



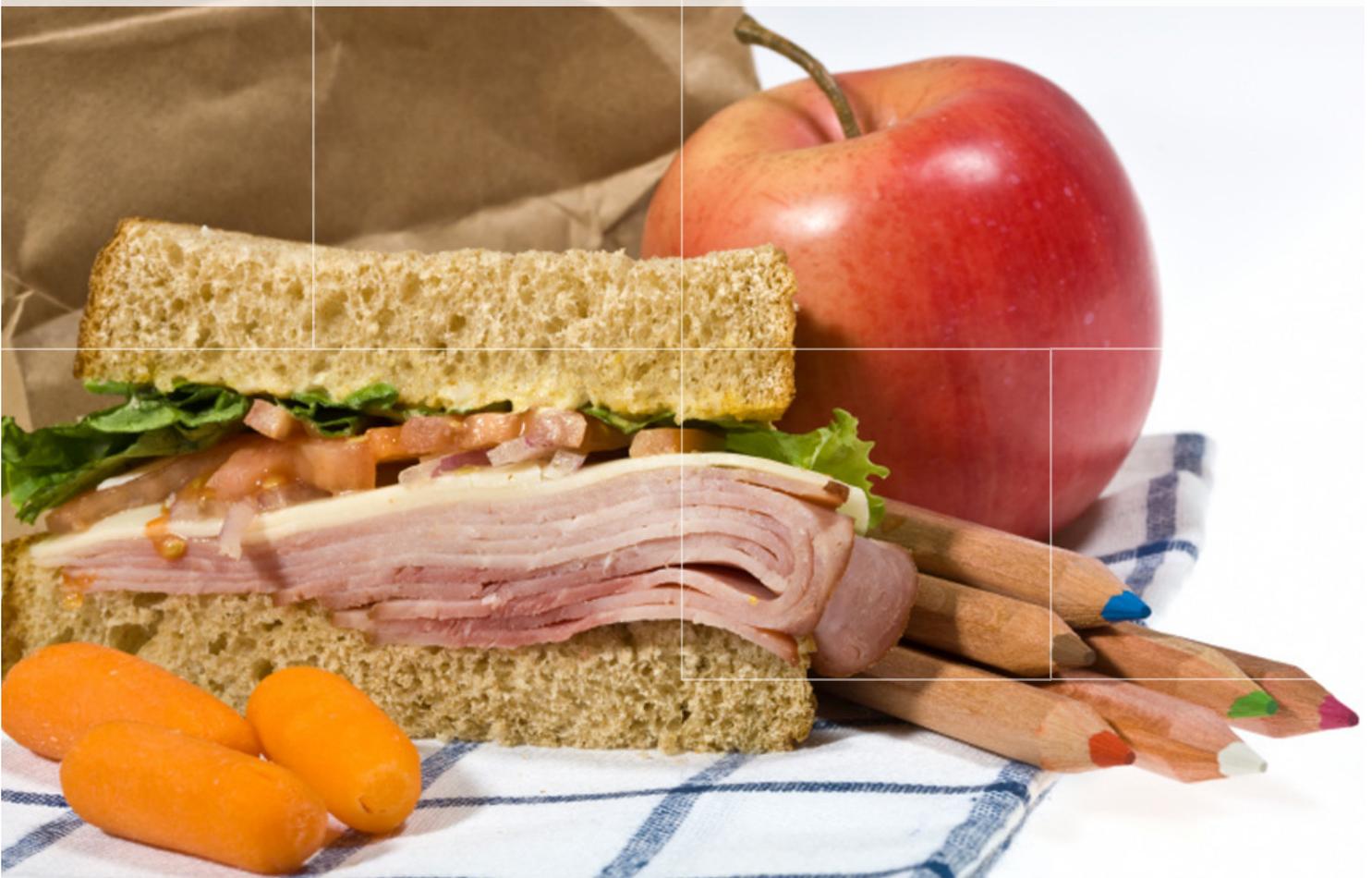
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Nordic Network NTP – Healthy Choices

- Current practices in delivery of school meals
- Explaining the concept behind Technology Platforms - Food for Life
- Recommendations for improvement



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Abstract: Various stakeholders; politicians, municipalities, school authorities, public health authorities, food industry, catering services, school chefs and researchers share responsibility of delivering quality meals in schools. The aim of this project is to integrate the knowledge from all those disciplines to offer healthier choices to school children. The aim of the European Technology Platform – Food for Life is to deliver innovative, new and improved food products to consumers by bringing together research in nutrition, food and consumer sciences, sustainable food production and food chain management to improve quality of life. In this project, corresponding Nordic National Technology Platforms use the same concept to identify solutions that will increase children’s consumption of healthy meals at school. Meetings and seminars with the stakeholders mentioned above, in all the Nordic countries revealed that one of the main obstacles is that some children don’t eat the school food at all. Results from surveys among parents and children have indicated that some children don’t like the food. Healthy food does not give children the necessary nutrients unless it’s eaten. Therefore, the main challenge is not only to make sure the food is healthy and nutritious, but also that it tastes good and is nicely presented in a pleasant atmosphere. The report gives recommendations, aimed at municipalities, school authorities, public health authorities, food industry, catering service, researchers and parents, on how communication and collaboration can improve quality of school meals, increase variety of healthy choices and encourage children to eat versatile, healthy and nutritious food at school.		
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Executive summary

Diet related diseases are increasing. Unhealthy diet, physical inactivity, and overweight are growing problems in the entire Western world, including the Nordic countries. The trend poses both a threat to the individual's quality of life and an economic threat to welfare. This project, with participants from different disciplines in all the Nordic countries, supports the Nordic Plan of Action on Health, Diet and Physical Activity by recommending actions to promote realistic and attractive choices of everyday meals for children.

Objective

The objective is to integrate available knowledge from different disciplines, with experience and common understanding, to promote attractive choices of healthier food products and meals for young people.

Methods

Collection of data was carried out by surveys, interviews and meetings of stakeholders from food manufacturers, catering services, canteen staff, public health authorities, municipal authorities, consumers and professionals of public health, nutrition and food science. Current practices in school meal systems, current legislation, nutritional guidelines and ongoing and recent projects were explored. Based on this information, common Nordic innovation priorities were defined.

Main results

The project covers current practices in delivery of school meals and explains the concept behind Technology Platforms - Food for Life. Open innovation methods to stimulate industry driven innovation projects are described. Such methods have proven useful to improve variety of healthy and tasty food choices. The need for education and training in the catering sector has been identified and improvements for in delivery of quality school meals recommended. Priority areas for research and innovation to promote Healthy Choices for Children have been defined and future actions of the Nordic Network of National Technology Platforms – Food for Life suggested.

A thorough overview of the school meal system in all the Nordic countries has been established in the project. Common obstacles have been identified and the concern in all the countries is that

children do not eat the food that is offered to them. Various projects and activities, described in chapter 6, have demonstrated key success factors related to serving nutritious, attractive meals to school children, so they will consume a diverse and nutritionally balanced diet at school.

- Key Success Factors
 - Legislation that ensures healthy food in schools
 - Tools for quality assurance of the school meal
 - Good guidelines and management of catering staff
 - Collaboration between different disciplines and responsible stakeholders
- Main Obstacles
 - Not all children eat the food that is offered to them
 - Budget strains are affecting quality of meals
 - Lack of knowledge to follow nutritional guidelines
 - Lack of respect for school catering from politicians and school authorities

Recommendations for improvement of school meal systems

On the basis of those success factors and obstacles the project proposes recommendations for improvement, directed at different levels of the school meal delivery system, for research and innovation priorities and future actions of the network.

- Municipalities: Ensure enough resources and treat school catering with respect
- Schools: Encourage teamwork and cooperation projects – Combine meals with education
- Food service: Create pleasant and health-promoting school restaurants
- Parents: Show responsibility and set a good example at home

Recommendations aimed at municipal authorities

- Improve image of school meals and treat issues concerning them with respect
- Encourage collaboration between different stakeholders and disciplines involved in school meal delivery to develop healthier choices with respect to the view of students and parents. Involve interdisciplinary advice group when preparing calls for tenders
- Ensure resources, sufficient funding, to get nutritionally balanced and tasty, high quality meals

- Provide education and training and organise meetings for people, responsible for school canteens, to exchange knowledge and experience

Recommendations aimed at school authorities

- Make school lunches a part of the educational curriculum, teachers eat lunch with the children
- Ensure that school meals are a joint project. Organise teamwork with involvement of headmasters in meal planning. Take view of students and parents into account.
- Encourage involvement of students in preparation of school meals as part of home economics and consumer studies. Encourage cooperation between teachers and food service personnel
- Create pleasant eating surrounding and atmosphere, health-promoting school restaurant and improve management of canteen staff
- Arrange joint attitude and taste workshops for children

Recommendations aimed at public health authorities

- Focus on a whole week menu when calculating nutritional balance
- Enhance focus on availability of a variety of recipes and more product knowledge to prepare tasty and nutritionally balanced meals. Keep in mind that children eat food – not nutrients
- Direct recommendations of healthier choices to politicians, decision makers and headmasters in schools

Recommendations aimed at the food industry

- Create food enterprise network to learn how to translate nutrition recommendations into attractive, healthy and tasty food choices for children through open innovation
- Establish a product development forum with participation of students, parents, chefs, food scientists, nutritionists, industry representatives and school officials to come up with ideas on convenient, healthy, attractive meals for school children.

Recommendations aimed at the catering service

- Adapt recipes to available raw materials and food supplies to meet demands of quality, availability of products and cost. Focus on the combination of the meal - main food categories and diet as a whole.
- Offer necessary training in nutrition, hygiene, food products and attitudes to staff members. Emphasise the importance of positive attitude and encouragement
- Improve management of the canteen staff

Recommendations aimed at parents

- Show a positive attitude and respect towards school meals
- Keep a responsible lifestyle and set a good example at home
- Put Healthy school meals on the agenda of parents' meetings

Recommendations aimed at research and innovation sectors

- ***Children's food choices*** involving knowledge on factors determining the food choices; and who are influencing the children's decision making
- ***Healthier food products and meals*** involving knowledge on how to make healthy food attractive; and how to promote the development of healthier food products
- ***The food providing systems*** involving knowledge on how food service systems influence the availability of healthy products; and what influence purchase processes and tenders have

Suggested future actions of the Nordic Network of NTPs – Food for Life:

- Promote Nordic food research priorities to the European Technology Platform - Food for Life and the European Commission's Framework Programme for research and technological development.
- Organize Nordic open stakeholder workshops to discuss future research and innovation needs based on Nordic diet and raw materials
- Actively build project consortia for selected topics to Nordic and European consortia.

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Introduction

Lifestyle related diseases, a threat to welfare

The importance of healthy eating and physical activity is generally known. However, diet related diseases are increasing. The prevalence of overweight and obesity is increasing in all the Nordic countries. “Unbalanced diet and physical inactivity have severe consequences for the health and quality of life of the individual and pose a serious economic threat to welfare in the Nordic societies. There is also increasing evidence that an unbalanced diet and physical inactivity contribute to inequality in health. There is a clear social dimension to unhealthy diet and low levels of physical activity and there is a significantly higher prevalence of overweight, heart diseases and diabetes in lower socioeconomic groups and among those with lower levels of education. The Nordic countries have made it a priority to make healthy food choices easier for all and to enable children and youth to make healthy choices.” (Nordic Action Plan on Health, Food and Physical activity)¹. A lot of good advice exists but nonetheless the diet of children and young people is far from perfect. One way to reach children of all socioeconomic groups is through advice on school meals and lunchbox that children bring from home. Various initiatives have been launched to support the Action Plan of Nordic Ministers and National Action Plans. It is important to learn from best practices, identify needs for training and define research priorities to stimulate increased supply of healthier, easy choices and meals for children. This project aims to stimulate discussion and increase awareness, among all stakeholders in the food sector, of problems related to unhealthy diet. It aims to identify solutions to influence availability of healthy food choices and thus support national policies on health, wellbeing and quality of life.

Nordic National Technology Platforms “Food for Life”

European and National Food for Life Technology platforms have been established to bridge the gaps between different disciplines and promote innovation in the food sector to deliver a healthier diet. The Food for Life platforms are led by industrial federations and therefore have ideal opportunities to involve food companies. Catering federations, retail federations, food research institutes, consumer organisations, educational centres and public authorities are also

¹ A better life through diet and physical activity Nordic Plan of Action on better health and quality of life through diet and physical activity http://www.norden.org/en/publications/publications/2006-746/at_download/publicationfile

partners of the platforms and are therefore easily reached as well. In this project, Nordic Food for Life Technology platforms work together and use the Technology platform concept to bring together stakeholders of different disciplines and interests to work towards the common goal to offer healthy meals to school children.

Multidisciplinary approach, a key to success

All stakeholders in the food and nutrition sector are under pressure of fighting the growing rate of overweight and obesity, especially among the younger generations. Different disciplines, involved in delivering food to consumers, are split and direct links and communication between sectors are lacking. Improved strategies are needed to promote mutual understanding and knowledge transfer from the health and nutrition sciences to the food industry and catering services who play a key role in influencing healthy food choices. Research to understand behaviour of consumers, in particular children and young people, is rapidly developing. The unique approach of this project is the leadership of the National Technology Platforms (NTPs) Food for Life in the Nordic countries supported by industry federations and participation of stakeholders, in this case public/municipal authorities, food research institutes and universities, as well as educational centres for professionals and staff in catering services.

Communication between stakeholders is a challenge

Improved strategies are needed to promote mutual understanding and knowledge transfer between health and nutrition sciences on one hand and food industry and catering services on the other and policy makers as well. The ideology behind the ETPs and NTPs is to bring together different disciplines to benefit from each other's knowledge and reduce mistrust. The NTP in Norway has shown that a great success can be attained by regular and repeated dialogue between different stakeholders. During the course of this project it has become obvious that it takes an effort for people from different disciplines to exchange ideas in a successful way. At the stakeholder meetings in Iceland some prejudice between people could be detected in the beginning but as the discussion developed, the strain wore off. Therefore it is so important to establish a long-term arena for the disciplines to meet regularly to exchange ideas and work towards a common goal.

Methods

Methodologies for collecting input and data in the project was based on a qualitative approach by conducting interviews and workshops, or by sending questionnaire surveys to stakeholders. The involvement of representatives from food manufacturers, catering services, canteen staff, public health authorities, municipal authorities, consumers and professionals of public health, nutrition and food science is emphasised in the project. The NTPs' representatives and project partners have compiled an overview on current practices on school meals in the Nordic countries. The objective was to obtain a collective multidisciplinary view of stakeholders on the concept healthy food for children and young people on a national and Nordic level.

In some of the countries stakeholder meetings or interviews were conducted (IS and NO), while questionnaires were sent to NTP stakeholders in Sweden. In Sweden and in Finland a review of studies on school meal chains were carried out and in Finland a survey among catering staff was performed. An overview on the current status of school meals in Denmark is based on the EVIUS project. Separate reports on activities in Iceland and Finland have been delivered. Furthermore, discussions in the project's working meetings and associated stakeholder seminars are the basis for synthesis of the common problems and identification of main obstacles and key success factors in the delivery of healthy choices for children in schools in the Nordic countries.

Chapter 1 National Technology Platforms Food for Life in the Nordic Countries

All the Nordic countries have established national Food for Life platforms during the past few years, based on the same principles as the European Technology Platform (ETP) Food for Life (<http://etp.ciaa.eu>). The longest history of networking is in Norway which started a stable collaboration between food stakeholders already in 2001. Funding frames and ways of action vary a lot between different countries but all platforms aim to increase the innovation power and competitiveness of their food sector by more intensive collaboration, delivering of knowledge and information, and influencing the strategies of ETP Food for Life.

NTP in Norway

NTP Food for Life in Norway (www.f4l.no) was established in 2007 by Food Companies' Organisations (NHO and FHL) and is a member of the governmental dialogue arena for food and health. The government arena has put forward a governmental Action Plan, (Recipe for a healthier diet - Norwegian action plan on nutrition (2007 – 2011) where one task is to establish an interdisciplinary dialogue forum between the food industry, authorities, researches and consumers. Other tasks in the Action Plan are dedicated to develop healthier foods in a diverse market (kindergarten, schools, hospitals, institutions, catering and service market), without any dedicated funding. The government has developed guidelines:

1. Guidelines for food and meals in kindergarten Norwegian Directorate of Health IS-1484 08/2007
2. Guidelines for school meals in primary and secondary school Norwegian Directorate of Health
⇒ National guidelines on prevention and treatment of malnutrition – the recommendations Norwegian Directorate of Health IS-1580 06/2009. *How to translate these guidelines into products and meals is an open question.*

NTP in Finland

ETP Food for Life Finland (<http://www.foodforlife.fi/>) is a collaboration platform between different stakeholders of the Finnish food sector. Furthermore, ETP Food for Life Finland is a window to Europe to show the activities and competences of the Finnish food actors outside

Finland. The main purpose of ETP Food for Life Finland is to support the growth, competitiveness and feasibility of the Finnish food sector by delivering information on stakeholders, research results, research funding opportunities, and most important meetings in Finland. In addition to this, the platform facilitates the contacts towards the main European Technology Platform (ETP Food for Life), and also towards national platforms of different European countries.

ETP Food for Life Finland was established in the beginning of 2009 and is conducted by the Finnish Food and Drink Industries' Federation by the end of 2011. The first face of the platform is financed by Sitra (The Finnish Innovation Fund), Tekes (Finnish Funding Agency for Technology and Innovation) and The Finnish Food and Drink Industries' Federation. The platform is steered by a committee representing Finnish food industry, funding agencies and research and development organisations. VTT Technical Research Centre of Finland has taken care of the actions: administration of the internet-site and the arrangements of related workshops and seminars as well as publication of e-Newsletters. The platform and its services are open to all actors in the food sector. The platform has a contact network of more than 1100 e-mail addresses covering the Finnish food sector very broadly. The funding and the way of action after year 2011 are still open (in the end of 2010).

One of the most remarkable results of the ETP Food for Life Finland platform has been the establishment and building of the FOODLE portal service. FOODLE (www.foodle.fi) is a new easy-to-use service to deliver information and results of the Finnish food research widely through the food sector. FOODLE offers the newest research results for enterprises, media and developers and furthermore, collects the Finnish food scientists and their activities in one place. FOODLE was established in collaboration between the ETP Food for Life Finland platform and the Food Development Cluster Programme, and was partly funded by the Uusimaa Regional Council.

NTP in Iceland

NTP Food for Life in Iceland was founded on 27th of May 2008. Founder members were a number of participants from federations of companies, research, education and consulting companies, public authorities, municipal authorities, NGOs, funding bodies and manufacturing industry companies (<http://www.si.is/foodforlife/>). A board of five members was elected at the meeting. The board has regular meetings and NTP- Food for Life Iceland has put an effort into participation in the network of European National Technology Platforms - Food for Life. The National Technology Platforms regularly collect data on available funding for research, development and innovation in the different countries, skills that companies need for future employment, in terms of employees with university education, technical skills and other type of skills. They exchange information on how to secure funding for their activities and how to encourage innovation in the food industry. The NTPs also synchronize their research priorities to put forward to the ETP Food for Life and the EU framework programme.

The Icelandic NTP Food for Life has not been granted any official funding so all activities and participation in the European network has been funded by SI the Federation of Icelandic Industries which has limited the ability for activities.

The NTP Food for Life applied to NICE for funding to form a network of Nordic NTPs Food for Life which resulted in this two year project, Nordic Network NTP – Healthy Choices. The NTP members have contributed to the project by participating in two big stakeholder meetings, one on healthy meals for children and young people, communication, training and education and innovation, and the other on calls for tenders for school meals.

NTP in Denmark

The Danish Food for Life platform (www.f4l.dk) was established in 2007 in corporation between the industrial organizations Danish Agricultural and Food Council (Landbrug & Fødevarer) and DI Food (DI Fødevarer) and the Centre of Advanced Food Studies, which is cooperation between Danish Technical University (DTU), University of Copenhagen, Aarhus University, University of Southern Denmark and Aalborg University.

The aim is to influence the research agenda, which is set in the European Technology Platform (ETP) Food for Life in a direction that is beneficial to both Danish food and food industry.

F4L pursues three main objectives:

- To help ensure knowledge development of food industry in a global competition
- To practice Danish influence on the priorities of European research funding through the Food for Life ETP and the EU's 7th Framework Research
- To help increase the number of Danish companies (especially SMEs) participating in EU research.

