

MINI REVIEW OPEN ACCESS

The Importance of National Monitoring of Children's Growth: Consensus Statement From the Nordic PromoKids Network

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Received: 18 January 2025 | **Revised:** 15 April 2025 | **Accepted:** 22 April 2025

Keywords: growth monitoring | health promotion | national growth data | obesity | register | surveillance

ABSTRACT

Aim: To describe the current approaches to surveillance and use of data on children's growth in the Nordic countries and to reach consensus on how this can be improved.

Methods: Members of the Promoting Healthy Weight in Children (PromoKids) network and additional public health professionals from five Nordic countries described their respective national growth surveillance systems. The various approaches to data collection and consolidation were analysed and compared.

Results: In Finland, Denmark, Norway, Sweden and Iceland, all children's weight and height are measured repeatedly at different intervals from birth by child and school health services. However, the data are not consistently registered centrally in all countries for use in public health planning, policymaking and research. Finland and Denmark had the most mature systems for data collection.

Conclusion: A consensus was reached that surveillance of body weight and height should be a mandatory element of national action plans to prevent and manage growth disorders including obesity, and to identify susceptible population groups. Surveillance protocols should be designed to prevent stigmatisation of children with overweight. Nordic countries should collaborate to accomplish comprehensive data coverage to uncover social inequalities and evaluate societal actions to prevent obesity in children.

Abbreviations: BMI, Body Mass Index; COSI, Childhood Obesity Surveillance Initiative; IOTF, International Obesity Task; PromoKids, Promoting Healthy Weight in Children; WHO, World Health Organization.

Liselotte Schäfer Elinder and Lauren Lissner shared first authorship.

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Summary

- This study describes the current approaches to surveillance of children's growth in the Nordic countries, where data are gathered but not consistently compiled at the national level.
- Finland and Denmark have well-developed systems for compiling national data and making it accessible to authorised users.
- The Nordic countries should collaborate in creating and maintaining reliable surveillance systems for growth data on all children to inform public health policy and research.

1 | Introduction

Growth is a fundamental indicator of children's health and well-being. Therefore, it is important to monitor body weight and height throughout childhood for early detection and treatment of obesity and other growth-related disturbances [1, 2]. Rising rates of childhood obesity, with associated social inequalities, have created public health concern. As a result, there is a debate on when, where and how often children should be measured, and how data should be reported and aggregated.

The World Health Organization (WHO) European region, recognising the need for a harmonised surveillance system to inform policy development in combating obesity, started the WHO Childhood Obesity Surveillance Initiative (WHO-COSI) in 2006. In 2016, WHO published the document *Ending Childhood Obesity* [2] stating that progress in tackling childhood obesity has been slow and inconsistent. Recommendations included promoting healthy food intake and physical activity from early childhood and weight management. The member states of the European Union also adopted an action plan against childhood obesity running from 2014 to 2020 [3]. The implementation of this action plan is currently being evaluated in all EU member states, but no updated plan has yet been adopted. The Nordic countries have worked on these issues since 2014 with a varying degree of commitment and limited national action.

The WHO-COSI study has collected data on children aged 6–9 years in an increasing number of countries, including Sweden and Norway starting 2007–2008 and since 2016 also in Finland and Denmark. In 2022–2024, 48 countries participated in the sixth round of data collection [4]. The systematic and standardised collection of anthropometric data by school nurses or special examination teams has allowed intercountry comparisons and a better understanding of the progression of childhood overweight and obesity in Europe. These investigations are all based on national samples but with varying representativeness [4], and differing information regarding health behaviours and socio-economic status. As the availability of national and regional databases increases, the protocol increasingly relies on data from school-based routine measurements by school nurses, instead of employing special examination teams.

