STEPS Study. Researchers interested in collaborative work or further information are invited to contact the principal investigator, Hanna Lagström, at [hanlag@utu.fi](mailto:hanlag@utu.fi).

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#### KEY MESSAGES

- STEPS is a multidisciplinary longitudinal study of the physical, psychological and social development of children, starting from pregnancy and continuing until adolescence.
- Although the participating parents were better educated than non-participating parents, birth outcome data showed no difference between the children.
- The quality of mother's and father's attachment representation about the unborn child and the future relationship with the child deteriorated with joint occurrence of marital dissatisfaction and depressive symptoms.
- Parents with food neophobia offer new and uncommon foods less frequently to their children than less neophobic parents.
- Nasal swab sampling by the parents is a feasible method to study the viral aetiology of community-acquired respiratory tract infections and the transmission of influenza in households.

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