NTP in Sweden

The NTP Food for Life in Sweden was initiated during 2006 by three Swedish participants in the European ETP working groups. The NTP was formalized 2007 and has a broad participation of Swedish stakeholders within the food sector. The NTP core group meets approximately four times a year and has representatives from the following organizations:

- The Swedish Food Industry Federation (*Li*)
- Svensk Dagligvaruhandel
- The Swedish Farmers' Foundation for Agricultural Research (SLF)
- VINNOVA (Sweden's innovation agency)
- Formas – The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
- The Swedish National Food Administration
- The Ministry of Agriculture
- The Royal Swedish Academy of Sciences
- Chalmers University of Technology
- SIK – The Swedish Institute for Food and Biotechnology
- SLU - Swedish University of Agricultural Sciences
- Umeå University
- University of Lund

The NTP has a contact network of more than 150 email addresses.

The first, and so far most important, activity of the NTP was to formulate a National Strategic Research Agenda (NRA). The NRA was finalized and published in November 2007 and has since been a major document for strategic research discussions with government and research agencies. In the governmental bill for research and innovation 2008, references were made to the NRA and it was used as the basis for establishing a new food research program

co-financed by government and industry. The first projects within the program were decided during the autumn of 2010 and will start 2011.

The NTP acts as an arena for monitoring and influencing food research initiatives on a Swedish, Nordic, or European level, for exchange of information, and for identification of specific actions needed.

The NTP has no regular external financial support. Each organization takes its own costs for meetings and normal operating activities. Funding is sought for specific actions, such as the work with the NRA.

Nordic Network NTP

By working together in the Nordic Network NTP – Healthy Choices project the Nordic NTPs have been able to share experience and benefit from each other in a number of ways. The project has endeavoured to stimulate discussion and increase awareness among all stakeholders in the food sector. Leading a healthy lifestyle should be an important part of formal education in schools. Healthy food products should be promoted as the easy choice for children in canteens as well as lunch brought from home. Therefore, parents, teachers, municipal authorities, industry and catering services have to be involved in discussions and planning of school meals along with experts on food production and nutrition. Emphasis on quality, diversity and nutritional balance must never yield to cost of raw materials. This is particularly important to keep in focus in times of economic recession.

Future activities of the Nordic NTP network

The network of Nordic Technology Platforms in the area of Food for Life has shown its strengths in this *Healthy Choices* collaboration project. During the years 2008-2010 the network of NTPs has been formed and has achieved active and fruitful collaboration in mapping the Nordic procedures and practices in children's school meal systems. In the future, the NTP network is eager to continue the work with a broader focus on several issues in the food sector to be able to better support Nordic food industry in global challenges.

For Nordic food industry the northern dimension is important. Most big companies and also many SMEs export their products to different Nordic and Baltic countries – the Nordic and Baltic countries are home markets for them. The use of Nordic raw materials, understanding of

Nordic consumers and better utilization of the heritage of Nordic diet & cuisine in new product and service innovations are common challenges. To further strengthen the collaboration, communication, joint planning and joint actions between Nordic companies, research organisations and other stakeholders is a demand. The continuation of the collaboration of the Nordic National Technology Platforms would be the most natural way to secure the sustainability of the network. The network suggests that NICE, as a Nordic supporting actor, should ensure the operational preconditions for collaboration of NTPs and use this NTP network as a reference group to identify common research and innovation needs at Nordic level.

The following future actions of the Nordic Network of National Technology Platforms – Food for Life are suggested:

- To compile a common Nordic food research vision paper based on the national food research strategies and communicate the topics of the vision paper to ETP Food for Life and other European actors in the food research area.
- To collect and discuss future research and development needs in each Nordic country by organizing regularly both national and Nordic open workshops with stakeholders, especially in the following topics:
 - Healthy food choices based on Nordic diet and raw materials
 - Sustainable food production
 - Food services for different consumer groups
 - Nutrition and its effects on health economy
- To actively build project consortia for selected topics to Nordic and EU consortia.

Chapter 2 Current practices in delivery of meals and healthy choices in Nordic schools

An overview of the delivery of school meals in the Nordic countries was given in the Nordic Plan of Action on Health, food and physical activity² as summarised in Table 1.

All the Nordic countries offer different types of education at schools on healthy eating and energy balance, primarily in the form of home-economics classes, but also in a broader context of health education. A high priority in all the Nordic countries is to ensure that all children receive healthy meals in school or day-care. Furthermore, all the Nordic countries have formulated guidelines with recommendations on the dietary quality of food available at schools.

Table 1. School meals in the Nordic countries are served either as hot lunches or children bring lunchbox

<i>Hot meals</i> Iceland, Finland and Sweden	In Iceland, Finland, and Sweden, meals are provided at school, and efforts are concentrated on ensuring a higher quality of the meals offered.
<i>Lunchbox</i> Denmark and Norway	In Denmark and Norway, the general picture is that no complete meal is offered at public schools, as both countries have a long tradition for lunchbox meals. The efforts in Denmark and Norway are therefore primarily focused on ensuring improved information to schools, parents, and children on the importance of healthy foods in schools.
<i>User financed hot meals</i> Denmark and Norway	Some local communities or institutions, in both Denmark and Norway, have established school meals, primarily user financed, and assistance is offered to these local communities and institutions. Norwegian schools also offer subscription-based programs for fruit and vegetables, and milk is subsidized by the government. In Denmark, milk schemes are widely available in schools and some local fruit arrangements have been established.

Note: Legislation is changing in Denmark / lunch arrangement for kindergarten – this puts obligation on municipalities - the system is currently adapting to the responsibilities and the implementation of school lunches is currently under development.

This chapter gives an overview of current practices on the delivery of school meals in Nordic schools. The representatives of NTPs in the Nordic countries have been responsible for

²Health, food and physical activity - Nordic Plan of Action on better health and quality of life through diet and physical activity, <http://www.norden.org/pub/velfaerd/livsmedel/sk/ANP2006745.pdf>

communication with stakeholders as part of the project's national activities and for gathering relevant information.

Each Nordic country has contributed by collecting:

- A summary of the history behind school meals
- An overview of the responsibility of meal programmes in their respective countries
- Information on implementation of nutritional recommendations
- Main obstacles and key success factors in the delivery of healthy choices in schools
- Proposals for improvements

Finland

School meals have a long history in Finland. In order to make it possible for poor children to attend school, The "School Soup Association", was founded in 1905. The aim of the association was to improve the nutritional state of pupils. To cover the costs the association collected membership fees, took donations, gave parties, and arranged raffles and collections. In 1943 an amendment was made to the law of primary school financing. Within five years all primary school pupils were to get a free meal on each school day. Thus 1948 is considered to be the year when universally free school catering started in Finland³. A review report was compiled in the project to provide the following overview of the Finnish school meal chain⁴

Decision making and guidance in Finnish school meal chain

There are several laws in Finland regulating meals in schools. Legislation defines that meals should be served free of charge consisting of a well-balanced school lunch for pupils every school day. There are also guidelines recommending that snack should be served if school day continues longer than 3 hours from lunch. However, snacks are voluntary and they do not need to be free of charge. Finnish municipalities are in charge of determining school lunch and snack serving in Finnish schools under legislation and under recommendations and guidance of governmental authority, National Nutrition Council. They are in charge of determining what kind

³C. Hille, presentation for "The Nordic action plan on better health and quality of living through healthy eating and physical activity" 9.3.2005

⁴ Review of Finnish School Meal Chain - Decision making, Nutritional guidelines, Success factors and Obstacles, 2009. Aimo Tiilikainen and Mirja Morkkila, VTT Technical Research Center of Finland; Eliisa Kotro and Teija Taskinen, Mikkeli University of Applied Sciences. Nordic Network NTP - Healthy Choices Project report

of school lunch and additional snacks are served, and how meal serving is organized in the schools. They can for example outsource the meal serving to private companies.

Implementation of nutritional guidelines in Finnish school meal chain

Typically, **catering personnel** put into practise school meal serving in the schools. They are in charge of raw material sourcing, meal planning, meal preparation and follow-up on meal quality. They have tools like quality evaluation sheets and nutritional calculators, and nutritional advisers to help them in meal quality follow-up. Catering personnel is in key position to apply nutritional recommendations in the Finnish meal chain.

National Nutrition Council has published a booklet of recommendations for school meals (Kouluruokailusuositus 2008). This booklet of 15 pages gives detailed recommendations how school meal serving should be organized in Finnish schools. Recommendations cover issues as follows:

- lunch time and the length of lunch and snack breaks
- eating surroundings
- nutritional content of lunch and snacks for different school grades
- right share and balance of various ingredients (vegetables, breads, fats, potato/rice/pasta, meat, fish and drinks)

National Institute for Health and Welfare conducts annually a survey to analyze eating habits of Finnish pupils at schools. Results in this chapter are based on large data from these surveys from 2005 and 2006 (Raulio et al. 2007). Surveys were conducted during the school hours under surveillance of the teachers. Results represent only grades 8 and 9 in elementary school and grades 1



and 2 in upper secondary schools i.e. the most challenging pupil group, teenagers. There is no representative data covering school meal eating habits of younger pupils. According to the study around 85 % of surveyed pupils eat some part of the school lunch every school day. Boys eat lunch more often than girls. However, only 35 % of the pupils eat all parts of school lunch (e.g. salad, main course and bread) daily (Raulio et.al. 2007). Over 50 % of the pupils eat something other than food offered by school during the school day. Most popular additional foods are

candies and soft drinks. School lunch is skipped more often by smoking, obese, alcohol using pupils and children from lower educated families. Intervention procedures studied by Hoppu et al. (2008)⁵, indicated that improved eating habits of 7th and 8th grade secondary school pupils, can be achieved.

Nutritional optimization of school meals in Finland presumes that all parts of lunch are eaten. However, as surveys indicate that only part of the lunch is consumed, nutrient intake is not balanced according to nutritional guidelines. Based on this, nutritional guidelines are fulfilled only partially, at least when considering teenaged students. **Only one third of children in those age groups are eating all parts of school lunch daily, as they should, to get optimal amount of nutrients during the school days.** A major challenge in Finnish school meal serving chain currently is how to get children, especially teens, to eat daily and according to nutritional guidelines. The conclusions above represent only teenage pupils. Younger pupils, at grades 1 to 6 in elementary schools, eat lunch under surveillance of the teachers. General understanding is that younger pupils are eating better, according to nutritional guidelines, because of supervision of the teachers. Another question is if children's own opinions have been taken into account. School meals are currently well-balanced taken into account nutritional facts and cost-efficiency but the viewpoint of pupils have been forgotten. In spring 2009 Finnish media reported that funds allocated to raw materials of school lunch is very limited and suggested that cost cuttings are affecting the quality of school lunches⁶.

Main obstacles of Finnish school meal chain

- A large percentage of teenaged students don't eat balanced diet at school
- Students feel that they don't have any influence on the food at school
- Budget strain may be affecting the quality of school lunches⁷.

Key success factors of Finnish school meal chain

⁵ http://www.ktl.fi/attachments/suomi/julkaisut/julkaisusarja_b/2008/2008b30.pdf

⁶ <http://www.hs.fi/kotimaa/artikkeli/Kouluruokaan+k%C3%A4ytet%C3%A4%C3%A4n+joissain+kunnissa+ehk%C3%A4+laittoman+v%C3%A4h%C3%A4n+rahaa/1135246148158>).

⁷ <http://www.hs.fi/kotimaa/artikkeli/Kouluruokaan+k%C3%A4ytet%C3%A4%C3%A4n+joissain+kunnissa+ehk%C3%A4+laittoman+v%C3%A4h%C3%A4n+rahaa/1135246148158>).

The key success factors in Finnish school meal chain are:

- **Legislation** which enables free and well-balanced school meals to pupils.
- Detailed guidelines on school meals by the National Nutrition Council

Main Proposals for further development of Finnish school meal chain:

There is no special school lunch policy or programme orienting health aspects in Finland. This is due to two issues: 1) the law states that school meals should be nutritionally well-balanced and 2) nutritional guidelines optimize the nutritional content of the school meals. These concurrently are assumed to lead situation where normal meals are health oriented and balancing nutrient intake. Therefore it is assumed there is no need for special health meal programme in Finnish schools. When considering the issue from the point of view of pupils' eating practices there is a need – not for a health oriented food programme – but for an eating activation programme: how to get teenagers to eat offered food.

Attitudes of parents and students toward school meals

Tikkanen's (2008) survey on attitudes of parents and children towards school meals (REF) gives some ideas how pupil involvement could be increased in the school meal chain. The survey shows that parents' opinions are well in line with pupils' own opinions. Both groups think pupils would eat school meals better if the food was tastier, children could fill the plate themselves, there were more alternatives available and as a whole, children's opinion would be taken better into account. There was a slight conflict between the answers of pupils and parents. Parents thought that pupils had meals at school almost daily, but the study revealed that 15 % of interviewed pupils at grades 7 to 8 in elementary schools and at grades 1 to 2 in upper secondary schools do not at all eat the food offered by schools. This means parents assumptions are too optimistic.

The survey included 168 pupils (conducted in four schools). Children in grades 5 to 9 in elementary schools (age from 12 to 16) were asked what would make them eat more often and better school meals. Pupils mentioned especially taste, versatility, and the availability of alternatives. In other words, children would eat better if the meal serving were more user-oriented, that is, foods would be **tastier**, **versatile** and more lunch **alternatives** would be

available. Surveyed parents (80 parents) evaluated the tastiness of various parts of school lunch. In summary, the parents thought school food to be moderate in tastiness. Main course got for example 3,16 value in tastiness (1 to 5 point Likert scale). When asked why children do not eat main course at school parents said major reason is children do not like offered food. From the study it is possible to draw indirect conclusions about the parents' attitudes toward school meals. Interviewed parents' attitudes were mostly fairly positive (4/5 on Likert scale) and clearly bigger share of parents could be classified as positive toward school meals. However, there was a smaller group of parents, who were classified and named as negative toward school meals. These parents questioned critically the meaning and also the need for school meals. The study gives indications on how schools could encourage children to eat more actively offered food, according to parents' opinion. Parents thought children would eat better if:

- meals were tastier
- more alternatives were available
- students had an opportunity to fill their own plate instead of fixed doses
- opinions and wishes of children were taken into account when developing school meals

Based on the reviewed studies on Finnish school meal chain there is an evident need to increase pupil-involvement in the development of meal offering. Currently school meal chain is facing a problem where pupils, especially teenagers, do not eat the food served in schools.

Following improvements are suggested:

- **Take carefully into account the opinions of pupils.** Surveys on attitudes of parents and children indicate, that children would eat better if the meal serving were more user-oriented, **tastier**, **versatile** and more lunch **alternatives** would be available (Tikkanen, 2008)
- The role of modern attitude influencing should be taken into account. Preliminary results of the Sitra's Sense Food project suggest that by **joining attitude and taste workshops** with development of eating surrounding will give good results.
- **Funds allocated to school meals** need to be secured to develop meals that are both nutritionally well-balanced and fulfilling the needs and wishes of modern teenagers.

Sweden

Sweden has a long tradition of serving school meals (Skolmatens Vänner, 2010). School meals existed already in 1845 when the Swedish elementary school was made compulsory. Sometimes the municipality was in charge of the function but just as often private charitable organizations served food to poor schoolchildren. The expansion of Swedish school meals started in the beginning of the 20th century. In 1946 the Swedish parliament voted for a reform for free school meals and the municipalities received government grants in order to build their operation. The government grants ceased in 1967 and since then school meals are a municipal matter that is regulated by the Local Government Act and funded by municipal taxes.

Responsibility and current practices in school catering

Since 1997 the free school lunch is a statutory right for elementary school pupils according to changes made in the Education Act (SFS 1997: 1212), whereas secondary schools do not have to serve free school lunches. Approximately 30 municipalities (out of a total of 290) take a lunch fee in secondary schools. School meals are normally operated by the municipalities, but there are also private contractors. Sodexo, ISS Facility Service and Amica Fazer are some of the larger operators. The responsibility for school meal staff is held by the headmaster, a dietary manager or a private contractor. The school canteen mainly serve lunch, but a growing number of schools offer breakfast as well. The school child care aimed at children aged 6-12 years, generally serve the snack in the school canteen as well. The school meal's purchase of food is regulated by LOU (the Public Procurement Act).

Implementation of nutritional guidelines

In current legislation, quality requirements for school meals have been issued. A new Education Act (SFS 2010: 800) was passed July 1, 2010, which says that pupils should be offered *nutritious* school meals. However, the law does not specify in detail what is meant by the term *nutritious*. Many are of the opinion that the legal text should state that the Swedish nutritional recommendations shall be followed so there will be a basis for quality assurance.

The requirement that the school lunch shall be nutritious comes after reports of tired students with poor academic results, who ignore school meals and in some cases replace it with fast food and candy. In a survey made by “Friends of School Food” (Skolmatens Vänner, 2008), the municipal politicians in charge estimated that 12% of the pupils skipped school lunch daily. The reason that students reject school meals is that they do not like it, that there are long food lines, the dining room is messy and noisy and there is no quietness while eating. The quality of the school lunches varies between municipalities and schools. Less than half of the country’s municipalities have a nutrition policy with guidelines to determine which standard there should be for school meals.

The most current advice for school lunches is *Good food in school* (Livsmedelsverket, 2007a), which is based on Swedish Nutrition Recommendations (Livsmedelsverket, 2005), and directed to different actors that in some way work with the school lunch (e.g. decision-makers in municipalities, headmasters, food service managers, the school meal service personnel, teachers and the school health service) but also to parents in order to support the schools’ work for good food habits. The advice concerns the communities’ public health plan and school plan and deals with, among other things, nutrient content, scheduling, hygiene, the eating environment and pedagogic meals (i.e. that teachers eat with pupils).



Good food in school (Livsmedelsverket, 2007), contains advice for all who are involved with the food in schools in order to promote healthy eating habits among children and adolescents. The advice states what should be served and how often, so that school meals will be varied and nutritious. Among other things, there are also instructions on appropriate hours to eat, good eating environment and food advice. *Good food in school* can be downloaded from <http://www.slv.se/sv/grupp1/Mat-och-naring/Mat-i-forskola-och-skola/>. On the same website it is also possible to rate school meals as part of an on-going survey.

Headmasters are, in most cases, responsible for school canteens, scheduling, and the possibility for teachers to have pedagogic meals, the appointment of a school-based „food council“

(consisting of pupils, teachers and food service personnel) and other activities of importance for the health of the pupils.

The food service managers that are responsible for purchasing food have great knowledge about the advice and think that they are good and usable (Brugård Konde & Carlbom Hård, 2009). They use the advice mainly for specification of requirements in the purchasing process. The advice is considered to have increased the quality of the school lunch, the snack and in many cases even the breakfast that sometimes is served at schools. The advice has also increased the understanding of the importance of the school meal among the school food service personnel. However, teachers, parents and decision-makers are not aware of the advice to the same extent and headmasters seem to have poor knowledge. In the schools, the advice is applied to varying degree (Brugård Konde & Carlbom Hård, 2009). For instance, the majority of schools do not sell sugary drinks and confectionary in the cafeteria and four out of five schools have a so called „food council“. Many schools also offer a great variety of vegetables, *but* relatively few serve more than one dish and just about half of the schools declare that they serve low fat milk and water to drink and keyhole⁸ labelled margarine spread.

Main obstacles to offering healthy food at school

The main reason why the advice is not followed to a greater extent is that it is just advice and not obligatory and that it does not gain a hearing among decision makers and headmasters (Brugård Konde & Carlbom Hård, 2009). In some communities, parents exert pressure to *not* follow the advice to serve low-fat milk and keyhole labelled margarine spread since they believe that it is healthier with full fat milk and spread. Another obstacle is that it may be too expensive to follow the advice or that the kitchens do not have the capacity to produce more than one dish. Thus, public procurement is governed more by political decisions and economic factors than by the advice. Headmasters lack sufficient knowledge about the advice, which is remarkable since they play a crucial role. Food service managers need support from the National Food Administration in discussions with parents about milk and margarine spread. **The conclusion is that the advice is well formulated but that greater attempts are needed from especially decision makers and headmasters to put them into practice. Thus, there is a need to direct certain efforts to**

⁸ The green keyhole is a symbol for healthy foods in Sweden that indicates high fibre and low fat, sugar and salt content (Livsmedelsverket, 2007b).

these groups and also encourage cooperation between foodservice managers and headmasters.