At the national level, surveillance of children's growth can inform political actions to prevent and manage obesity and identify susceptible population groups. Epidemiological surveys in the Nordic and other European countries have consistently shown that low parental educational level and income are strong risk factors for childhood obesity [5–7]. To conduct surveillance of childhood overweight and obesity at the national level and in population subgroups, the data should preferably cover the whole population, and it should be possible to link the data to other national registers. This also allows for research on the risk of diseases of adulthood related to high body mass index (BMI) in childhood. Moreover, surveillance of large representative populations of children over extended time periods makes it possible to conclude with reasonable certainty if an intervention or a national policy is successfully preventing or reducing obesity and decreasing inequalities in health in the country [8]. In contrast, in research-based intervention trials, samples are often relatively small, non-representative and short in duration. Thus, they are not useful for monitoring trends in obesity or potential effects of health promotion initiatives at the population level. Controlled effectiveness studies of interventions can at best document improvements in diet and physical activity and modest reductions in the average BMI of participating children in the short term but cannot establish if this intervention would prevent childhood obesity at the national level.

In all Nordic countries, children's growth is measured repeatedly by skilled personnel at child and school health services, with varying intervals in the same child from birth to 18 years. Although routine health data exists in children's electronic health records, the data are not consistently registered centrally in all Nordic countries for use in public health planning, policymaking and research. The aim of this study was to describe the current approaches to surveillance and use of data on children's growth in the Nordic countries and to reach consensus on how this can be improved.

2 | Methods

The Nordic network Promoting Healthy Weight in Children (PromoKids) was established in 2016 to enhance collaboration on health promotion and childhood obesity prevention in five Nordic countries (Sweden, Denmark, Finland, Norway and Iceland). The PromoKids network strengthens efforts to improve children's health and prevent obesity by organising open workshops and yearly webinars in different Nordic countries. PromoKids serves as a dynamic forum for public health professionals and researchers to share and disseminate effective practices and policies, not only within the Nordic countries but also to other public health promoters in the European Union. Since 2018, the network has been funded by the Nordic Council of Ministers' Health and Social Services Directors working group.

3 | Results

The current situation in five Nordic countries regarding surveillance data and national registers for child growth has been reported by representatives from each country and is summarised in Table 1.

TABLE 1 | Overview of routines for measurement and management of surveillance data on child growth in five Nordic countries.

	Routine weight and height data collected at hospital or child healthcare	Routine weight and height data collected at school health services	National consolidated register	Coverage, forecast, comments
Finland	15 measurements at child health care services from birth to age 6	9 measurements at school health care up to age 16	National register for primary health care [9] since 2011 FinChildren register [10] since 2019	Currently 57% coverage at ages 2–16 years [10]. Individual data can be linked with other national registers
Denmark	8 measurements at birth, 5 weeks, 5 months and age 1,2,3,4,5	3 measurements at school health services at ages 5–8, 9–13 and 14–16	Danish National Register of Children's Health [11] since 2009	Danish National Register of Children's Health can be accessed and linked to other national health and social registers. Coverage rate is 70–90% of all children aged 0–16 years [12]
Norway	14 measurements at health check-ups at child health centres from birth up to age 6	3 measurements at school health services	National Register for Primary Health Care, in pilot stage	The National Register of Primary Health care with growth data from child and school health services is forecasted to be operational in 2025 [13]
Sweden	15 measurements from birth to age 6	At least 3 measurements at school health services up to age 16	Under consideration	Voluntary registration of weight and height in children 0–6 years in the Child health care register (BHV-Q) [14]. Comprehensive monitoring of weight and height from ages 0 to 20 by 2026 is under consideration [15]
Iceland	Routine monitoring from birth to age 4 during regular visits	4 measurements by school health care at ages 6, 9, 13 and 15	Under consideration	Strategic priorities in prevention, health promotion and treatment in 2024 include a focus on data collection and monitoring, with emphasis on children and young adults [16]

3.1 | Finland

According to the Health Care Act 9 and the Government Decree on Maternity and Child Health Clinic Services, School and Student Health Services and Preventive Oral Health Services for Children from 2011 [17], Finnish children should have 15 health check-ups in child health care and nine in school health care up to the age of 16 years. Children's growth is assessed by public health nurses, using national guidelines to standardise anthropometric measurements [17, 18]. The use of these data for national monitoring purposes was piloted in 2007–2009 by the Children's Health Monitoring Development project [19]. Since 2011, the national register of primary health care [9] administered by the Finnish Institute for Health and Welfare obtains real-time data on measured body weight and height from health checks. These data are received from child and school health services by automatic transmission from electronic health records. The consolidated data register includes all health centres and municipalities in Finland. Data collection is based on the Finnish Institute for Health and Welfare Act 668/2008, § 5 [20].