Key success factors for offering healthy food in school -Sweden

A key success factor is legislation that the school meal shall be nutritious.

- The advice *Good Food in School* (Livsmedelsverket, 2007) is a valuable tool in this work, which, however, seem to be applied to a varying degree.
- Tools for quality assurance of the school meal are developed. A webbased quality assurance tool, *SkolmatSverige*, is currently under development by Karolinska Institutet and is pilot tested by the municipality of Stockholm (SkolmatSverige, 2010). In 2011, all other municipalities in Sweden will have access to the tool.
- The National Food Administration have a survey on their website for monitoring school meals, *Rate meals in school*, which is open for pupils, parents, school meal personnel and decision makers among others (Livsmedelsverket, 2010).

A key success factor is to examine pupils' opinions.

- In a successful intervention study (Prell, 2002a, 2002b, 2005), focus group discussions and questionnaires were used to examine pupils' views of the school meal.
- Pupils' description of the meal quality concept in the school restaurant has been examined (Dahlgren, 2010). The major themes that describe meal quality for pupils consist of the food, the environment, service and influence. According to pupils, the food should not only be nutritious but palatable and fresh, be prepared with care and consumed in a pleasant environment together with friends. Moreover, it is important that the pupils feel that they can influence what is served and have the possibility to convey opinions to decision makers.
- In a study on efforts to reduce food waste in the school restaurant, *a holistic approach* regarding pupils' food experience (e.g. palatable, good quality food in a calm environment) was considered an important factor (Naturvårdsverket, 2009).

A key success factor concerns the involvement of both the school canteen and the home economics classes (Prell, 2005). A significant increase of fish consumption among pupils was noticed in the group where these efforts were combined.

Proposals for further development

- Politicians and other decision makers (e.g. headmasters) should be reminded of the importance of the school meal and the advice *Good food in school* so that schools could be given more resources.
- Cooperation between responsible food service managers (dietary managers) and headmasters should be encouraged as well as cooperation between teachers (e.g. home economics teachers) and food service personnel.
- What “a holistic view” of the school meal entails might be further explored from the perspective of the pupils.
- Healthy food initiatives that involve cooperation between food industry and school restaurants might be further examined.
- Different activities and efforts to change norms and the image of the school meal might be further investigated.

Iceland

In 1989 the Icelandic parliament approved a parliamentary resolution on official food and nutrition policy. It states that healthy food shall be available at school to primary and secondary school students. Elementary School Law from 1995 states that healthy meals shall be available to all students during school hours. From 2004 almost all elementary schools in Iceland have been offering warm meals for lunch. Different approaches are applied in the delivery of school meals in Iceland. Centralized meal service companies provide meals and many schools have in-house cooking facilities. Since the new law for elementary school was established (2008) the development in delivery of healthy meals is rapidly evolving and all schools are now offering meals either delivered from central catering or prepared in school kitchen facilities.

Responsibility and current practices in school catering

Municipalities are responsible for the operation of **preschools** (Preschool law nr. 90/2008) and **elementary schools** (Elementary school law nr. 91/2008). There is no clause about school meals in the preschools law. However, the general rule is that preschool children, who stay at school for 8 hours get three meals at school, breakfast, lunch and afternoon snack. Lunch is usually a warm meal prepared at the school. Learning how to eat is an important part of the education at

preschools. According to the law on elementary schools (Article 23) every pupil shall have access to a meal, during school hours according to official dietary recommendation. Municipalities have the right to charge a fee for school meals in accordance with a special rate list set by them. Meals are paid by parents and in most cases subsidised by municipalities.

The government is responsible for the operation of **secondary schools** (Secondary school law no. 92/2008) and they are classified by law as government institutions. Some schools, especially outside the capital area, operate dormitories for pupils who can,† attend school in their home commune. Those dormitories offer meals for their residents and in some cases also for other pupils. In those cases the pupils are charged for the cost of the raw materials but the government pays salaries of the canteen staff.

Implementation of nutritional guidelines

The school authorities are responsible for the school catering. The Icelandic Nutrition Council (2002) recommends that all children in primary school shall have a nutritious meal at school. There are no specific demands for education for school canteen staff in Iceland and knowledge of nutrition and calculation of the nutritional balance of the meal is limiting. Therefore, the authorities put emphasis on the so called dinner plate. The dinner plate guideline illustrates a preferable combination of a meal where 1/3 is rich in protein, 1/3 is rich in carbohydrates and 1/3 is vegetables/fruits.



The Public Health Institute of Iceland publishes guidelines⁹ intended for those who prepare food for preschool and children in elementary school. There are no official recommendations for the nutritional content of meals in secondary schools but a new handbook for catering in secondary schools has recently been published (2010) by the Public Health Institute. The purpose of the handbook is to help personnel to give the children healthy, tasty, safe and suitable food with special emphasis on diversity, consumption of fish, fruits, vegetables and water.

⁹http://www.lydheilsustod.is/utgafa/baekur-baeklingar-listar-rit/naering-og-holdafar/#Handbok_fyrir_skolamotuneyti

The handbook is supported by a poster with the most important notations from the handbook to hang on the kitchen wall. Furthermore, the handbook contains a suggestion for a six week menu with recipes and deals with allergies, intolerance, obesity and other diseases and economic shopping among other guidelines.



The project „Everything affects us especially ourselves”¹⁰ under the leadership of the Public Health Institute (PHI) has performed surveys within schools regarding nutrition of school children. The results of surveys are summarised as follows: Meals and drinks offered in preschools and schools are in most cases according to the recommendations of the Public Health Institute. Processed meat products are however offered more often than is recommended despite the guidelines which have emphasized to limit the processed meat products. Fish is offered at least twice a week in almost all preschools and schools in the whole country. The variety of raw vegetable should be enhanced but the selection of fruit is very good in preschools. However, it is rare that fruit is offered in schools during the morning break, but the variety of raw vegetables has increased with the lunch. Water is available for all during lunch, but it is suggested not to serve milk with the lunch in schools. The food and drinks served in the preschools and in school varies and the nutritional content of the meal within the same municipal can be different. The quality of the school lunches varies between municipalities and schools and the price of the lunch also varies. Price does not necessarily correspond to quality.

Norway

There is no national legislation for school meals in Norway today. In some counties it has been implemented for many years in such a way, that the parents have been paying school meals, but in most parts of the country there is no tradition at all with school meals. The school milk scheme has been implemented for many years. The milk is subsidized so that all children are

¹⁰http://www.lydheilsustod.is/media/allthefurahrif/Public_Health.pdf

offered milk at a reduced price, and Norwegian schools also offer subscription-based programs for fruit and vegetables.

Responsibility and current practices in kindergarten and school catering

The Government has the overall responsibility. The County Governors act as a link and the municipalities are responsible for providing and running municipal kindergartens, as well as approving and supervising both public and private kindergartens. The municipalities are also responsible for operating and administering primary and lower secondary schools, whereas the county authorities are responsible for upper secondary education and training. Non-governmental organizations are making different activities to increase consumption of fruit and vegetables, fish and fibre rich bread together with Directorate of Health and Ministry of Education and Research. These activities are paid by the local county. Oslo Municipality has developed information materials like facts sheets about fruits and vegetables, fish, breakfast and lunch boxes together with non-governmental organizations. The establishment of fruit and vegetable subscription programme to increase the consumption of fruit and vegetables among schoolchildren has been important. The subscription is a government-subsidised programme paid by the parents and guardians. There are many indications that the pupils who need it the most are not participating. Access to healthy food at school, either in the form of canteens or kiosks, is important for ensuring that lower and upper secondary pupils can eat nutritionally beneficial meals during the school day.

Ministry of Health and Care Services is responsible for making nutritional guidelines for kindergarten, day-care centres and schools through Directorate of Health. Hygiene is an important part of the guidelines and Norwegian Food Safety Authority is involved to approve the kitchens. The Municipalities have the responsibility to implement the guidelines.

Implementation of nutritional guidelines and responsibility

Many challenges remain concerning the school food habits of children and young people. This is related to lunch breaks and offerings of food and beverages. The recommendation for lunch breaks is a minimum of 20 minutes.

In kindergarten kitchen facilities and staff responsible for meals are a limiting factor. Since 1995 no money has been dedicated to positions of catering staff, and the schools are depended of the

interest of the pre-school teachers. Hygiene is the greatest challenge without a person dedicated to make the food. In kindergarten the children bring breakfast and afternoon snack from home, while lunch is provided. There are normally four days with cold lunches and one day with hot lunch. The food available is organized by the local municipality through calls for tender to a wholesaler. There is a wish to have more control of the quality and assortment. The parents pay an annual fee, which cover the lunch expenses and fruit/vegetables (apple, pear, orange, carrot).

For schools there is a greater diversity. Very few schools offer hot meals, but some private initiatives exist. Most schools have canteen at upper secondary level, but fewer at primary level. Cold food is served as sandwiches and fruit and vegetables. These canteens are run by the pupils themselves or kitchen staff. The challenges are organizing, hygiene, purchasing system and price. There is no control of what the children buy in kiosk or nearby shop.

The Norwegian strategy for healthier meals in kindergartens and schools is described in Norwegian action plan on nutrition (2007 – 2011) Norwegian Ministries I-1128E 12/2007 Chapter 4. Healthier meals in kindergartens and schools: In kindergarten challenges are mainly related to what is offered of food and beverages. Offerings of fruit and vegetables in particular should be increased. Too few wholegrain breads and cereals are served, and kindergartens that offer whole milk should serve low-fat types of milk. It would be advantageous to increase servings of fish and seafood since the consumption of fish among children is low. Birthdays and holidays are often celebrated with cakes and other sweet and fatty foods.

Denmark

No national legislation for school meals exists in Denmark. In some counties parent paid school meals have been implemented for many years. In most counties there is no tradition at all.

The driver behind school meals in Denmark is a concern about the eating habits of the children and teenagers. The traditional school meal is the lunch packet made of dark rye bread with liver pâté, sausages or cheese. The problem is that the school children drop the lunch packet and instead eat fast food or cakes. Only a few of the Danish schools (primary) offer schools meals. Lot of schools have their own little shop from where the children sell e.g. fruit, juice and bread.

Every initiative is on behalf of the school itself. A school milk in program in Denmark is coordinated by the Danish dairy board.

Responsibility and current practices in schools

The Danish Parliament is discussing a national legislation for school meals, but so far the majority have been in favour of a commercial approach, where schools and the local county decides if a system should be introduced in the local schools. In some counties school meals come from kitchen that is also preparing meals for the elderly in the county. In general the schools meals are financed by the parents (or children). However Copenhagen is special because the city has decided to invest public money in establishing a school meal system.

The Danish project Food+Lab (www.food-lab.nu) (Healthy school food – How to get there on a national level) invited food enterprises, school kids, parents, teachers and municipalities to participate in a joint forum. The project's discussion was on nutrition, quality, school political issues, prices, food and physical activities, and motivation to select the healthy choice i.e. open innovation. The result of this project was new ideas for healthier products, estimate for the market potential, principles for food quality, nutritional requirements for producers and guidelines for implementing politics for nutrition and eating on schools. Danish Food and Drink Federation and Ministry for Agriculture, Food and Fisheries funded the project, which was completed in 2007 without any following up.

Recommendations on school meal arrangements - The EVIUS report

School meal arrangements have spread in Denmark over the past 10 years, partly as a result of requests from parents, teachers, children and politicians, and from an idea that school meals can supplement or replace lunch packs. In addition, the introduction is driven by the idea that they can provide health benefits and help to create better and healthier food and meal habits and better learning in school. EVIUS project¹¹, supported by Fødevarer erhverv had the opportunity to explore some of these assumptions. The EVIUS (Effekt Vurdering af Interventioner omkring frokost for børn og Unge i Skoler) report was produced by a number of organisations involved

¹¹Projekt *EVIUS – sammenfattende rapport*. Redigeret af: Bent Egberg Mikkelsen og Sofie Husby; Hvidbog om en EU-strategi om sundhedsproblemer i relation til ernæring, overvægt og fedme.

with food and pedagogic meals. In the report a number of projects are evaluated and conclusions drawn to give recommendations on how school meals can be organised in Denmark.

The Danish project team for Nordic Network NTP – Healthy choices made a summary in English from the EVIUS report. The project indicates that there are nutritional gains by implementing school meals. To gain a significant effect and an all over benefit, it is important to improve the conditions for more pupils choosing school meals. It is also necessary to ensure a high nutritional standard of school meals - that school meals meet energy and nutrient recommendations. In that way, there could be full advantage of the potential nutritional benefits. EVIUS also shows that school meals must be age-adjusted in terms of both the food and portion sizes but also in terms of eating environment. The report gives a list of recommendations on school meal arrangements, aimed at different levels in the meal delivery chain, meal supplier level, school level and municipal level, and even specific recommendations for organic school meals, aimed at municipality and school level and national level. The list of recommendations of the EVIUS report can be seen in Appendix II.

Summary of current practices

The responsibility for the delivery of meals in the Nordic countries varies. Finland, Sweden and Iceland have legislation on school meals. The meals are provided free of charge in Finland and in Sweden for elementary school, but in secondary schools a fee is charged. In Iceland the meals are paid by parents, but often subsidised by municipalities. In the three countries the national health authorities have published advice or handbooks for catering personnel and those involved in school lunches, which are based on national nutrition recommendations. The guidelines also include general advice on food habits, eating environment and advice on hygiene. The quality of school meals is generally not mentioned in guidelines. The delivery of meals is either by catering service companies or the schools have in-house kitchen. In Norway and in Denmark there have been discussions about implementing lunch programmes in schools, but currently the main rule is that children bring lunchbox to schools but voluntary prescription based meal programmes exist in some schools.

Within the Nordic Network NTP Healthy Choices project some common problems have been identified in the Nordic countries. In all countries there is a concern because of low attendance of students in school meals.

- ✓ Not all children are eating what is offered. This applies both to hot lunches and lunchbox arrangements.
- ✓ Not all children like the school meals and replace it with fast food and candy
 - *Sweden* - 12% of the pupils skipped school lunch daily (*Skolmatens Vänner*, 2008)
 - *Finland* – only 35 % of age group 13-16 eat all parts of school lunch (Raulio *et al.* 2007).
 - *Iceland* – only 40% of age group 13-16 attend the school canteen (PHI, 2010)
 - *Norway* - subscription-based programs for fruit and vegetables => Indications that the pupils who need it the most are not participating
 - *Denmark* - the problem is that some children drop the lunch packet and instead eat fast food or cakes
 - EVIUS report from Denmark indicates that a lot of school meal programmes have low user participation

A key success factor is legislation stating that the school meal shall be nutritious, but follow up activities are needed by applying common tools for quality assurance of the school meal and surveys should be conducted by authorities for monitoring school meals.

Chapter 3 View of stakeholders on delivery of healthier school meals

An important approach in the project was to stimulate direct communication and discussion among stakeholders to gain a better understanding of the different opinions about school meals and identify how different disciplines can have an impact to improve the current system. The view of stakeholders and the various disciplines was obtained in the project by company visits, by conducting surveys and by arranging meetings, seminars and workshops. Each event is explained shortly in the following chapter.

Interviews with catering companies and school chefs in Iceland

In 2009 interviews were conducted, with representatives of centralized meal service companies and an in-house cooking chef, to obtain information on the current status and to discuss the main success factors and obstacles in the delivery of school meals.

Centralized school meals service companies

Two companies were interviewed, one a family based SME, with a long experience in catering services¹², the other a division of a big meat processing plant¹³. Customers of both companies are schools in several municipalities in south west part of Iceland. Lunch subscription is optional and some children bring their own lunch pack. Service is based on the cook and chill concept and meals are reheated at the school canteens. The companies provide their own staff to serve the children at the canteen with assistance from school staff. Students choose their own accompaniments, e.g. vegetables and fruit, from a sidebar.

Success factors:

- **Collaboration**: The companies focus on good cooperation with their clients (school authorities, parents, district municipalities, students). Further, they cooperate with food manufacturers for raw material and meal component sourcing and aim at providing more variety of healthy products in their menus.

¹² www.skolamatur.is

¹³ www.holltihadeginu.is

- Training: The companies offer training courses for their own staff several times a year, in cooperation with experts in the field of nutrition, hygiene and others. All employees of the companies are obliged to attend the training, but school staff can't be forced to attend.
- Facilities and attitudes: Many factors influence the children's liking and acceptance of the meals. Eating surroundings, how the meal is presented and attitudes of catering staff are seen as the main influential factors to motivate children in eating what is offered in school canteens.
- Follow up activities: Attitude surveys among the children are conducted either by the companies themselves or by independent companies. The results of the surveys give valuable information on how the children like the food and the atmosphere in the lunch room. The surveys have shown very clearly how very important the human factor is. Children, especially 9-12 year olds, are keen to express their opinion towards the meal.

Main obstacles

- Eating surroundings are inadequate in some places and it is rare that teachers have lunch with the children. In the opinion of the catering companies it is preferable that teachers and pupils eat lunch together rather than having separate canteens.
- Calls for tender are common and competition is severe. It is obvious from recent calls for tender that the emphasis on cost is great and important that it doesn't affect the professionalism.
- Municipalities lack knowledge of foods, which can lead to misinterpretation of official recommendations.

In-house school canteen

In Reykjavik municipality the main policy is that in every primary school there is an in-house kitchen where meals are prepared from scratch. The chef is hired by the school principal and is responsible for purchase of all raw materials and menu planning. This particular school serves 500 pupils, 13-16 years of age. Participation in the lunch program is optional.

Success factors

- Students and teachers eat lunch together in spacious dining facilities.
- A hot meal is served every day and there is always a choice of fish, even if the main meal is meat

- 86% of the students are enrolled in the lunch program

Obstacles

- Cost cuttings are affecting the operation.
- The school principal makes decisions on employing assistant staff in the kitchen and during lunch the number of assistants is a limiting factor to manage the number of customers and therefore students have to wait in lines.
- Lack of resources and qualified staff to adapt menus to requirements of students with allergies and food intolerance.

View of Swedish NTP stakeholders on obstacles and success factors

A questionnaire was sent to NTP stakeholders in Sweden, in August 2009, to identify the main obstacles and keys success factors in the delivery of healthier school meals.

The main obstacles according to stakeholders are

- Political and economic factors
 - Lack of interest from politicians.
 - Lack of money and resources spent on the school meals, which influence food quality.
 - Centralised kitchens (instead of cooking the school meal at each school).
- Parents with unhealthy food habits, lack of time or no interest in the question.
- Environmental aspects
 - The eating environment in school restaurants needs to be improved.
 - There is no choice in the school restaurant and the possibility to influence what is served is low.
 - Available healthy choices are limited in school cafeterias. Stakeholders believe that school cafeterias offer unhealthy food.
- Knowledge
 - The educational level among the school food personnel is low.
 - Lack of knowledge and understanding concerning the need and expectations of children and adolescents regarding the school meal.
 - Pupils in general know how to eat healthy but do not how to put this knowledge into practice.

- The media debate is not knowledge driven and contradictory messages are offered regarding what is healthy food.
- Norms
 - School friends’ negative attitudes influence consumption negatively.
 - The image of the school meal. It is not considered *cool* to eat the school meal.
 - Notions about the taste of healthy food. It is believed that healthy food does not taste good.
- Lack of scientific studies that address the question, for instance longitudinal intervention studies.

View of Icelandic stakeholders on obstacles and success factors

Iceland arranged a stakeholder meeting in 2009¹⁴ with participants from different disciplines (companies producing food for catering, municipalities, school authorities, public authorities, associations, educational and consulting centres, school catering, research and funding agency). Discussions took place about what participants considered to be healthy, preferred meals for children and young adults, obstacles and improvement in innovation and product development, needs for training and education for staff in catering. A report from the meeting is published on the website: <http://www.si.is/f415/nordic-network-ntp--healthy-choices/>.

Main obstacles to offering healthy food at school

- ✓ Cost efficiency is a pressure and affects the quality of the food. The municipalities are very cost conscious. Municipality representatives often lack knowledge of food and nutrition. Calls for tenders are made by the municipalities where great demands are put forward in terms of quality and nutrition, but choice is invariably made, based on the lowest cost, without comparing quality or follow up on what is delivered.
 - The canteen staff members sometimes lack knowledge and have no means of making sure that the children eat all parts of the meal so that the nutrition is balanced.
 - In some schools the cooking facilities are insufficient to prepare balanced meals.