In 2019, the national FinChildren register [10] was established, and the prevalence of overweight and obesity in children aged 2–16 years has subsequently been reported annually at the national, regional or municipality level based on primary health care register data. Due to technical data transfer issues, the coverage of height and weight data from the primary health care register was only 57% in 2023 [10]. Overweight and obesity are defined according to the Finnish growth reference for children [21], while the IOTF [22] or WHO criteria [23] can be used in parallel for international research purposes. These data are regularly used for monitoring of prevalence in Finland and for COSI since 2016. These data can also be linked with national registers on the individual level, for example, with Statistics Finland's data on the socio-economic status of the parents and for other research purposes [7].

3.2 | Denmark

According to the Danish Health Law, all newborn children and their families are offered home visits by specially trained nurses employed in the municipality, who perform examinations and have health dialogues with new parents. It is mandatory for all the municipalities' health nurses to report information from the examinations on children's body weight, height, duration of full breastfeeding and exposure to tobacco smoking in the home into the Danish National Child Health Register established in 2009 [11]. Body weight and height are registered at birth as well as at 5 weeks, 5 months, 1, 2, 3, 4 and 5 years of age by general practitioners and health nurses. However, reporting is not mandatory for general practitioners, and the extent of missing data is unknown [12].

The Danish Health Law also requires that all schoolchildren be examined by public health nurses employed by the municipality. Body weight and height are measured during the 1st or 2nd year at school (5–8 years old), the 5th–7th year (9–13 years old) and the final year (14–16 years old). Registration of school health data has been mandatory since 2011 for the public health

nurses in the Danish National Child Health Register [11]. The database includes anthropometric data of all children up to the age of 16 years. The BMI categories are based on age- and sex-standardised IOTF cut-offs for thinness, overweight and obesity [22].

The register is administered by the Danish Health Data Authority. Data on indicators included in the register are available on the national, regional or municipality level and can be further stratified by sex and year of registration. Prevalence data on overweight and obesity are available to public health stakeholders, governmental bodies and journalists. For research purposes, data can be accessed after a formal application process and linked to other national health and social registers, enabling longitudinal follow-up [12].

For some time, there has been a vision to establish a broader contemporary database useful for policymaking in the public health sector and to guide decisions that will benefit the physical and mental health of all children and adolescents. Several partners in Denmark are now seeking finances for such a survey, which is called the Danish National Child and Youth Health Profile [24]. The purpose will be to monitor health, health behaviours and well-being among 0–24-year-olds in Denmark and to collect representative data at national, regional and municipal levels.

3.3 | Norway

Growth surveillance data are routinely collected by specially trained public health nurses at child health centres and by the school health services in accordance with national guidelines [13]. Norwegian children are scheduled for 14 health check-ups in child health centres and three in school health services. In total, 17 measurements are registered between birth and the first year of lower secondary school when children are 13–14 years old. National standards for measurements are described in the guidelines [13]. The WHO growth standard is used for monitoring body weight and height in preschool children. For school-aged children, national growth references from the Bergen Growth Study are used [25, 26]. IOTF cut-offs for overweight, obesity and severe obesity have been included in the national BMI reference. Information about body weight and height is documented in an individual child's electronic patient journal. The main aim of this monitoring is to identify individual deviations from the growth curves. Another aim is to summarise data at population level on trends in children's body weight and height over time.

From 2008 to 2019, Norway participated in five rounds of the WHO-COSI with measurements from 8-year-old children. These data were collected in collaboration with the school health services through the nationally representative Norwegian Child Growth Study, conducted by the Norwegian Institute of Public Health [27]. This study has been used for monitoring national and regional trends [28], and results have been published [29].