¹⁴Report from Stakeholder meeting in Iceland on Healthy Choices for School Children, May 2009.

<http://www.si.is/media/matvaelaidnadur/H08047-Summary-from-stakoholder-meeting-in-Iceland-270509.pdf>

- Nutritional recommendations are very general and should only be used as guidelines, but they need to be adapted to the available raw materials and food products to ensure delivery of nutritious meals.
- Lack of knowledge of staff to follow the nutritional guidelines. Product knowledge is often lacking when alternate products need to be selected to prepare meals.
- Limited budget for catering services is of concern
 - cost should not be the main issue
 - facilities and well trained staff are important to prepare meals according to nutritional recommendations
- Too little time is dedicated to meals and facilities are not sufficient to create a pleasant atmosphere for children in school canteens.
- The view of teachers needs to be changed regarding the meal as a part of the educational programme
- Parents are not well informed about nutritional content of certain food products and don't realise that new products have been developed to meet nutritional guidelines
- There is a lack of knowledge and misunderstanding in what is healthy.
- Prejudice against processed food, generally regarded as unhealthy
- Concern that children are not eating the school meals

Key success factors and proposals for further development

- A good handbook for school kitchen staff, with general recommendations on nutritional balance and menus exists in Iceland, which is in use by majority of catering services and school kitchens. The handbook is being developed further in collaboration with municipalities. They are responsible for meal combinations and portion sizes.
- Everything affects us, especially ourselves is a successful initiative carried out by the Public Health Institute in collaboration with Icelandic municipalities which has shown to have an impact on the choice of a more variety of healthy food and awareness of healthy lifestyles in schools. School meals are becoming more popular.
- It is recommended that teachers eat lunch with the children to educate them and show good examples in eating a balanced meal and to keep the noise in the dining halls down.

- Students and parents should be involved in meal planning. In some schools there are council groups where teachers, pupils and others are represented and can influence the product development
- Simple presentation of meal combinations, like the dinner plate is useful
- More focus should be put on availability of a variety of recipes and more product knowledge to prepare tasty and nutritionally balanced meals.
- In preschools the meal is a part of the educational program, this is not the case in elementary schools. Separate canteens for children and staff.
- School lunches should be part of the educational curriculum.
- Flexibility in guidelines to meet demands of quality, availability of products and cost.
- Focus on the combination of the meal - main food categories and diet as a whole. Not only single products or meals.
- The menu over the whole week should be the focus, rather than single meal to allow certain flexibility.
- Different disciplines and stakeholders should be involved in preparation of school menus

System challenges

Calls for tenders - Barriers for product innovation

All the Nordic countries have challenges with calls for tenders concerning price, food quality and food choices. During discussions in a project meeting in Oslo in March 2010, it became evident, that common problems existed in the Nordic countries regarding the organisation and procedures for public procurement for school meals. Municipalities commonly have their own budget for meals at schools. Cost efficiency is important, but the concern is that the quality of the food has to suffer. Contracts for purchase are made according to specific criteria but follow up is lacking. There appears to be a gap between what is defined in the specifications and what actually is delivered. There is a need for an interdisciplinary approach to prevent misunderstanding and to ensure that experts with product knowledge and nutritional expertise are involved in the process of preparing calls for tenders. Cost issues should be carefully evaluated along with the long term effect of economical constraints on the nutritional content, quality and variety in school meals.

Knowledge of food processing and preparation, raw materials and nutrition are important factors to make the most of a limited budget to deliver meals that are healthy, diverse and tasty.

Municipalities who call for tenders in food purchase must have access to thorough knowledge of foodstuffs, either among their own staff or from consulting agencies.

Can tenders be applied to positively affect the nutritional composition, diversity and taste of school meals?

Nordic Network NTP - Healthy Choices project in Iceland organised a meeting to provide a platform for stakeholders to discuss calls for tenders for school meals (Stakeholder meeting, May 2010)¹⁵. Municipal officials, school chefs, suppliers of ready school meals, public health authorities and scientists in food science and nutrition, most of whom had some previous knowledge of the project, were invited to the stakeholder meeting. 23 people attended, predominantly from Reykjavik municipality and school canteens in Reykjavik. The group was divided into three groups who discussed the following topics:

- How to involve interdisciplinary knowledge in preparing tenders
- How to coordinate economy, diversity, nutrition and quality, product knowledge in conditions and specifications for a tender
- How to involve different opinions in menu planning
- Readymade meals versus meals made on site
- Follow-up control of framework agreements

At the end of the meeting all groups reported on their discussions

Minutes are available in Icelandic and a summary with main conclusions in English.

Conclusions on calls for tenders and suggestions for improvements:

- Meal service and procedures for call for tenders could be improved by involving an interdisciplinary advice group (composed of chefs, food manufacturers /suppliers, nutrition- and food science specialists and other responsible actors in food service) to take part in the preparation of the calls for tenders

¹⁵Nordic Network NTP – Healthy Choices, Stakeholder meeting in Reykjavik, Iceland, 27th of May 2010, Subject: Calls for tender. <http://www.si.is/media/matvaelaidnadur/Stakeholder-meeting-270510---summary.pdf>

- Cost and benefit analysis is recommended to provide a more holistic view of the different services involved. A better understanding of the factors involved in the successful delivery of affordable, good quality, tasty and nutritious meals is needed
- It is recommended to establish a product development forum with participation of students, parents, chefs, food scientists, nutritionists, industry representatives and school officials to come up with ideas on convenient, healthy, attractive meals for school children

View of Norwegian stakeholders - Results from workshop in Oslo

A workshop, Healthy Food Choices for school children, was organised in connection with a project meeting in Oslo¹⁶, with participation of the project partners and Norwegian stakeholders. The focus of the workshop was on food innovation for school meals. A report with presentations and summary of discussions from the workshop is published on the website:

<http://www.si.is/f415/nordic-network-ntp--healthy-choices/>

Main obstacles to offering healthy food at school according to the workshop

- Tenders can be obstacles for implementing a healthier food policy.
- Cost efficiency is a pressure and affects the quality of the food. A school that had a health policy suddenly went back to the cheapest choices. Responsibility should be placed on the municipality, and the parents should put a pressure on the official bodies
- Knowledge of what is nutritious, healthy food for children is lacking, and more education is needed for municipalities, schools, kitchen staff and parents.
- Difficult to make surveys with children to ask what sort of food they want. It is possible to reach the children through the teachers.

Recommendations to develop healthier products and meals to serve in Norwegian schools

- Children's preferences must be characterized (sensory and chemically/physically) and translated into products and meals
- Guidelines for food and meals in kindergartens, primary and secondary school have to be translated into products with specified quality and recipes of healthier easy choices for children created

¹⁶ The Nordic Workshop – Healthy Food Choices for school children in Oslo 9th March 2010

- Create an arena with different stakeholders (industry, catering, innovation and research organisations, educators, consumers and health authorities) to discuss the need for healthier products and greater diversity
- Create food enterprise network to learn how to translate nutrition recommendation into attractive, healthier and tasty food choices through open innovation including calls for tender
- Make contracts with schools, outsourced companies or hire special staff for the canteen. What is the basis for developing the menu? Strategy is to try something new every month - popular meals. If they like it, include into the menu
- Arrange taste workshops at school with cooking lessons and involve the children to help in the kitchen
- Make food fun. Make an image - Colour, tempting, attractive i.e. Healthier choices which are tasty, convenient and trendy. Apply different concepts levels, and different marketing for different age groups. Cartoons for the younger children (or a reward system), and cool things for the older
- Make focus groups and children's councils in schools and give their opinions about the school food

View of Finnish stakeholders - Results from workshop in Espoo

A workshop, Healthy Food Choices for school children and young, was organised in connection with a project meeting in Espoo, with participation of the project partners and Finnish NTP stakeholders¹⁷. Presentations were given on the following subjects, Nordic Network NTP – Healthy Choices project, Finnish national food promotion program (SRE):review of past and current projects on school meals; opinions of pupils and parents; creating health-promoting food environment for school children and “Youth exercise and nutrition” project. Group work, together with Finnish ETP Food for Life representatives, took place to discuss future activities of

¹⁷ <http://www.foodforlife.fi/finnish/tapahtumat/icalrepeat.detail/2010/09/08/427/-/M2QwZDYzOTI1YWVhYzY1MmQ1YWRiOGZzMzcwN2NmZmE=>

the Nordic NTP network. A report with presentations and summary of discussions from the workshop is published on the website¹⁸

Results from workshops in Gothenburg and Reykjavík

Towards the end of the project, seminars were held in Gothenburg¹⁹ and Reykjavík²⁰. The presentations in Gothenburg covered Nordic Network NTP – Healthy Choices project, National recommendations and evaluation of current practices, Skolmat Sverige – a web based quality assurance tool for school food, quality evaluation of school meals, the purchase process and promoting dietary change in schools. In Reykjavík the discussion topics were on national nutritional recommendations, Nordic Network NTP – Healthy Choices project, purchase policy of Reykjavík municipality, public procurement of school meals and service contracts and the view of parents. Those seminars confirmed the main results on obstacles and key success factors identified throughout the project in the Nordic countries. The main conclusions are:

Main obstacles:

- Nutritional guidelines are good but school authorities and catering staff lack knowledge to translate them into meals
- School masters are too ignorant about the school canteen and recommendations
- Budget strain affects the quality of meals
- Procurement is based on politics and price rather than quality
- Lack of respect towards school meals
- Not all children eat the food at school – they have to like the food to eat it

Key success factors:

- Collaboration between disciplines and stakeholders is a key issue
- Supervision of grown-ups at meals – pedagogic meals
- Focus on the whole diet rather than single products or meals
- Diversity and variety is more important than focus on single products

¹⁸ The Nordic Workshop – Healthy Food Choices for school children in Espoo, September 2010

<http://www.si.is/media/matvaelaidnadur/Finland-Seminar-08092010.pdf>

¹⁹ <http://www.si.is/media/matvaelaidnadur/Gautaborg-Seminar-12112010.pdf>

²⁰ <http://www.si.is/media/matvaelaidnadur/Reykjavik-Seminar-23112010.pdf>

- Take the opinion of children into account
- Pleasant and quiet lunchrooms are equally important as the food itself

Summary – View of stakeholders

The results from discussions with stakeholders in the project has strengthened the view that communication and collaboration of stakeholders and different disciplines is the key to ensure quality school meals for children. Not only is the nutritional balance and content of the meals important, but also the understanding that delivery of school meals is a joint responsibility. This includes the acknowledgement of responsibility and commitment of all involved to ensure quality school meals (see Figure 1). The overview of current practices obtained in the project and examples of ongoing activities and projects related to operation of Nordic school meals systems, have demonstrated that common key obstacles exist in all the countries and success initiative have been identified. The lessons learned in the project have clearly demonstrated a Nordic consensus on important activities that are needed to improve the delivery of healthier meals for school children.

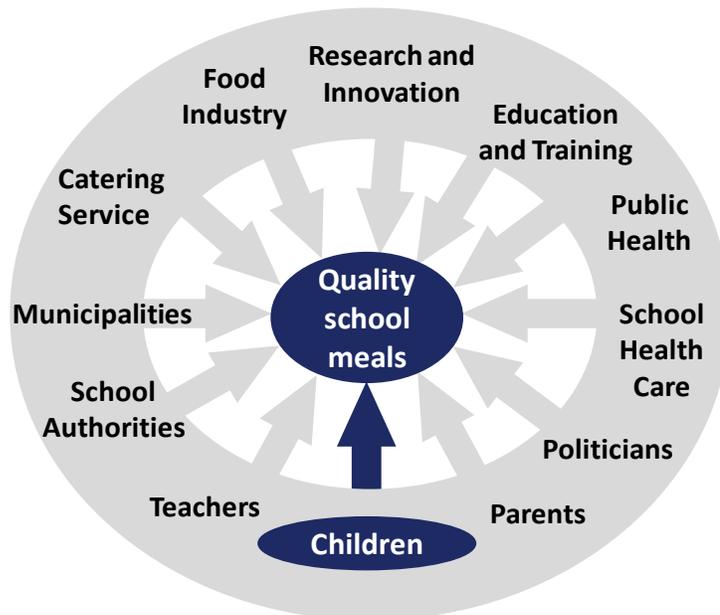


Figure 1. Joint responsibility of stakeholders, different disciplines, authorities, school management and parents to deliver quality school meals that take into account the view of children (From: Hedinsdottir et al., 2010)

Main obstacles

The obstacles that have been identified are similar in all countries. i.e. limited resources, the image of school meals is poor, facilities are often inadequate. The environment in school canteens needs to be improved and the opinion of students should be taken into account. In general knowledge on food and nutrition is lacking and further training is needed. Following are the key obstacles identified within the project:

✓ *Cost and resources*

- Limited resources and funds allocated to school meals => concerns were raised that cost cuttings will influence food quality
- Procurement is currently based on politics and price rather than quality of the food and services. Cost should not be the main issue.
- Recommendations on nutritional content of school meals and for the combination of food commodities for the lunch box are general. They say nothing about the food quality.
- There is a gap between nutritional guidelines and the availability of products on the market. An interdisciplinary advice group is needed to take part in the preparations of calls for tenders to ensure compliance of specifications and available products.

✓ *Image of school meals*

- Lack of respect for school catering. Politicians and head masters show little interest in school meals.
- Too little time is dedicated to meals
- Limited surveillance of teachers or staff during lunch
- Knowledge is often lacking to translate nutritional guidelines into meals.

✓ *Facilities are inadequate / Environment in school canteens needs to be improved.*

- Opinions differ on whether centralized kitchens or cooking the school meal at each school are better
- Facilities are not always sufficient to create a pleasant atmosphere for children in school canteens. Sometimes there are long lines, the dining room messy and noisy and too little time to eat
- Choices in the school restaurant are limited and the children have little possibility to influence what is served

✓ *Lack of knowledge / Lack of training*

- Lack of knowledge of food (catering staff, school authorities, parents – municipalities)
- Lack of knowledge and understanding concerning the need and expectations of children and adolescents regarding the school meal
- Catering staff: lack of positive attitude- lack of knowledge
- The educational level among the school food personnel is low
- Nutritional guidelines are good but school authorities and catering staff lack knowledge to translate them into meals
- Misunderstanding regarding what is healthy food
- Processed food generally regarded as unhealthy
- The media debate is not knowledge driven and contradictory messages are offered regarding what is healthy food
- School masters are often ignorant about the school canteen and recommendations

✓ *Norms*

- Not all children eat the food at school – they have to like the food to eat it
- School friends’ negative attitudes influence consumption negatively
- The image of the school meal. It is not considered cool to eat the school meal
- Notions about the taste of healthy food. It is believed that healthy food does not taste good

Chapter 4 Open Innovation

The background for this chapter is the need to stimulate new, industry driven, product development projects and to improve the variety and innovative combination of healthier food offers for children. Following key obstacles identified by stakeholders in the project support the need for innovation in relation to school meals:

- ✓ Not all children are eating what is offered
- ✓ Lack of knowledge of how to translate nutritional recommendations into healthier food products
- ✓ Misunderstanding regarding what is healthy food - Processed food generally regarded as unhealthy
- ✓ Public procurement – lack of product and food knowledge
- ✓ Limited resources - cost cuttings

New knowledge and results from projects on product development to meet new trends in lifestyles should be implemented along with best practices to influence eating habits of young people. Translating nutrition recommendation into products and healthy meals is a challenge for food industry and catering services who must also take into account economical aspects of their enterprises. Different disciplines must work together as equal partners, who respect each other's qualifications, but there is a huge knowledge gap between these disciplines.

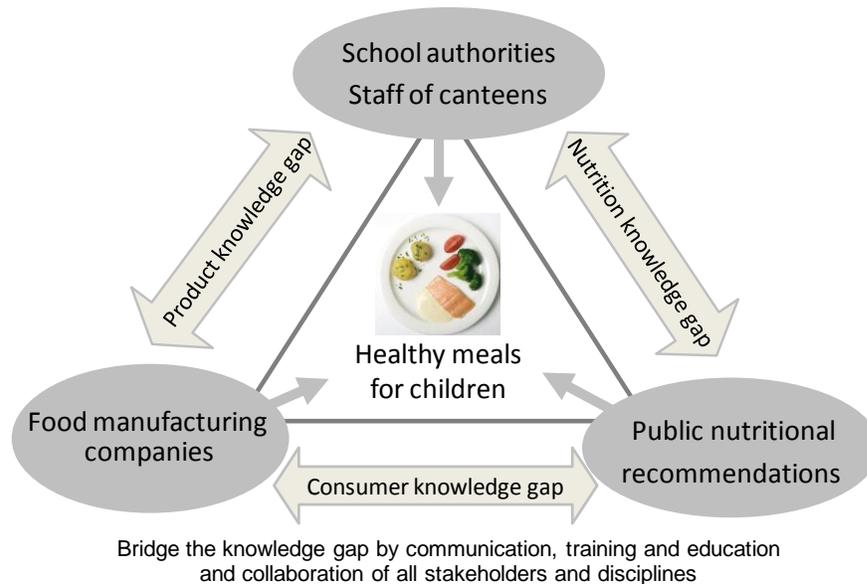


Figure 2 Healthy meals for children rely on good collaboration of those who are responsible for the delivery of the meals. Relevant experts with knowledge on nutrition, food manufacturing and food preparation and available products on the market should be involved

- *Nutrition knowledge gap*: how to translate nutritional recommendation into products and meals
- *Product knowledge gap*: how to produce healthier products and meals through open innovation – market trends and breaking technologies.
- *Consumer knowledge gap*: how to select healthier choices - expectations and behavioural pattern.

QUALITY MEALS FOR CHILDREN IS AN INVESTMENT FOR THE FUTURE

Nutritional needs and consumption of processed food

People consume meals consisting of different products and consume several products in one meal and several meals per day/weeks/months/years. Over a period of time all the necessary nutrients are needed to stay healthy. Carbohydrates, proteins, fats, water, vitamins and minerals and various micronutrients which have recently proven to have physiological effects, must be covered in meals which are tasty, trendy and convenient.

The WHO recommendations are very general i.e. eat more fruits and vegetables, more cereal products and more fish or specific compounds i.e. eat less sugar, fat and salt and more fibre. The recommendations are a summary of documented lifestyle factors affecting health²¹, and are made by experts from different disciplines, primarily medical doctors and dieticians. Healthy product categories are mentioned, but the quality these products should have, is not defined.

Many of those products are processed. There are many myths about processed food. Some people claim it contains unhealthy fat and fast carbohydrates, bad fat (rancid or trans-fatty acids), too much salt and many additives. In many cases the myths are simply untrue. Most people would find it difficult to live without bread, milk, orange juice, ready-to-eat cereal, ham or canned tuna fish - all of these are processed, healthy choices.

Processed foods have been altered from their natural state for safety reasons and for convenience. The methods used for processing foods include washing, grinding, mixing, cooling, storing, freezing, heating, filtration, fermentation, extracting, extruding, frying, drying,

²¹WHO report number 916 on Diet, nutrition and the prevention of chronic disease 2003

concentrating and packaging. Consumers want convenience food; they don't want to spend much time making food, so more and more fast food and convenience food are placed on the market.

The food industry strives to make healthier choices, but they need help from food scientists to translate research results and nutritional recommendation into real products. These challenges of the food industry were emphasised by Floros et al (2010) in a "white paper", where they explain why society is dependent on processed food. However, the industry is frequently burdened by responding defensively to a steady stream of misperceptions and miscommunication about the role of processed foods in the American diet.²²

What kind of technology is needed to offer more variety of healthier choices? Must the composition of the raw material change? Must the recipe change? How is the stability of the process or the product? Is there any interaction within the food matrix when you adjust the recipe to make a healthier version? What is the optimised content to keep the taste, texture and other important qualities within single products and as a total meal? These challenges have to be solved to develop innovative, healthier choices.

We do not eat single components or single products. Most diets are composed of a number of meals which shall taste good, be convenient and constitute an important part of a person's need for nutrients. The sensorial properties of the final product are crucial – it must taste good! Consumers will not buy healthy food which tastes bad.

Product Innovation - Knowledge and collaboration

The content and quality of nutrients and other constituents with physiological activities in all food commodities are affected by species/varieties, feed quality/cultivation, slaughtering/harvesting, handling, processes (heating, freezing etc), storage (temperature, packaging materials etc) and preparation into meals (cooking, frying, steaming etc) before consumption, which again will influence the absorption of nutrients after the food has been eaten

²² Floros, J. D., Newsome, R., Fisher, W., Barbosa-Cánovas, G. V., Chen H., Dunne, P., Bruce German, J., Hall, R. L., Heldman, D. R., Karwe, M. V., Knabel, S. J., Labuza, T. P., Lund, D. B., Newell-McGloughlin, M., Robinson, J. L., Sebranek, J. G., Shewfelt, R. L., Tracy, W. F., Weaver, C. M., Ziegler, G. R. "Feeding the World Today and Tomorrow: The Importance of Food Science & Technology" (Comprehensive Reviews in Food Science and Food Safety 2010, pp 28 doi: 10.1111/j.1541-4337.3010.00127.x

and affect health. The “Food for life” concept also includes the positive social aspects of sharing a meal and the pleasures and ambiance of food, and the content and quality of nutrients and other constituents with physiological activities are the key elements to taste, texture and colour of the product.

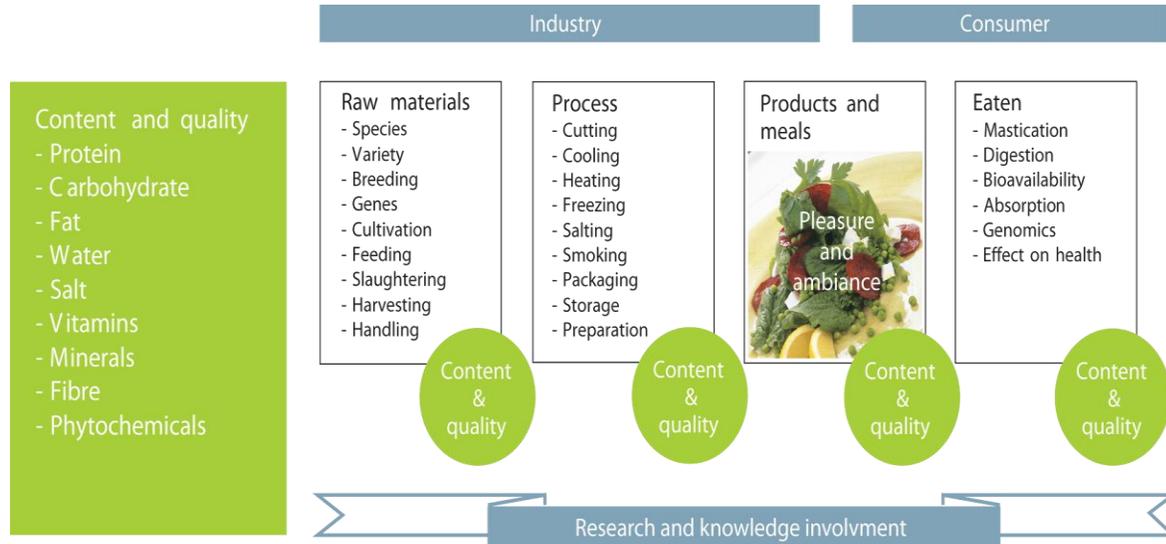


Figure 3 Overview of food content and quality factors in the value chain of production of food until consumed and the involvement of research and knowledge

Today the research is very fragmented due to its complexity and lack of co-operation between the different disciplines like research scientists in nutrition and medicine together with food scientists and technologists to produce healthier products and meals which are tasty, trendy and convenient. Innovation projects should have a close contact and communication with the government (decision makers) and the consumer. Interdisciplinary action is necessary to initiate innovation projects which cover the whole value chain.

Translation of nutritional guidelines into products and meals for children

All the Nordic countries have formulated guidelines with recommendations on the dietary quality of food available at schools and kindergarten. The guidelines have to be translated into products and meals.

There is a gap between the guidelines for food and meals in schools and the resources provided by municipal authorities to implement the guidelines. The products available are limited and the end-user has no influence on the quality. The challenge is to put together the right combinations

of products to make appetising healthier meals for children at an acceptable price. Availability of products fulfilling the criteria of healthy food according to recommendation is perhaps limited. Therefore, the nutritional content of meals, over a longer period of time (a whole week), should be calculated, so that the nutrient content on average is balanced. There is a need for more education for municipalities, schools, kitchen staff and parents to ensure that the meals are balanced. Responsibility should be placed on the municipalities, and the parents should put a pressure on the official bodies.

The aim should be to translate nutritional recommendations into healthier choices through networking, communication, research and education, and interdisciplinary collaboration is the key factor for innovation of healthier products and meals with specified quality and to create recipes of healthy and easy choices for children.

Interdisciplinary co-operation

How to develop healthier foods which are tasty, convenient and trendy

The food recommendations of today emphasize to eat more fruits and vegetables, more cereal products and more fish or specific compounds i.e. eat less sugar, fat and salt and more fibre, and are based on the WHO recommendations. All countries in the world have adopted these recommendations and current practice to stimulate healthier product development and research priorities are reflected in these recommendations. Some projects are at commodity levels, while others are at nutrients or phytochemical levels.

Defining what is healthy food, is a challenge. People tend to focus on individual products and try to categorise them as either healthy or not healthy. That is a great simplification. The main issue is to combine liked and tasty products into attractive meals. Various attempts have been made to make traditional products healthier by reducing fat, sugar and salt and adding fibre, vitamins and minerals. That is also a challenge because a lot of taste and texture is linked to fat, sugar and salt and adding foreign substances like fibre, vitamins or minerals can also add a foreign flavour that is not acceptable. Knowledge from different disciplines, such as food science and nutrition, food processing, marketing and consumers is necessary to overcome those challenges and increase the offer of healthier products that make it easier to combine tasty and attractive meals at a reasonable price. The biggest challenge, when making a new product, is the taste.

A broader collaboration, among different disciplines, is necessary to translate the nutritional recommendations into products and meals, and Nofima Mat has developed such a product innovation model as described in the following section.

Product Innovation Model

A common knowledge platform was created with stakeholders representing the government, consumers, industry, retail and research institutes (food science/technology and medicine/nutrition) in 2001 (Figure 3). Based on environmental scanning and relation analysis, a detailed communication map was designed. Personal invitations were sent out to a carefully selected group of stakeholders. They participated in three ongoing interactive workshops to initiate a dialogue on different topics related to “Food and health”. The workshops revealed knowledge gaps within food science, technology, nutrition and health. Innovation networks were formed in the period 2004 – 2008 to close these gaps. The networks were financed through The Network Programme for the Food industry, which is administrated by Nofima Mat on behalf of Innovation Norway. The Norwegian food companies learned about the relationship between food, nutrition and health in dialogue with the other stakeholders in the knowledge arena. The thirst for knowledge was enormous. The stakeholders learned about the technology challenges related to changing the content and quality of sugar, fat, salt and fibre in foods, and to produce tasty and convenient products and meals. Many new or optimised products in agreement with the goals of WHO's global strategy were launched in 2007 with an increased turnover of US \$ 9 million (Baardseth and Reksnes 2007)²³. From the start, product developers in the companies attended the innovation network, but we soon realised that the market knowledge had to be included to ease the communication within the company and towards the market. Interdisciplinary co-operation and communication are the key elements to create healthier products and meals to the consumer which are tasty, convenient and trendy. The key success factors were an open and credible dialogue between the food enterprises, consumer, government and research community's i.e. open innovation. (Figure 4)

²³ Baardseth, P. & Reksnes, H. 2007. Bringing Nutrition into Play. The World of Food Ingredients December 2007, pp 58 – 60

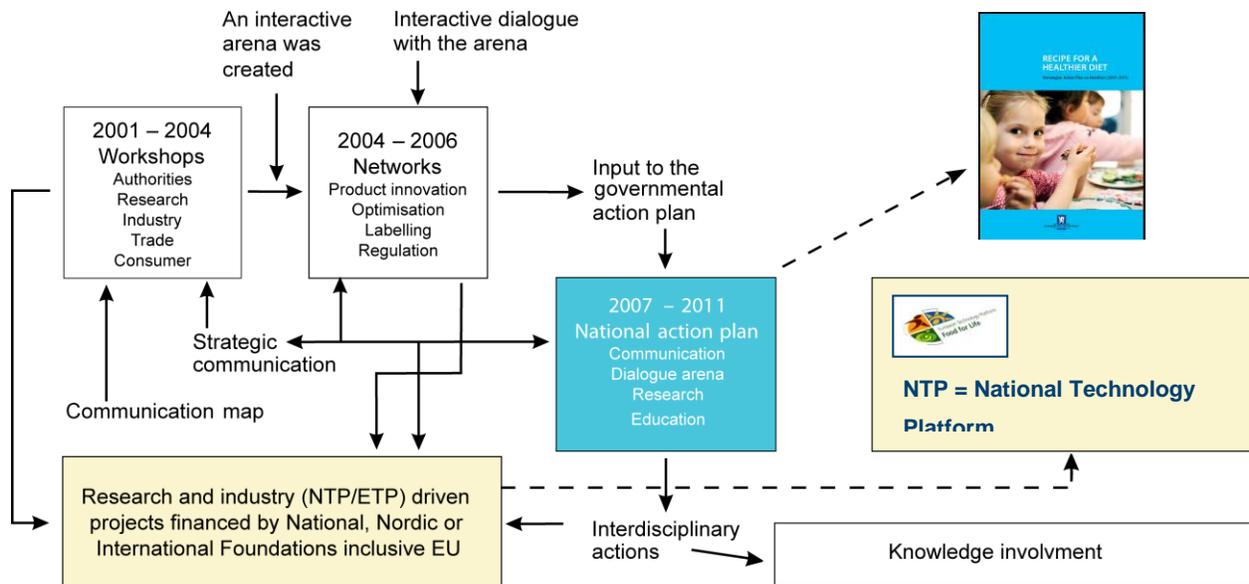


Figure 4 Innovation of Healthier choices needs interdisciplinary collaborations. Baardseth & Reksnes (2007)

24

The new concept was adapted in the governmental action plan (Recipe for a healthier diet - Norwegian action plan on nutrition (2007 – 2011)) where one task was to establish a interdisciplinary dialogue forum between the food industry, authorities, researches and consumers. The arena was established in November 2007 with members from Ministry of Health Care Services/WHO, industry, retailers, research and consumers, who meet annually.

Open Innovation Concept

Common language

Through the work in the networks, the need for a common language became obvious. An open and well-balanced communication is needed to bridge the different disciplines within policy makers, safety authorities, technology and nutrition. All the actors must respect each other and have a fruitful dialogue to get a win-win situation.

²⁴ Baardseth, P. & Reksnes, H. 2007. Bringing Nutrition into Play. The World of Food Ingredients December 2007, pp 58 – 60

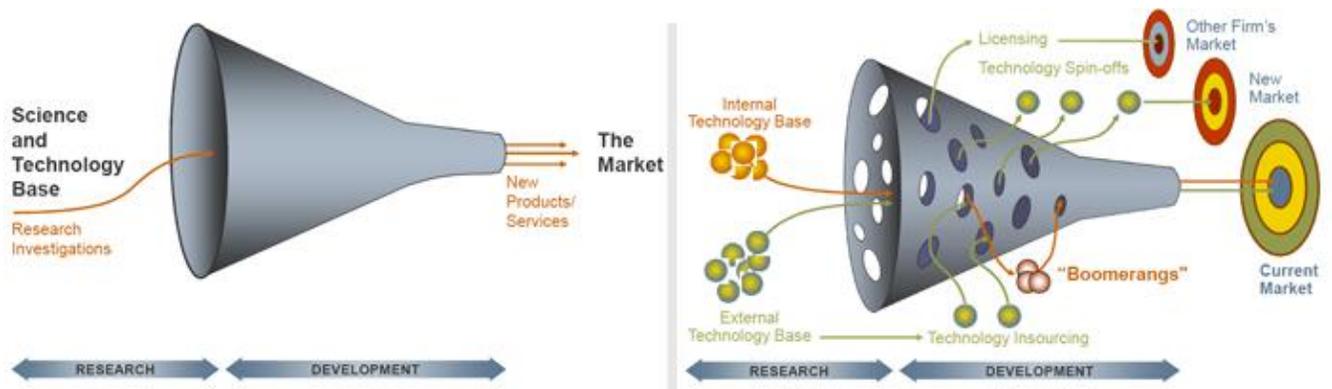


Figure 5 The term "open innovation" refers to collaboration across organisational borders to develop successful innovations and create added value for the consumers (emphasis on common issues rather than specific and competitive issues) From H. Chesbrough 2003 "Open Innovation: The New Imperative for Creating and Profiting from Technology", Harvard Business School Press

Education

The need for further education in the field of healthier choices for children has become obvious during this work. To ease the communication between food scientists and /technologists on one hand and nutritionists and medical doctors on the other, the former group should learn about how nutrients are digested and absorbed in the body and then influence health i.e. after the food has been eaten, while the later group should learn about the challenges in producing products and meals with less salt, sugar and saturated fat, and more fibre, as well as obtaining proper sensory attributes i.e. before the food is eaten. Teachers at all levels should also learn about the interdisciplinary concept Food for life which includes knowledge about food science, technology, nutrition and health, so they can teach the children at all levels.



Figure 6 A new concept bridging food industry (product and market knowledge), research (food and nutrition knowledge) and consumer (food enjoyment, taste and well-being) together with the government (recommendations, regulation, labelling and education) to produce healthier, tasty and convenient foods to the benefits of the consumers has been developed = open innovation in practice

Market potential

The market for school and preschool meals is very big and interesting for the food industry and catering service. Figure 7 and the table below summarise the key figures from national statistical bureaus based on number of students enrolled in Nordic schools and the average price for meals. Based on "best available estimates", it is possible to conclude the following:

- 56 % of the 2,8 million school children in the Nordic countries are being offered school food equivalent to more than 1,5 mill. children
- The differences are big - from 90 % in Sweden to 15% in Norway
- The value of the market can be estimated to 325 mill. Euro (purchase of food products) - with a potential of nearly 600 mill. Euro.

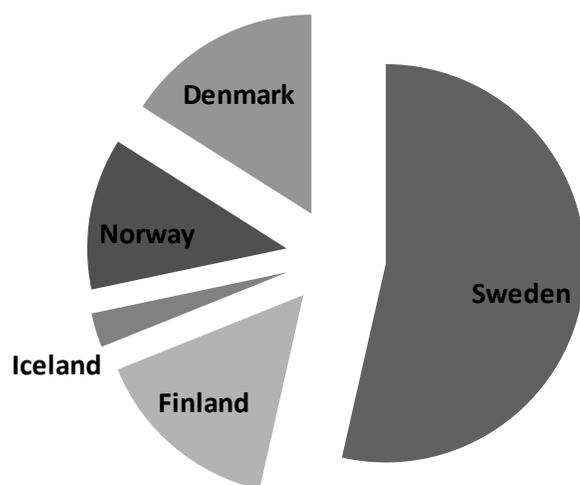


Figure 7 Market potential for school food in the Nordic Countries

	Pupils	Pupils eating	Days of school food	Actual Value/year	Potential Value/year	Cost of food products	Actual Value/year	Potential Value/year
	x 1000	x 1000	%	nat. Currency	nat. Currency	mill. Euro	mill. Euro	mill. Euro
Sweden	906	815	90	178	1,6 mia SEK	11 SEK	174	196
Finland	546	437	80	190	49,8 mill €	0,60 €	50	62
Iceland	43	30	70	180	1,5 mia ISK		9	13
Norway	615	92	15	200	322 mill. NOK	13,7 NOK	40	173
Denmark	720	216	30	200	389 mill DKK	9 DKK	52	148
TOTAL	2830	1590	56	190			325	592

Overview of research projects on healthy food products and meals

The Nordic Network NTP – Healthy choices project made an overview of research projects of relevance for developing healthier products and meals and in particular those aimed at children and young people. The list of projects is not exhaustive, but gives good examples of the type of ongoing research activities. The projects can be categorized in five categories, (1) Product development of modified healthy food products, (2) Increased accessibility and consumption of healthy products, (3) Catering, (4) Nutrition research – monitoring and intervention studies and (5) Lifestyle and genes.

The first three categories deal with food and the last two with health. The communication between these two categories is almost lacking. The Food projects are organized in collaboration between food industry, research scientists and technologists, and the product quality has been followed from raw materials to product present in the shops. The Health projects are, on the other hand, carried out by medical centres, using food composition databases to calculate the nutrient content in foods which have been eaten in the human intervention trials i.e. they do not analyse the quality of the products and meals which are processed in the food industry and treated before consumption. Food and Health projects should be more strongly connected in the future to make sure that we know what we eat and how it affects our health. (see a list of projects in Appendix II).

(1) Product development of modified healthy food products

This category involves development of new formulations of original products to enhance healthier attributes. Examples are meat products with less salt and additives than the original products²⁵, dairy products with less sugar and fat and bread with more fibre and less salt and sugar than the original products. A number of consumer products, specially intended for children, exist on the market. Examples are sausage type meat product, free from additives and allergens, low in salt and fat compared to similar meat products and with vegetables mixed into the meat emulsion. Also yoghurts containing healthy lactic acid bacteria exist on the market. An example of such development are products that have been marketed under the label of

²⁵ www.matis.is/media/matis/utgafa/25-09_SkyrsluaAgrip.pdf

LazyTown, like sausages²⁶, dried fish containing less salt than ordinary dried fish, yogurt, cod liver pate²⁷, fruit juice, water²⁸, biscuits with vanilla or red raspberry and fish roe spread (Figure 8). Those products have to fulfil certain criteria set by LazyTown, such as appropriate portions for children, controlled fats, salt and sugars and no artificial sweeteners, flavours, colours or preservatives.



Figure 8 Examples of products marketed under the label of LazyTown

Juices with reduced sugar together with more fibre (Lowjuice) and bread with low salt and more fibre are under development (Barley bread). Such projects are carried out both in house in the industrial enterprises and in collaboration with research institutes to help the industry to overcome the technologies and sensory challenges. (see list of projects in Appendix II). Other examples are Valio Kidium® Gefilus® yoghurts, contain LGG® lactic acid bacteria which are suggested to improve the natural immunity.

(2) Increased accessibility and consumption of healthy products

These projects focus on products such as fish, cereals, fruits and vegetables and on the promotion of consumption of those products among schoolchildren.

There have been a number of projects concerning food for children i.e. how to increase the consumption of fish (Young consumer attitudes and fish consumption, MmmmmSeafood, SEAFOODPlus) or fruit and vegetables (ProChildren, ProGreens, Icelandic study on fruit and

²⁶ <http://www.kjarnafaedi.is/default/mos/1198>

²⁷ <http://triton.is/news.php?full=1&page=3>

²⁸ www.glacialwater.is/nordicwater/Products/LazyTown/

vegetable intake of 11-year-old children, Preferences for apple varieties). Development of different cereal products, such as bread and pasta, with barley and oats with good taste and texture has also been done. Also school meals have been looked into. The general focus has been on the nutritional aspects in order to secure that the children get a healthy meal at a low price. However, it is very important to take into account the taste and preferences of children when developing meals for children. Quotation from the project Attitude and fish consumption of young people underlines this²⁹:

“Marketing fish products for this age group or making an effort in increasing their fish consumption it should be taken into account that it is very important that young people’s demands and preferences are valued. They have various likings and the variety of fish meals needs to be diverse and providing access to good fish recipes e.g. on the internet is important. Intervention which included increased accessibility to fish in the school canteen, open lectures and presentation on the web resulted in better knowledge of fish and fish oil consumption almost doubled, more among girls than boys.”

Young adults express their desire for seafood products that are attractive, healthy, palatable and convenient. Seafood products should be accompanied by clear advice on preparation methods and ingredients.

(3) Catering

This category entails projects that develop guidelines on eg. how to prevent loss of vitamins, antioxidants and minerals during processing prior to consumption. Focus is on the use of local food and regional food, and how to upgrade professional kitchens

(4) Nutrition research – monitoring and intervention studies

This project category focuses on the impact of Nordic food or ingredients on metabolic responses and nutritional status.