Norway is currently gathering nationwide routine measurements of growth from all child health centres and school health services, as well as information on breastfeeding, into the

National register for primary health care. The system is being piloted and should be operational in 2025. These data will be used for monitoring at the population level and made available for policy makers and the public alike. Data will also be available for research purposes, as has been demonstrated in a recent publication [29], with the possibility to link to other register data. Future COSI data will be delivered from the National registry for primary health care.

3.4 | Sweden

Sweden has offered regular visits for all children at child health centres and school health services since 1938 and 1942, respectively. Children and parents attend the child health centres 15 times from birth to 6 years of age. Nurses follow a standardised protocol that includes growth monitoring of children, together with parental consultations regarding, for example, feeding practices. Since 2001, the BMI chart has been used to track weight status using national standards and the IOTF cut-off points.

More than 99% of all families attend the child health centres during the child's first year of life and the majority continue regularly up to school age. In 2013, The Swedish Child Health Services Register was founded [14]. It is a national quality register, which extracts data from the child's health record collected by the 21 Swedish regions and automatically presents data in real time. At present, the register includes 21 variables, including body weight and height. However, as data collection is voluntary in quality registers, coverage is not complete. Nevertheless, in 2025, height and weight data from 87% of the 4-year-old children in Sweden were published [30]. From the age of 6 years, all children are offered at least three health visits at school health services, managed by Sweden's 290 municipalities and several private school companies. Body weight and height of all children is measured but have so far not been consolidated at national level due to administrative, technical and legal obstacles. Since 2007, Sweden has been contributing child height and weight data to COSI collected from a representative sample of schools. In addition, a few regional studies have reported the prevalence of overweight and obesity in schoolchildren [31, 32]. Researchers can apply for ethical permission to link the data with other registers. For obesity treatment in children, The Swedish BORIS quality register [33] collects data from child obesity treatment clinics, with improving coverage. In contrast to quality registers, reporting to six public health data registers administered by the National Board of Health and Welfare is mandatory and regulated by a Swedish law § 543 introduced in 1988. For example, the Medical Birth Register is a source of data on birth weight and height of children born in Sweden. However, child growth data after birth are not included in any of these public health data registers.

In 2023, the Swedish Government assigned the National Board of Health and Welfare to develop a national health program with coherent, regular and equitable health monitoring and reporting, including body weight and height for children and young people aged 0–20 years by 2026 [34]. While this is considered technically feasible, one challenge in the proposed aggregation of growth data involves technical differences between and within regions, requiring considerable support and investment.

To make progress, the National Board of Health and Welfare recently requested new regulations to achieve comprehensive health monitoring for children and youth, with the purpose of obtaining reliable data on trends in child health. These statistics, once established, could be utilised by policymakers, clinicians and researchers, providing the possibility to follow up on national, regional and local health initiatives and to perform research.

3.5 | Iceland

In Iceland, children's body weight and height are routinely monitored through primary healthcare services, with measurements taken from birth to age four during regular childcare visits, and again by school nurses at ages 6, 9, 13 and 15 years. School nurses play a key role in this process, providing measurements and other support. IOTF cut-offs are used to define overweight and obesity. All measurements are registered in primary healthcare databases with a coverage of about 90–95% and can be viewed by healthcare professionals on an individual level as needed. However, the information is owned by the primary healthcare authorities and has not been made openly available. Therefore, the data has not been used strategically for policy development. Nevertheless, the prevalence of obesity in schoolchildren, both regionally and nationally, has been estimated in the last few years, based on these data. According to a recent study of children attending the obesity clinic of the national Paediatric Hospital, the prevalence of insulin resistance and related blood abnormalities has risen over the past 10 years, with 84% of children undergoing obesity treatment already exhibiting signs of metabolic disturbances [35]. This alarming trend calls for national surveillance of childhood obesity and an increased effort in preventive policies.