(5) Lifestyle and genes

In this category the relationship between food, nutrition, genomics and health is emphasized. See list of projects in Appendix II

²⁹ G. Einarsdóttir (2009) www.matis.is/media/matis/utgafa/Skyrsla_05-07.pdf

Summary – Open Innovation

Main obstacles to offering healthy food at school and kindergarten

- There is a gap between the guidelines for food and meals in kindergarten and the resources provided by municipal authorities to implement the guidelines. The municipalities use calls for tender to provide food to kindergarten. The products available are limited and the end-user has no influence on the quality.
- There is also lack of qualified canteen personnel due to reduced budget from municipal authorities
- Rules are very general for dietary recommendations or for the combination of food commodities for the lunch box. They say nothing about the food quality
- Lack of influence on the final products

Key success factors and proposals for further development

- Research gaps - children's preferences must be characterized (sensory and chemically/physically) and translated into products and meals
- Create an arena with different stakeholders (industry, catering, innovation and research organisations, educators, children and parents and health authorities) to discuss the need for healthier products for children and greater diversity
- Create food enterprise network to learn how to translate nutrition recommendation into attractive, healthy and tasty food choices for children through open innovation
- Qualified staff through education
- Involving the children in the preparation of the meals and at the same time including information about healthier choices which are tasty

Proposals for action to improve school/kindergarten catering:

- Translating guidelines for food and meals in kindergartens, primary and secondary school into products with specified quality and to create recipes of healthy easy choices for children
- Create an arena with different stakeholders (industry, catering, innovation and research organisations, educators, consumers and health authorities) to improve variety of

attractive, healthy and tasty food choices for children and young people through open innovation. Include the children and ask what they like.

- Take into account that children's preferences must be characterized (sensory and chemically/physically) and translated into products and meals
- Price – tender with specification – direct contact with the food industry
- Resources to get food and meals which are nutritionally balanced and tasty

Chapter 5 Education and training in catering for children/young people

Catering staff needs to be trained and increased product knowledge, positive attitudes, motivation and environmental settings have been suggested as determinants for influencing eating habits. This chapter is based on the objective to obtain a collective multidisciplinary view on the training practices in the different Nordic countries. The aim is to increase the knowledge and skills within the catering service and school canteens. This will help create positive atmosphere, enhance product knowledge and facilitate delivery of healthy choices in an attractive way. The aim was fulfilled by collection of training practices and success stories on national levels. Identification of knowledge gaps between nutrition, food science and consumers in the sector was achieved by conducting national workshops with the participation of key stakeholders.

The educational situation in the Nordic countries

Based on a comprehensive collection of training practices in the Nordic countries, in order to analyse what kind of education will be offered in the different Nordic countries, it can be concluded that there are no criteria at all regarding education and training practices for personnel involved in the school meal services in preschools and elementary schools. But in all the Nordic countries people involved in the preparation of school dinners have opportunities to get educated in either a short or more long-term duration.

In Finland education of catering staff is vocational and education regarding nutrition is a part of the tourism, catering and domestic services education. It is possible, among other, to gain a basic degree of Catering or of Hotel and restaurant. In Finland education of catering staff is vocational (2 or 3 years) and education regarding nutrition is part of the tourism, catering and domestic service education. For managerial duties in food services, education (3½ years) is organized by Universities of Applied Sciences and it gives Bachelor's degree in Hospitality Management. It is also possible to study nutrition at university to obtain Master's degree.

In Norway education is vocational as well. It is possible to obtain a bachelor degree in food and catering management or a master's degree in nutrition, health and environmental science.

In Iceland education of catering staff is vocational. Apart from chefs education (4 years) there are some shorter versions offered, such as diet cooking (3years) and cooking at sea (1 year). There are no criteria regarding education for catering staff in preschools and elementary schools, but in most cases at least some of the staff has some kind of education. Institutions for continuous education and retraining, like IDAN vocational centre and Sýni – School of food, offer short, practical courses for catering staff. University degrees in Food Science and Nutrition can be gained at the University of Iceland.

In Sweden a university degree in Food and nutrition/Catering management/Food service management can be obtained. Moreover it is possible to join vocational courses of shorter duration.

In Denmark it is also possible to get a master or a bachelor's degree in nutrition. Moreover there are educations as nutrition helper or nutrition assistants. There are also possibilities for shorter courses targeted at more healthy food in canteens held by different parties such as VIFFOS.

Results from an inquiry in Finland

A web-based inquiry was sent to members of Municipal food experts in summer 2009 to get first hand up-to-date information of the reality of educational needs in Finnish school catering system.

The survey covered one hundred respondents from municipal food services(90%) and food service companies. Most respondents were responsible for several kitchens and nearly half of them were liable for more than 10 kitchens. Three out of four respondents produce daily over 2000 servings and have more than 10 employees.

Respondents were asked about education of staff members, need for further education, kitchen and lunchroom facilities, duration of lunch break, implementation of nutritional guidelines, the offer of snacks between meals, involvement of students in meal planning, etc.

Majority of the respondents state that nutritional recommendations are followed. Over 60% say that surroundings of school meal are comfortable but only 29% that a team of pupils and personnel for discussions and development of school meal serving exists.

The survey revealed some worries about cost cuttings. Mince meat and poultry is used rather than whole meat and offer of fruits and vegetables has decreased. The report from the survey is in Appendix III.

Success story from Finland: Example of further education for school canteen staff

In the survey made in summer 2009 educational needs of school canteen staff were asked. The survey revealed the following further educational needs:

1. Communication and interaction
2. Usage of technology
3. Nutrition
4. Cleaning and hygiene
5. Taste factors of food

In Finland many projects have been carried out in recent years to raise the prestige of school meals and to increase children's participation in school meals. At the end of year 2009 even a doctoral dissertation was published titled: School catering staff to act as educators in comprehensive schools.

An in-service training program, **Smart Catering Staff (SCS)** was designed and put into practice among school catering staff. The aim of the one-year SCS program was to add to and encourage the development of the know-how of catering personnel regarding new challenges in the school community as well as to enhance and empower their educator's role in the school. The content of the program consisted of four two-day intensive teaching-sessions as well as assignments which were carried out between these sessions. The main contents of the SCS program were personal and organizational learning, school curriculum concerning school catering, school culture and co-operation, customer service, and the role of catering staff as educators.

The data from the action research was gathered from 2000 to 2008. The results show that the SCS program can change the work community culture in that the catering staff is more encouraged to participate in the development projects of the school, and can see themselves more as educators alongside the teaching staff. It is concluded that in school communities all adults can be educators, but to achieve this aim empowering in-service training is needed.

The school catering staff's commitment to participation in the education align with the educational goals of the school unite children's and teens safety net. This can affect for example the growth of communal responsibility and prevention of alienation. (Lintukangas 2009)³⁰

Summary Training - Obstacles and possible ways to improvement

Based on enquiries with national stakeholders and discussed in a Nordic context the most predominant obstacles against healthy choices in school canteens and possible ways to improvements are the following:

Obstacles	Possible ways to improvements
Nutrition recommendations from the Public institute of health are general but are often interpreted in a dogmatic way and thus are limiting if knowledge to choose raw materials and recipes is limited	Diverse recipes and ideas for combined and nutritionally balanced meals should be made available to canteen staff. Canteen staff should be trained to implement recommendations. Flexibility in nutritional composition of meals within the week.
Shortage of knowledge about meal composition and the importance of positive attitude towards food amongst school canteen staff.	Increased supply of training courses for school canteen staff, school assistants, parents and children concerning food, nutrition, cooking, human communication and positive attitude. School principals should make sure that their employees attend such courses and parents' organisations offer similar courses for parents and students.
Lack of knowledge about healthy eating Among canteen staff make them choose unhealthy products widely liked by children	Sufficient information on ingredients and nutritional composition has to be linked to school menus, e.g. on the internet.
Time pressure in the daily work leaves no time for further education, not even shorter courses	The Municipalities and the School Canteen Management urge and supports education for their canteen staff

³⁰Lintukangas Seija. 2009 School catering staff to act as educators in comprehensive schools. Doctoral dissertation. University of Helsinki

<p>Poor facilities, uninspired staff and negative attitude of parents towards school meals can affect the children's attitude in a negative way. This is especially the case for older children.</p>	<p>Create positive atmosphere at meal times. Train staff to associate with the children in a friendly and encouraging way. Invite parents to participate in school meals. This will create a better understanding, tradition and security.</p>
<p>The environment of the school canteens can be dull and noisy.</p>	<p>Improve the canteen setting to be cosy, pleasant and peaceful during the lunchtime. Involvement of the children in creating a better atmosphere is important.</p>
<p>Time for meals too short. Noise and disturbance reduce appetite and create indisposition.</p>	<p>Lunch should be obligatory for all primary school pupils. Eating lunch with the children should be an inevitable part of a teachers job and eating habits and manners a part of the curriculum.</p>
<p>Low job status in the school canteen. Problem of recruiting new staff.</p>	<p>Increase the status of the school canteen jobs and the conditions and rewards for the personal.</p>
<p>Price is the most important issue in the purchasing of food for schools canteens. Lack of product specifications for healthy choices in the calls for tender.</p>	<p>Quality specification for the most important food products for the school canteens could be developed in corporation between school canteens, municipalities, wholesalers and the food industry.</p>
<p>Municipalities could make better use of wide knowledge of meal composition and economical shopping existing among many canteen representatives.</p>	<p>Municipalities should hold regular meetings and create a communication network among canteen representatives so they can exchange good practice. Examples of good practice should be collected and made available to all.</p>
<p>Negative reportage and misleading media coverage of foodstuffs.</p>	<p>Make media understand the importance of positive reportage of foodstuffs. Encourage increased coverage of foods, cooking, healthiness, enjoying food together etc.</p>

Recommendations

Even though the different school food traditions in the Nordic Countries give different needs for further education it is recommended to focus on the following areas in order to increase knowledge and skills within the catering service and school canteens about healthy choices:

- 1) Further education of canteen staff
- 2) Improved management of the canteen staff
- 3) Atmosphere and physical environment
- 4) Improve general image of school food

Further education of canteen staff is needed because there is generally a knowledge gap concerning nutrition, meal composition and the importance of attitude and service. Leadership and management support is needed to create change and to ensure that time and resources are available so education is possible in a busy daily routine. Attitude, atmosphere and the physical environment is important to encourage eating in the school canteens especially for the older children, and it can be recommended strongly to build a better image for school canteens. An image could be build on the importance of creating “healthy habits” for our children in the future and the key role that needs to be played by the “chefs” in the school “restaurants”.

Chapter 6 Lessons learned

Special programmes and activities in the Nordic countries to motivate healthy choices for school children

School-based dietary programmes have a large potential for promoting healthy eating among children and adolescents and it seems as if the combination of school meal modifications and classroom education yield positive effects. A WHO review concerning interventions on diet and physical activity concluded that successful programmes in schools consisted of comprehensive, multi-component programmes targeting the school environment (e.g. food services) and classroom curriculum (World Health Organization, 2009). Improvements were seen in knowledge, attitudes and behaviour. Successful components were trained teachers that included a diet component in the curricula, parental involvement, a supportive environment and a food service with healthy choices.

Examples of special programmes and activities in the Nordic countries to improve healthiness of school meals have been compiled. Various initiatives are ongoing and the consensus in the Nordic countries is that improvements are needed to motivate young children and school authorities towards better school food.

Success stories - Efforts to motivate children to eat school food

Attitude change, lunch development and eating surrounding development

Sitra, the Finnish Innovation Fund, has funded so called **Sense Food** (Järkipalaa) pilot project to try to motivate pupils to eat better school food in 2007-2008 (Keso *et al.* 2008). Six pilot schools participated in the project. Nutrition education was organized for the pupils in the pilot schools. Additionally, eating surroundings and meals were developed in the schools, and food tasting sessions were carried out with pupils. Pupils had also workshops where they had discussions about their attitudes and food choices.

The Sense Food project achieved promising preliminary results. They reported that

- eating of candies decreased

- attitude toward school lunch developed more positive
- snacking decreased
- water became largely consumed as thirst drink instead of other drinks

Sense Food is an example of a project how to influence to eating habits of pupils, and how to get nutritional recommendations better realized. The key is to invest both in attitude change, lunch development and eating surrounding development.

School Restaurant – involvement of the whole school

Project “Lintu Sininen” /Blue Bird was carried out at Karjaa Co-educational school in southern Finland which was elected” School Restaurant of the year 2006”. It also got reward of Jubilee Year of School Meals in 2008. The aim of the project was to put into action customer-oriented food service, step by step, systematically, in cooperation with pupils and personnel. The main goal was ”to get as many pupils as possible to eat balanced and healthy school lunch and enjoy refreshing lunch break”.

The appearance of the school restaurant was changed to a welcoming, peaceful place. It was defined as “a place without controlling and conflicts”. More interest for school restaurant was created by e.g. variable decorations and theme weeks. The customers of school restaurants, pupils, are members of a committee of the school restaurant. Beside the 6 pupils there are 2 representatives of catering staff and manager of food & cleaning services on the committee. It has been proven that having a group of pupils, instead of 1 or 2, brings plenty of ideas for e.g. cooperation and happenings. The School restaurant has become a Comfortable own place of pupils! There is also a kiosk run by pupils. It’s open after lunch time healthier snacks are offered than before, like smoothies and warm sandwiches.

It was seen important to have the whole school involved so the deputy headmaster was involved, for several years in developing school catering and to create new operations model. She had resources to organize groups and discussions. It was also defined that all adults of school, teachers, catering staff and caretakers, had to be involved to really meet the pupils (face-to-face).

Project for nutrition and welfare of Upper Comprehensive School pupils

The Project “Järkipalaa” was a large survey of food habits, school meals and mouth health of upper comprehensive school pupils. There were 12 schools, approximately 700 pupils, involved. Several changes were made in normal practices e.g. having new table cloths and curtains and drawings on the walls, having restrictions for exit from school yard during school and selling of unhealthy snacks. But above all the tools for nutritional education and ways of adding the presence and good example of adults, at school and at home, were seen most important. Some healthier snacks were also developed in co-operation with food production companies.

There is a web handbook (Best Practices) which offers practical means for those responsible of school catering. The two different parts of the handbook are:

- 1) Adults at home and at school make the eating environment for young (co-operation between school and home, snack-practices, school meals as a part of parents' meeting) and
- 2) Practical tools for nutritional education (teaching material, method of getting used to new flavours, models for functional workshops)

- <http://www.jarkipalaa.fi/kasikirja/>
- http://www.jarkipalaa.fi/kasikirja/osa1/fi_FI/jk1/files/82128919109048796/default/Jarkipalaa_manuaali_osa1.pdf / web Handbook

Bread as a healthy snack / Bite a snack

“Haukkaavälillä”(Bite a snack) was a project of The Finnish Bread Information Association (2009). The project was conducted in 4 cities which had altogether 47 schools and approximately 26000 pupils. The importance of bread as a healthy snack was the main focus of the project. Material was developed together with school catering staff to make it easier to start and promote snack service at schools. Training was organized for catering staff and administration personnel. Assortment of snacks were checked and fashioned to meet the School meal recommendations. Parents could buy “Snack passport” beforehand and thereby guide their children to eat healthier snacks. <http://www.leipatiedotus.fi/default.aspx?path=4;182;345>

Success stories - Intervention – Motivation of healthy choices

One example of a successful intervention study in Sweden with adolescents in the school setting was reported by Prell *et al.* (2002a, 2002b, 2005), in which the combination of school lunch modifications and changes in the home and consumer studies syllabus resulted in an increased proportion of fish eaters in the school canteen among participants (n=228). Two intervention schools (SL; school lunch and SL+HE; school lunch+home economics) and a control group participated. Before the intervention was developed pupils' opinions and attitudes were examined by means of focus groups interviews and questionnaires and main obstacles were identified to optimize the intervention. The school lunch part of the intervention focused on the preparation and appearance of the fish meals and on extending the choice. The intervention included training for the food service personnel. Also, alternative fish was served. Extra effort was put into the preparation of side dishes and accompaniments and of marketing the fish meal of the day. Furthermore, the school canteen environment was improved. The pupils also had the opportunity to vote for one fish meal that they would like to have.

The home economics part consisted of theoretical lessons and actual food preparation in the classroom. The pupils took part in more food preparation occasions with fish than usual and one of those occasions was devoted to preparing the winning fish meal from the voting. The pupils also had a lesson that focused on the nutritional benefits of eating fish and slides from the school canteen kitchen, with the school food service personnel preparing fish, were shown to the pupils. Furthermore, a fish retailer came to the classroom and demonstrated and talked about different fish species and how to fillet them. Finally, each pupil selected a fish-related topic and wrote a small essay about it. Showing slides from the work in the school canteen kitchen could be one way of reducing the distance between the school canteen kitchen and the pupils. Unfortunately, it was not possible for the pupils themselves to visit the kitchen or to take part in the work during the intervention period. In the SL+HE group, the proportion of fish eaters increased from 56% to 71%.

⇒ **In conclusion, it is recommended that cooperation between teachers and food service personnel take place.**

⇒ *Other* initiatives and projects in specific municipalities and counties are described on their websites and may inspire schools in offering healthy foods.

- *Skolmatens Vänner* [*Friends of School Food*] is an association that aims to promote good school food (SkolmatensVänner, 2010). Ideas, tools and different initiatives and news are presented on their website: www.skolmatensvanner.se
- *Skolmats Akademin* [*The School Food Academy*] in VästraGötaland, is a knowledge network in the Western part of Sweden which organizes about 25 municipalities. The network aims to disseminate good examples and initiatives: <http://epi.vgregion.se/sv/Skolmatsakademin/Natverk/>.
- Hitta stilen (<http://www.hittastilen.nu>)
- A food preparation competition for children (<http://www.barnensmatskola.se/>)
- TV chefs prepare school meals (<http://www.matakuten.se/>)
- Pelle Pump, an activity directed towards fourth-graders (www.hjart-lungfonden.se)
- Cooperation between the food industry and school restaurants in the city of Malmö.

Success stories – Open Innovation

“A HEALTHIER CHOICE” IN CONVENIENCE STORES

The Open innovation model concept funded by the Norwegian Network Programme was used to develop a new Fresh – concept product, composed of convenience wraps with chicken and cheese/ham and Luna with chicken, both with vegetables and less salt. A label stating “A healthier choice” has been defined and developed for healthier meals “on the run” which has been used with success. The Fresh-concept was developed for Shell petrol stations (fast food market) for the target group truck drivers. A market survey was performed among truck drivers who have short time when they stop at petrol stations, and they need food which is easy to eat (handy), tasty and filling.

The aim was to develop healthier products to the fast food market in accordance with The Norwegian Ministry of Health’s action plan – Recipe for a healthier diet (2007 – 2011).

The following interdisciplinary stakeholders were involved in the development: The enterprise “Norgesgruppen Convenience AS” who was the project owner and the producers (Bakers AS, Gourmet Companiet AS, Nordic Lunch/Bama, Nortura BA, Stabburet AS, TINE BA) of the products to the Fresh-concept on Shell petrol stations, the government (Ministry of Health and Care services/WHO, The Directorate for Health Affairs, Norwegian Food Safety Authority, Innovation Norway), Food and health knowledge (Dept. Nutrition University of Oslo, Synnovat MMI, SIFO (National Institute for Consumer Research), LHL (The Norwegian Heart and Lung Organisation), Nofima Mat AS (Norwegian Institute for food, fisheries and aquaculture industries)), communication strategy tools (Norgesgruppen Convenience, Allegutta, LHL, TINE BA), label/surety (LHL)



Success stories - Training

The S.M.A.R.T. food concept in Sweden

The S.M.A.R.T. food concept in school restaurants of the city of Malmö has been in use for about ten years and has continuous education of the catering staff as one important element. The aim is to train staff in preparing menus complying with the S.M.A.R.T. (an acronym in Swedish) concept involving:

- more vegetables
- less space for empty calories
- more ecological
- right choice of meat and vegetables
- less transports

The result has been that less meat has been served, but more lentils, beans and whole grain. Less rice and more potatoes have been prepared. Since 2005 additives and salt content have also been reduced. This has been done through dialogue with food industry. A special plate has been designed to help pupils select food according to the “plate model”. It consists of one green, one yellow and one red part. Green marks how much vegetables the plate should contain. Yellow shows the place for potatoes, pasta and rice. And, finally, the red part is for meat, fish and egg.

Diet in a nutshell

The project 'Diet in a nutshell – a taste for life' is intended to stimulate the establishment of a range of dietary schemes in schools and institutions, and also to give the entire population access to the Danish Veterinary and Food Administration's knowledge of food via the new website <http://www.altomkost.dk/>

The establishment of dietary regimes in schools and institutions is to take place by helping such bodies to help themselves. An itinerant team from the Danish Veterinary and Food Administration is prepared to visit the individual schools and institutions, and a telephone hotline has been set up on which advice and guidance can be sought. The website addresses both the "Dane in the street" and food professionals. "Diet in a nutshell" summarises the Danish Veterinary and Food Administration's knowledge about healthy food and nutrition, and is also

intended as the point under which we can bring together our knowledge of nutrition and disseminate it in a form in which it is comprehensible to all.

The website has several different functions, which allows people to measure their BMI reading, put together a meal and see what it contains in terms of energy and fat. There are quizzes and an entire section on the "joy of food". A lot of recipes can be found to help people to keep a healthier lifestyle.

EAT/ 123 Skolemad

At the Copenhagen school dinner concept, Eat, as well as at the national company, 123 Skolemad, all employees, involved in the preparation and sale of the food, have been trained in food safety and hygiene. The menus that are served in the respective businesses all satisfy the recommendations of the Danish institution diet, and are thereby guaranteed healthy with regards to the content of macro nutrients (fat, protein and carbohydrate).



Sýni – School of Food in Iceland

Sýni – School of Food (www.syni.is) offers a course called “Kids’ food”, which is intended for catering staff who prepare food for school and preschool children. The aim of the course is:

- to prepare food, high in vegetables, complex carbohydrates and fibre
- to use interesting but mild flavours, such as different kinds of curries, cinnamon, cumin, coriander and herbs which are thought to be accepted by children
- to motivate catering staff to be innovative and offer children new meal combinations and flavours regularly. This stimulates children to be more eager to try something new.

The aim is to teach the participants to prepare **healthy and delicious food for kids**. The course is based on short lectures, cooking demonstrations and enjoying the food preparation. It is emphasized that, the food **HAS TO BE** appealing and delicious. The course was developed in response to an identified need based on results from audits on nutritional value of school meals and observations on the combination of food served to children. The audits revealed that:

- The attitude of canteen staff towards the food and the meal has great impact.
- The children consumed more varieties of food and more vegetables if they were attended to by teachers or supervisors at meals.

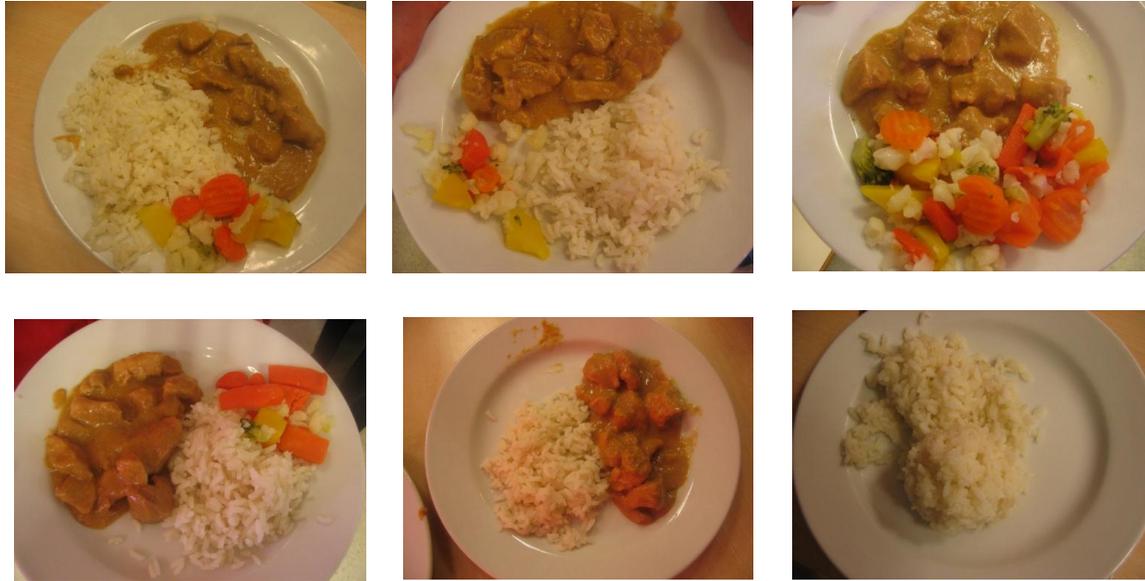


Figure 9 Examples of composition of food categories served to children according to their wishes

The figure indicates that even though the menu may be well balanced, all children are not consuming all varieties as needed to fulfil nutritional recommendations.

After the training course, all menus were checked for three additional semesters. Improvements were noticed in most schools. The main achievements are:

- ✓ More varieties of meals
- ✓ More enthusiasm among the catering staff
- ✓ Most participating schools use recipes from the training courses or have developed their own recipes based on new ideas from the courses



Supervision and good attitude towards the food is very important

Success stories - Municipalities, parents and children - Collaboration

Everything affects us especially ourselves – Public Health Institute Iceland

The project “Everything affects us especially ourselves” is a collaboration of municipalities and the Public Institute of Health Iceland (PHI) to promote healthy lifestyles of children and their families by emphasising increased physical activity and improved diet³¹. The PHI evaluated the project 2005 and again 2007 and finally in 2009 in each participating municipality by sending a questionnaire to school principals, both of kindergarten and elementary schools emphasizing various elements regarding physical activity, the participation of the students, involvement of parents and evaluation the environment of schools.

- ✓ The factors evaluated concerning food were the following:
 - Availability of food in schools, wholesomeness of the food and the degree to which students eat the food offered by the school
 - Instruction on healthy lifestyle in schools for students and parents
 - Schools' instructions about sack/box lunches
- ✓ Survey of health-related lifestyles of children and youths, aged 11, 13 and 15. The specific food related topic was the following:
 - Food habits and utilisation of the school cafeteria
- ✓ Survey on parents attitudes and experiences concerning obstacles to healthy eating and physical activity of their children

The project has enhanced the awareness of the importance of healthy lifestyle and food habits and motivated collaboration of municipalities, staff in schools, parents and children.

³¹http://www.lydheilsustod.is/media/allthefurahrif/Public_Health.pdf

Summary of key success initiatives in the delivery of school meals in the Nordic countries and proposals for improvement

Combination of factors has been suggested as success factors to motivate the delivery of healthier choices in schools in the Nordic countries in the Nordic Network NTP – Healthy choices project (see Figure 10).

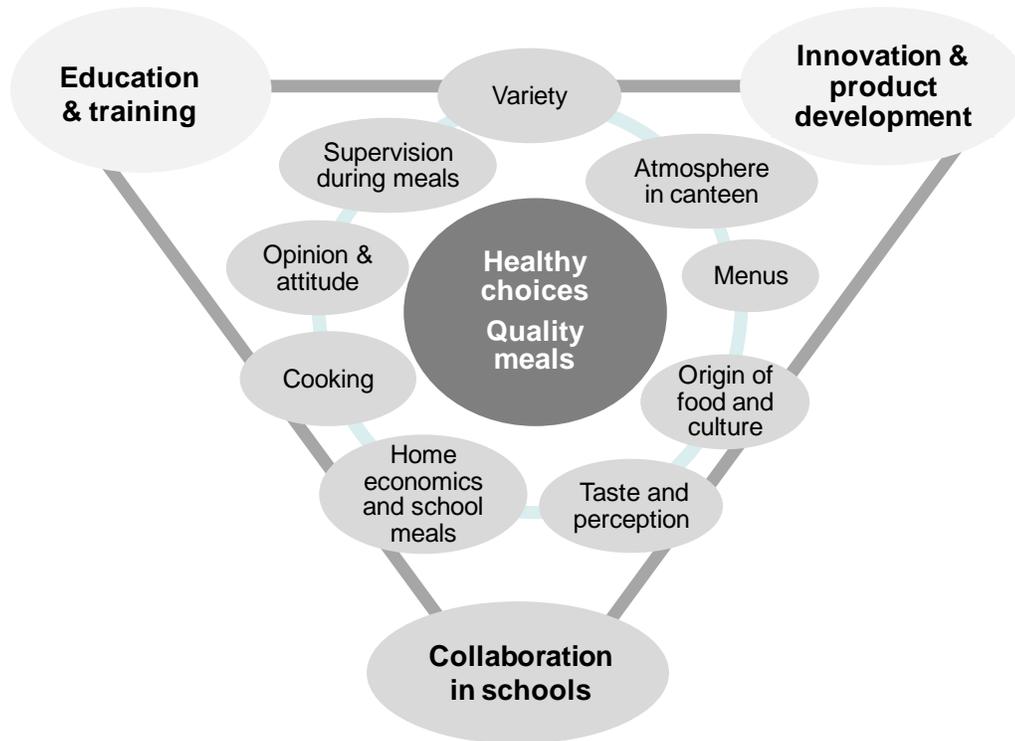


Figure 10 Overview of factors that motivate the delivery of healthy choices in Nordic schools (Adapted from : Hédinsdóttir et al. 2010a)

Joint responsibility - Collaboration in school

- ✓ School meals should be a joint project, a part of school life
- ✓ Collaboration between disciplines and stakeholders is a key issue
- ✓ Teamwork/cooperation at school is important - parents, teachers, catering staff, children and school authorities. Meals should be part of the school curriculum
- ✓ Cooperation between food service managers and headmasters is important
- ✓ Parents involvement should be encouraged

- ✓ Pupils should feel that they can influence what is served and have the possibility to convey opinions to decision makers
- ✓ Supervision of grown-ups during meals, pedagogic meals are recommended
- ✓ Cooperation between teachers (home economics and consumer studies teachers) and food service personnel is recommended
- ✓ Students' opinions should be taken into account in the development of meal offerings
- ✓ Joint attitude and taste workshops can increase interest in more tasty, versatile and a variety of lunch alternatives
- ✓ Involve the children in the preparation of the meals and at the same time including information about healthier, tasty choices

Facilities - Ways to motivate healthy choices

- Improve the image of school meals
- Create pleasant eating surroundings and atmosphere, create a health-promoting school restaurant
- Pleasant, clean and quiet lunchrooms are equally important as the food itself
- According to pupils, the food should not only be nutritious but palatable and fresh, be prepared with care and consumed in a pleasant environment together with friends

Combination of meals

- ✓ Simple presentation of meal combinations, like the dinner plate is useful
- ✓ More focus should be put on availability of a variety of recipes and more product knowledge to prepare tasty and nutritionally balanced meals.
- ✓ Focus on the whole diet rather than single products or meals.
- ✓ Allow flexibility in menus, evaluate the combination of meals over a whole week, not single meals
- ✓ Diversity and variety is more important than focus on single products
- ✓ Recipes should be adapted to available raw materials and food supplies and take into account the opinion of the children
- ✓ Students and parents should be involved in meal planning. In some schools there are council groups where teachers, pupils and others are represented and can influence the product development

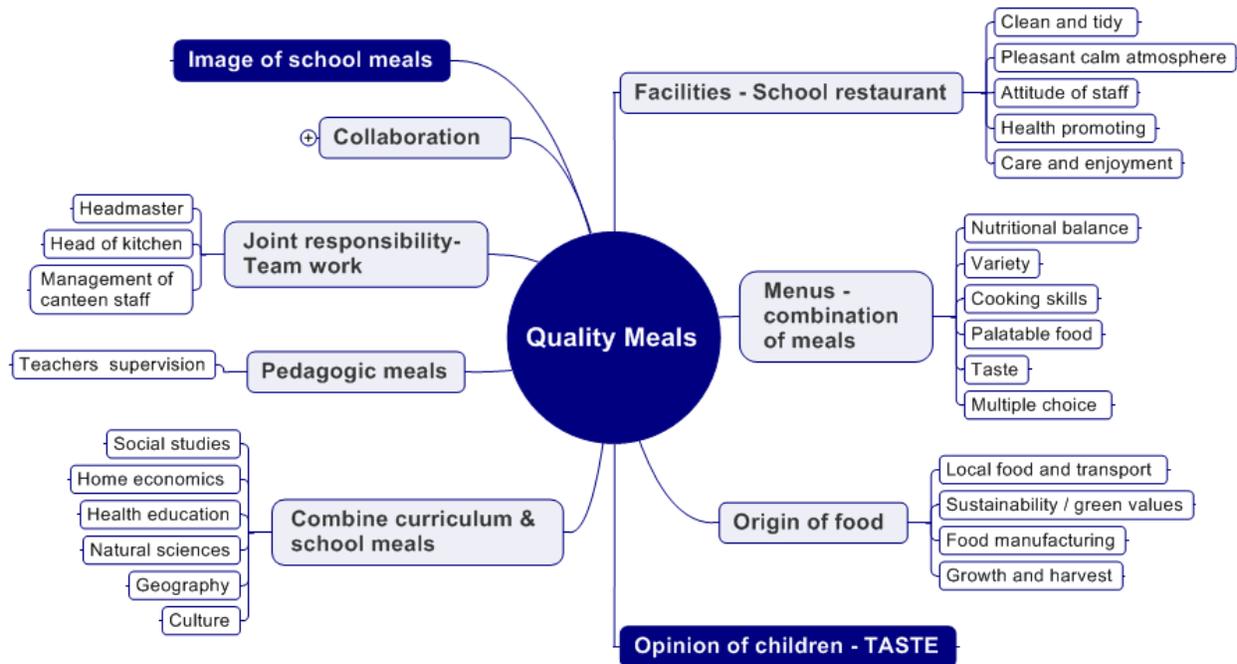


Figure 11 Key success factors and proposed actions to motivate quality school meals.

Management and collaboration in delivery of healthier school meals

- Motivate better communication and collaboration of different stakeholders and disciplines
- Efforts regarding implementing guidelines of healthy food should be directed to decision makers and headmasters in schools
- Meal service and procedures for call for tenders could be improved by involving an interdisciplinary advice group (composed of chefs, food manufacturers /suppliers, nutrition- and food science specialists and other responsible actors in food service) to take part in the preparation of the calls for tenders
- Cost and benefit analysis is recommended to provide a more holistic view of the different services involved. A better understanding of the factors involved in the successful delivery of affordable, good quality, tasty and nutritious meals is needed.

Product innovation – Open innovation

- Create an arena with different stakeholders (industry, catering, innovation and research organisations, educators, children and parents and health authorities) to discuss the need for healthier products for children and greater diversity
- Create food enterprise network to learn how to translate nutrition recommendation into attractive, healthy and tasty food choices for children through open innovation
- Establish a product development forum with participation of students, parents, chefs, food scientists, nutritionists, industry representatives and school officials to come up with ideas on convenient, healthy, attractive meals for school children

Training

- Training of staff (nutrition, food products, attitudes) / Qualified staff through education
- Improved management of the canteen staff
- Atmosphere and physical environment
- Improve general image of school food

Chapter 7 Nordic Research and Innovation Priorities

Vision paper on common Nordic priorities in food research related to healthy choices as the easy choice for children

Introduction

“Making the healthy choice the easy choice” is a main challenge as identified in the strategic research agenda of the European Technology Platform (ETP) Food for Life. Lots of things may influence our health, but it is an undisputed fact that food is one main factor. However we make our food choices on the basis of many various aspects, where healthiness in most cases is not the dominating one. The healthier meal therefore has to be the most attractive meal. What we eat as children influence our health for years to come and during childhood our food habits are also to a great deal being established. There are, therefore, double reasons to focus on the situation for children and try to identify research and innovation needs for giving them the attractive, healthy choices.

There are many actors that have to be involved in the process of turning the food habits and food choices of children into a more healthy direction. The children and their parents, of course, but a further obvious and important part is the school and child care sector. In our project “Nordic Network NTP – Healthy choices”, we have had a Nordic perspective and we have paid specific attention to the role of the meals children eat at school. In the work we have studied the present situation; we have identified successful initiatives in the Nordic countries; and we have defined obstacles for children’s healthy eating. Based on this we in this vision document draw conclusions on knowledge gaps and make suggestions on main research and innovation priorities from a Nordic perspective.

Areas for research and innovation

From a research and innovation point of view there are several aspects to be taken into consideration in order to achieve Healthy Choices for Children. In this document we have focused on three main aspects and structured the discussions accordingly:

- ***Children's food choices***
 - involving knowledge on factors determining the food choices; and who are influencing the children's decision making
- ***Healthier food products and meals***
 - involving knowledge on how to make healthy food attractive; and how to promote the development of healthier food products
- ***The food providing systems***
 - involving knowledge on how food service systems influence the availability of healthy products; and what influence purchase processes and tenders have

Children's food choices

This is a highly multidimensional aspect. The food choice determinants and the food consumption patterns are a function of many different variables, such as situation and the children's age. It also varies who really makes the choices in specific situations, i.e. the children themselves, their parents or the school kitchen. The final choice of the child will be dependent on options and availability. Taking the meals at school as an example, it has to be discussed what influence the children have or the canteen management, the budget department at the municipality or other stakeholders?

It may also vary on what basis choices are made, involving factors such as nutritional composition, economy, environmental impact, and, of course, sensory aspects, such as taste, texture, appearance etc. When the final consumer (the child) makes the choice, the sensory aspects, no doubt, are crucial. The food has to taste good! Availability is also an important factor. The product has to be known and available to be chosen. Attitudes and knowledge are other important aspects. A deeper knowledge here is needed to be able to influence in a positive and desirable way.

Findings from the project

We see from surveys of the school meals in the Nordic countries that a significant part of the children don't eat what is offered, which applies for schools with hot lunch systems as well as for schools with lunchbox arrangements. The children instead replace the school meals with fast food and candy. This may have many reasons. Negative attitudes from school friends may be one important factor. It is not considered "cool" to eat the school meal. It may also be that the food is not tasty and attractive. There seems also to be a common believe that healthy food does not taste good.

Several successful studies show the importance of involving the children in the preparation of the meals, in the development of meal offerings, in evaluations and discussions on taste and other quality aspects. This leads to increased knowledge and awareness on the food, its origin, its taste, its healthiness, etc. Intervention studies have been performed in this area. Further such studies have to be continued to gain more knowledge and suggest further successful actions in this area.

Research challenges

- Children's attitudes and preferences at various ages has to be further characterized and the knowledge has to be translated into food products and meals
- The factors influencing the attitudes and preferences in various situations and contexts need to be better identified.
- Intervention studies should be performed to find effective means to motivate children to be interested in food and develop good food habits.
- Research on communication methods is needed aiming at effective support to children (and their parents) to make healthy choices.

Healthier food products and meals

Healthy alternatives are, of course, a requirement for the children to make healthy choices. This means food products and meals that are tasty and attractive – in addition to being healthy. The technological challenge is to translate nutritional recommendations into real and attractive products. The basis is existing (and emerging) knowledge on what makes food healthy and from that we need to be innovative to develop and produce the products that fulfil those requirements and are liked and preferred by the target group of consumers (in our case children).

This is an important task for the school meal systems, but also for the food sector at large, involving food industry, restaurants, catering, and home-made food. Since the school meal is (or should be) an important part of children's diet and therefore a good opportunity to influence the children's attitudes and food habits, it could be an important target product for these purposes. In the various Nordic countries there are different experiences and solutions for providing the school meal. This may be a good basis for making comparisons, drawing conclusions, and filling knowledge gaps. Lunch boxes vs. hot meals - pros and cons; Meals prepared in the kitchen or provided by industry; Experiences from involving the children in the meal development; Etc. The design and development of healthy and attractive food products will very much be a matter of fruitful interaction between all partners involved, not the least the children.

Findings from the project

In the common thinking there is a lot of misunderstanding on what food is healthy and what food is unhealthy. The media debate is not knowledge driven and contradictory messages are offered. Processed food, for instance, is often *per se* regarded as unhealthy, while ecologically produced food, on the other hand, is interpreted as healthy food. There is an information gap here, in spite of good initiatives from several authorities and organizations with guidelines, handbooks and information activities.

The need for new attractive and healthy food products and meals for children is obvious and the market is significant. Not the least is the school lunches a considerable market. Actions to motivate innovation may be highly helpful to create a variety of tasty and versatile meal alternatives. There are successful examples of the power in interaction and networking between partners with different perspectives in this process. A recommendation is, therefore, to create an arena for different stakeholders (industry, catering, innovation and research organizations, educators, consumers and health authorities) to support innovation and improve the variety of attractive, healthy and tasty food choices for children and young people. The children should also be included, not the least to express their preferences.