In 2024, the government published the report entitled Strategic Priorities in Prevention, Health Promotion and Treatment—recommendations for actions regarding obesity, body image, health and well-being [16]. Proposed goals and actions aim to improve public health and reduce the negative health consequences of obesity without causing harm. Emphasis is placed on a holistic approach to healthy lifestyles across all levels of society. According to this report, Iceland should establish a long-term public health strategy over the next decade, with an emphasis on younger age groups up to 40 years old. One of the goals will be to reduce the incidence of obesity during this period. Other aims include systematic work against weight bias and discrimination based on body size among healthcare professionals as well as in society at large.

4 | Discussion

The aim of this study was to summarise current approaches to surveillance of growth data from children in the Nordic countries and their value for health promotion and disease prevention. The authors reached a consensus that comprehensive growth monitoring and reporting should be a mandatory element of all national action plans to prevent and manage obesity. Childhood overweight and obesity have continued to increase in Nordic

populations, while socio-economic inequalities are strong and persistent, underscoring the importance of systematic national surveillance. Reliable and comprehensive data are therefore needed at the population level to identify and understand associations between children's environments, behaviours, and health outcomes over the early and later life course. It is important to be aware of variations in national, IOTF and WHO standards for defining childhood obesity, which lead to lack of comparability between countries' prevalence estimates and inconsistencies in gender differences [36, 37].

Despite the advent of new treatment modalities for children and adolescents, the future disease burden resulting from increasing childhood obesity is large and will come at a heavy societal cost. Today there is wide agreement that a comprehensive societal transformation is needed to combat obesity at local, national and international levels [38]. We therefore need high-quality individualised surveillance data with complete coverage to be compiled in national registers, which will enable prioritisation of government actions and health systems responses [39]. Examples of relevant policies could be implementing a sugar tax or a ban on advertising of unhealthy foods and drinks targeting children. It is also possible, with ethical approval, to use comprehensive register data to estimate the long-term effects of controlled obesity prevention initiatives and trials.

There has been controversy in the Nordic countries whether measuring and communicating the results of children's body weight and height can lead to stigmatisation of children with a high BMI or disturbed body images. A Norwegian study in third-grade children reported satisfaction with being screened for body weight and height regardless of the child's BMI [40]. In contrast, a literature review based on six studies from the UK and USA indicated that routine weighing and weight feedback had negative psychosocial consequences for some children [41]. It is therefore important that measurements are performed carefully and professionally with equal emphasis on all measurements ranging from height and body weight to hearing and eyesight. Moreover, it is important to consider how the results are discussed and shared with the parents and what follow-up initiatives are available. More training of health care professionals is therefore needed to avoid stigmatisation and offence while securing optimal coverage and participation rates.

5 | Conclusion

The primary aim of growth monitoring in children is to assess the child's overall health, growth and well-being. However, we also need comprehensive national and accessible databases with individual growth data for research and evaluation of policies aiming at health promotion and obesity prevention in children. The Nordic countries have the potential to reach this goal, with Finland and Denmark serving as good examples.

Author Contributions

Liselotte Schäfer Elinder: conceptualization, investigation, writing – original draft, methodology, writing – review and editing. **Lauren Lissner:** conceptualization, methodology, investigation, writing – original

draft, writing – review and editing. **Annika Janson:** writing – review and editing, writing – original draft. **Tatjana Hejgaard:** writing – review and editing, writing – original draft. **Emil Steen Steensen:** writing – original draft, writing – review and editing. **Ingunn Holden Bergh:** writing – review and editing, writing – original draft. **Marit Dromnes Manvik:** writing – review and editing, writing – original draft. **Liv Elin Torheim:** writing – review and editing, writing – original draft. **Pétur Benedikt Juliusson:** writing – original draft, writing – review and editing. **Anna S. Olafsdottir:** writing – original draft, writing – review and editing. **Ragnar Bjarnason:** writing – original draft, writing – review and editing. **Tryggvi Helgason:** writing – original draft, writing – review and editing. **Antti Saari:** writing – original draft, writing – review and editing. **Heli Kuusipalo:** writing – original draft, writing – review and editing. **Päivi Mäki:** writing – original draft, writing – review and editing.

Conflicts of Interest

The authors declare no conflicts of interest.

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