Research challenges

- Improved communication strategies need to be developed ensuring the translation of nutrition recommendation into food products and meals, taking into account lifestyle factors, eating situations, and preferences, making sure that the healthier food also will be eaten.
- Methods to utilize interactions in the chain from children/parents all the way to food industry to make healthy and enjoyable food products should be developed. The potential in these methods to encourage innovation should be studied.
- The possibilities to build on the “new Nordic cuisine” movement to design healthy meals should be evaluated. Are there any specific healthy benefits of Nordic foods? Or can the cultural recognition be of value when developing healthy meals?

The food providing systems

The delivery of school meals is relying on a food service system with several stakeholders, including the children, their parents, the school kitchen, the school management, the municipality, the food providers, etc. This creates risks for communication gaps. One important aspect is the routines for purchase of food and meals to the school kitchen. This is often made through tenders and these need to be carefully prepared to cover all various aspects, including nutrition, quality and economy.

Findings from the project

The project has had focus on school lunch situations. Several aspects of the food providing systems related to healthy food choices for children have been looked at. One is the decision systems and the purchase routines governing the final composition and quality of the meals served. There are many diverse requirements on the food and in the end there will be a compromise between them. One is cost. The budgets for lunch meal programs are limited. There may be good guidelines for healthy aspects, but there is a gap between the guidelines and the availability of products. The involvement of an interdisciplinary advice group to take part in the preparation of the calls for tenders is recommended.

Another aspect is the eating situation and the atmosphere for children in the school canteens. This may also be an issue of economy, but it is as much a question of organisation, knowledge

and attitudes. There are many encouraging examples to learn from here; often based on cooperation and involvement. The children's involvement in the meal development and in the lunch situation is important. Meals should be a part of the school curriculum. For this teamwork/cooperation involving parents, teachers, catering staff, children and school authorities is needed. It is also recommended that teachers eat lunch with the children to educate them and show good examples in eating a balanced meal and to keep the noise during eating down. There may also be need for training of various categories of personnel in the school meal system.

Some key success factors in the delivery of school meals in the Nordic countries to be mentioned is existing legislation stating that the school meal shall be nutritious. Tools for quality assurance of the school meal have been developed and should be implemented. Regular surveys conducted by authorities for monitoring school meals are important to ensure the quality.

Research challenges

- The role of the purchase process, including the involvement of healthy aspects in the decision making and tender preparation, needs to be elucidated.
- The impact of eating situation and surroundings and the children's involvement in school restaurants should be studied and better understood.
- The importance of integrating the school meal in the education and curriculum should be further studied.

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Appendix I

Projekt *EVIUS* - Conclusions from the *EVIUS* report

School meal arrangements have spread in Denmark over the past 10 years, partly as result of requests from parents, teachers, children and politicians, and from an idea that school meals can supplement or replace lunch packs. In addition, the introduction is driven by the idea that they can provide health benefits and help to create better and healthier food and meal habits and better learning in school.

EVIUS project³², supported by Fødevarerhverv had the opportunity to explore some of these assumptions. Against this background, we can notice that a number of interesting perspectives for the publicly organized school meals.

EVIUS project indicates that there are nutritional gains by implementing school meals. To gain a significant effect and an all over benefit, it is important to improve the conditions for more pupils choosing school meals. It is also necessary to ensure a high nutritional standard of school meals - that school meals meet energy and nutrient recommendations. In that way, there could be full advantage of the potential nutritional benefits. *EVIUS* also shows that school meals must be age-adjusted in terms of both the food and portion sizes but also in terms of eating environment.

The project also points out that it is not enough to focus solely on the food when it comes to gather the nutritional benefits. Learning about food and health as an integral part of the educational activities at school is vital. The same applies to the implementation of food and meal policy vision in the school's organizational life. It can be assumed that by far the greatest health effect is not derived from the healthy food in itself, but from the long formation process resulting from the good example that comes from eating a daily healthy meal at school. The good example from the school canteen shall be traceable to the way food is part of everyday life at school for example in the food and meal policy and in the education programme. School-based meals

³²Projekt *EVIUS* – *sammenfattende rapport*. Redigeret af: Bent Egberg Mikkelsen og Sofie Husby; Hvidbog om en EU-strategi om sundhedsproblemer i relation til ernæring, overvægt og fedme.

would thus help to "create" children in the right direction when it comes to meal habits. Such an approach would also mean that the school increasingly will help to educate tomorrow's food consumers with ambitious preferences for quality foods. The project indicates that the practical organization of food and school activities also should be linked up in a global vision with a clear food policy goal.

Several of the EVIUS subprojects also identifies the advantages of involving students, and a closer integration of school meals in the classroom and other learning activities in the everyday school life. The learning activities concerning food should be far more exploited, particularly with the goal to ensure that school meals are consistent with students' food and meal preference. An integration of the learning activities concerning food requires a sufficient allocation of resources. EVIUS shows that the children's food preferences play a big role garnering the necessary support of school meal. The project shows that it is a major challenge that the school meal system in Denmark - in contrast to other comparable countries - is an individual and market-based phenomenon. This market-based approach to school meals give children a freedom of choice regarding dining alternatives and that means in practice that particularly the older pupils go other places to buy food. There is a need for a clear vision to change the students' habits, in terms of using school meals. EVIUS have shown that a canteen environment modified according to the students' wishes can enhance the use of the canteen. Again, a closer involvement of pupils in the development and operation of systems is crucial. Attention must also be given to a strong need of developing methods to harvest and utilize students' ideas and desires for school meals through user driven innovation in children's height.

EVIUS shows that a lot of school meal programmes have low user participation. That gives an immediate business operation and logistical challenge. Therefore it is important to work for an increased user share to achieve durable solutions.

The investigation of possibilities to integrate organic food items into school meals, reveals a number of challenges for food in schools in general and organic school meals in particular. It points particularly to the fact that being organic should not only concern the meals, but should be integrated closer in the educational activities and school life. EVIUS shows that there is a clear

contrast between the political objectives regarding organic, as expressed by the government and several municipalities, and the actual proportion of organic food items in the Danish school meals. The holistic approach to health interventions could be a workable model of development. The approach has successfully been applied within the framework of the health promoting school (the Whole School Approach).

EVIUS project, with its multidisciplinary approaches provide a good picture of how today's school meals work. This is especially true for the "inexperienced" schools, who only offered meals to their students because of this project, and in the second row the "experienced" schools. The project has also identified that there are a number of opportunities to get both types to work better.

EVIUS project indicates, however, that today's meals are driven by very different principles and with varying degrees of success. Obviously to meet the health perspectives that lie within the possibilities of school meals, there is a need for a comprehensive food policy vision, ambition and objective of school meals.

It is primarily the responsibility of the government to take such an initiative and here it is important that there is a co-ordination within the various discipline areas: food, health and education. Secondly, it is important that municipality, including the relevant administrations, such as: children and young people, social, health, finance, technology & environment, etc. contribute to an overall vision for school meals. It's also important to be sure of back off from the schools, since they are responsible for the final and practical implementation of the vision. With regard to the educational system, there is a special obligation to incorporate the vision of school meals in the future development of the teaching profession. For the food industry and the primary production, there is a challenge to incorporate such a vision into future product and concept development.

Recommendations

The recommendations of the report are listed below in a short version. The recommendations are elaborated in the individual chapters of the report.

Meal Supplier Level:

- Guaranteeing the nutritional quality, including:
 - Energy content of school meals should be high enough and tailored to different age groups.
 - The quantity of fruit and vegetables should be increased.
 - The use of wholemeal products should be increased.

School Level:

For the construction and anchoring of school meals, schools should:

- Ensure communication and cooperation between the various actors and the integration of the school meal program with the rest of the school. So, ensure that school meals are a joint project and make it a part of school life, so that the responsibility will not only rest on a few persons. To ensure ownership it is a good idea to organize a "school meals team."
- Develop a food and meal policy, involving teachers, pupils and if possible parents.
- Ensure attention to the social needs of pupils in relation to the framework for school meals.
- Customize and choose a meal program that matches the wants, needs and resources of the school, pupils and parents - both before starting, but also continuously. This should be based on:
 - Prospecting among parents and pupils
 - Mapping of resources
 - School's values and goals with the meal program
 - Contact suppliers (according to prepared specifications and requirement-specifications)
 - Regular dialogue and systematic feedback from key target groups (pupils, parents, teachers, supplier)
- Contact the municipality regarding cooperation and support options
- Ensure a greater focus on integration of meals in school teaching. This can be done by involving healthcare, nutrition, organic and food culture in the teaching.

- Inform students and parents about the purpose of the school meal program, the contents of the system, expectations and plans and so on, when the program is initiated.

Municipal level

Municipalities should ensure focus on administrative communication systems about the school meals. By looking at the technical aspects the municipalities should support the schools developing a program on a financially sustainable basis. Technical aspects refer to both the productive and administrative systems, which would provide the basis for a more viable school meals production.

Specific recommendations for organic school meals:

Increased focus on the promotion and visibility of the organic approach towards parents and students, through preparation methods, sales environment, packaging, presentation, serving and dining facilities.

Municipality and school level

The structures and the framework for school meals at schools varies between municipalities. The following recommendations are therefore written for both municipalities and schools, depending on the municipal system. Both parts should:

Perform a comprehensive assessment of policy options with stakeholders and the choice of objectives for school meals: The municipality and school management and employees most consider the purpose of a meal program, is it just feeding or a project that is also conceivable into an educational context.

- Ensure participation and involvement of the teachers and pupils
- Give choices and options for optimal nutrition and take into account the children's preferences so that students have options in relation to their preferences. Ensuring saturating portion sizes for all age-groups. And ensuring the nutritional quality
- Integrate the dining recess, as part of the schools everyday life. Ensure that students receive reasonable terms, with regard to the arrangement of dining facilities
- Seizing the educational and professional opportunities and ensure a framework for this

- Involve marketing and focus on the children's needs in each age group to increase use rates. It is necessary to calculate with costs to information, promotion (towards the pupils but also parents and teachers) and the development of meal environments

National level:

The following advice can be given to the framework for possible future support to facilitate implementation of school meals in Danish schools:

- Securing the necessary time for preparation and support of the preparatory stages to ensure a more durable organized process, priorities and conditions.
- Target support in relation to the type of meals and purpose of the duties pertaining thereto. With tasks such as health promotion, educational programs in health, systems with social benefit, it is advisable to support schools in developing new eating environments and possibly reward teachers or educators to participate in eating.
- Advising the various phases of the process, for example through support from process consultants.
- Ensuring measurement tools (templates, case studies and guides), that provides useful knowledge about wants, needs and assessments in relation to a meal program.
- Support for network coordination, during which schools and authorities both virtual and physical can meet and exchange experiences and create synergy and innovation within the field.

Appendix II List of projects

- (1) **Product development of modified healthier food products**
- (2) **Increased accessibility and consumption of healthy products**
- (3) **Catering**
- (4) **Nutrition research – monitoring and intervention studies**
- (5) **Lifestyle, genes**

(1) Product development of modified healthier food products and convenience food	
<p>Product development of healthier processed meat products</p> <p>Funding: Technological fund and Agricultural fund in Iceland</p> <p>http://www.matis.is/media/matis/utgafa/25-09_SkyrsluAgrip.pdf</p>	<p>The aim of the project was to develop healthier processed meat products with lower salt and fat content. In the production development process the sensory attributes of the prototypes were evaluated by a trained sensory panel. Consumer tests were conducted to study the consumer liking of the products.</p> <p>Results: Consumers are in general in favour of fat-reduced meat products but there is a gender difference and also a difference towards different product categories. Most of the consumers believe that fat-reduces meat products are healthier than traditional products. The taste is most important to most consumers and the price is also important. The consumers make the same demands to quality of fat-reduced food as other food. Consumers find the healthiness of food important, but not as important as the taste.</p>
<p>HEALTHGRAIN : Exploiting Bioactivity of European Cereal Grains for Improved Nutrition and Health Benefits</p> <p>Funding EU FP6 Integrated Project</p> <p>Partners: 42 R&D partners</p> <p>www.healthgrain.org/</p>	<p>The aim is to improve the well-being and reduce the risk of metabolic syndrome related diseases in Europe by increasing the intake of protective compounds in whole grains or their fractions. The aim is to produce health promoting and safe cereal foods and ingredients of high eating quality.</p> <p>The target bioactive compounds are vitamins (folate, tocols, choline etc.), phytochemicals (lignans, sterols, alkylresorcinols, phenolic acids) and indigestible carbohydrates.</p>
<p>LOWJUICE : Novel process for reducing sugar and adding fibre to natural apple juices</p> <p>EU-CR-PES.</p> <p>Partners: NHO Mat og Drikke, Lerum fabrikker (fruit and berries company), Nofima Mat AS, Norway; The Danish Fruit and Vegetable and Potato Board, Erik Lolle SME, Denmark; Spain; Germany; UK; Greece; Israel; Turkey; Austria</p> <p>http://www.nofima.no/mat/en/prosjekt/6243963987983469090</p>	<p>The aim of the LOWJUICE project is to reduce the calorie content of juice by and increase the fibre content. This will be done with the aid of enzymatic processes. In other words, the researchers use enzymes to take the sugar out of the juice early in the process.</p>

<p>Barley Bread: European guideline for healthy high fibre/low salt baking process based on the use of European barley</p> <p>Funding EC EU-CR-PES.</p> <p>Partners: NHO Mat og Drikke, Baker Hansen (bakery), Nofima Mat AS, Norway; Spain; Estonia; Turkey; Scotland; UK</p> <p>http://www.nofima.no/mat/en/prosjekt/7997429039245532969</p>	<p>Objective: To establish a novel European guideline which includes barley genotypes suggestions, suggestions for milling of barley and a novel state-of-the-art guide for baking bread with high content of fibre (75%) and barley (60%), with a reduced salt content (down to 0.4%) and avoid the bitter taste normally associated with barley baking products, liked by the end users.</p>
<p>TRUEFOOD Traditional United Europe Food</p> <p>Funding: EU Contract no.: 016264-2 (2007 – 2010)</p> <p>Partners: 31</p> <p>Establish an effective and sustainable system of technology transfer of innovations (those developed within the TRUEFOOD projects and in other EU, national and industry funded R&D projects) into traditional food industry, focussing specifically to SMEs.</p> <p>www.truefood.eu</p>	<p>Objective: To introduce suitable innovations into traditional food industry to maintain and increase the competitiveness of the industry in an increasingly global European market place. Identify and quantify consumer perceptions, expectations and attitudes with respect to (a) safety and quality characteristics of traditional foods, and (b) innovations that could be introduced into the traditional food industry. Identify, evaluate and transfer into the industry innovations which guarantee food safety, especially with respect to microbiological and chemical hazards. Identify, evaluate and transfer into the industry innovations which improve the nutritional quality, while at the same time maintaining or improving other quality characteristics recognised by traditional food consumers (e.g. sensory, environmental, animal welfare and ethical qualities). Support the marketing and supply chain development of traditional food products.</p>
<p>DoubleFresh (2006 – 2010)</p> <p>Funding: EU-STREP-SAM FP6-2004-FOOD-3-B</p> <p>Scientific partners: SIK, Nofima Mat AS, IVV, University of Ioannina, University of Vienna, LEI-WUR, Wageningen University. Objective: Towards a new generation of healthier and tastier ready-to-eat meals with fresh ingredients.</p> <p>www.doublefresh.eu</p>	<p>Results: Ready-To-Cook (RTC) meals characterized by containing raw ingredients (e.g. chicken, fish, and vegetables), partly cooked staple foods and pasteurised sauces have been developed. These fresh microwaveable meals aim to have a better appearance, taste and nutritional value than traditional heat-treated ready meals. The distribution and consumption of RTC meals have up to now been limited by a short microbiological shelf life and are not yet sold in Norway. Work in the EU-funded project Double Fresh has shown that the shelf life of RTC meals can be extended by using marinated raw materials and low oxygen modified atmosphere storage.</p>
<p>NRC - Innovative and attractive fish dishes. (2008 – 2011)</p> <p>Partners: <u>Nofima Mat AS</u> Ås and <u>Stavanger</u>, Nofima Marine, Swedish Univ Agriculture Science, Gastronomisk institutt, Vikomar, White Fish Qualitec (fish company, Domstein Enghav Haugesund (fish company), Mic Vac (equipment company), Bama Industrier (vegetable company), FMC Food Tech, Medirest Norge (food service), Måltidets Hus, Sodexho (food service)</p>	<p>Objective: To stimulate fish and vegetable consumption through development of innovative and attractive seafood dishes using novel processing- and packaging techniques.</p>
<p>NRC - Framtidens sunne og gode varmretter (2007 – 2010) Healthy and tasty meals for the future</p>	<p>Objective: Optimize health-related and sensory quality of vegetables in meals to catering and industry</p>

Partners: Findus Norge AS Avd Tønsberg (vegetable company), Fjordland AS (ready-to-eat meal company), Gastonomisk institutt, Medirest Norge AS (food service), Nofima Mat AS Ås and Stavanger	
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(2) Increased accessibility and consumption of healthy products	
<p>HealthCat - Network for Nordic excellence in sustainable and healthy catering www.healthcat.net</p> <p>Funding NICE</p> <p>http://www.nordicinnovation.net/_img/04249healthcat_finalreport.pdf</p> <p>Through workshops, seminars, a survey of the networks' participants and different case-studies the network has shed light on both positive and negative experiences from introduction of sustainable and healthy food in the food service sector.</p>	<p>Aims:</p> <ul style="list-style-type: none"> • function as a meeting point for central stakeholders in the Nordic countries, • transmit experiences with sustainable and healthy foods from public to private sector, • strengthen the competitiveness of Nordic food service businesses in this field, • create more attention in the public opinion about sustainable and healthy foods, and • increase the international co-operation. <p>In spite of the fact that the situation for sustainable and healthy food vary in the different Nordic countries, there are some common challenges that should be addressed on a Nordic and international level. This is especially true on areas such as;</p> <ul style="list-style-type: none"> • information and education, • bottlenecks in the value chain, • coordination of regulations and information on food procurement and food labelling, and • cooperation on research and development.
<p>MmmmmSeafood</p> <p>Increased accessibility and consumption of healthy products: such as fruits, vegetables, cereals and fish and promotion of consumption of those products among schoolchildren.</p> <p>Funding: NICE Duration: 2007 - 2010</p> <p>http://www.mmmmmseafood.org/</p>	<p>The aim is to support Nordic Fish industry by development of new ideas for marine products according to the needs and wishes of consumers, especially young people, to promote fish consumption in and out of home. Innovative concepts for culinary oriented Nordic seafood products for easy use at home and for out-of-home consumption. Since volume and economical value of exported seafood is by far much more important than the domestic market in the Nordic countries, the local Nordic market has been partly neglected by the key industrial players. The main objective is to strengthen the Nordic seafood sector by developing consumer oriented new seafood product concepts for young adults and young families, in order to stimulate the consumption of healthy high quality seafood at home and in out-of-home situations.</p>
<p>Altintzoglou, T, 2010. Young adults and seafood: Using the voice of consumers to develop new seafood product concepts aimed at increasing consumption. PhD thesis 24 September 2010 University of Tromsø, Norway. ISBN 978-82-90263-59-1</p>	<p>A study carried out in Norway suggested a discrimination of consumer groups, indicating a lower health involvement by younger consumers. Additionally, the results showed a positive association between health involvement and attitudes towards seafood consumption. Young adults express their needs for seafood products that are attractive, healthy, palatable and convenient. Seafood products should be accompanied by clear</p>

	advice on preparation methods and ingredients. Fish fillets were preferred than minced fish.
<p>Fiskesprell</p> <p>The Norwegian Seafood Export Council is responsible for the project “Fiskesprell” in cooperation with Ministry of Fisheries and Coastal Affairs, Directorate for Health and Social Affairs and National Institute of Nutrition and Seafood Research</p> <p>http://www.fiskesprell.no/</p>	The aim of the project 'Fiskesprell' is to stimulate fish consumption via the kindergartens.
<p>Young consumer attitudes and fish consumption: Improved image of seafood</p> <p>G. Einarsdóttir, 2009.</p> <p>Viðhorf og fiskneyslaungsfólks 16 til 20 ára: Íhlutun á Akureyri. Report no 03 - 09 Matis Food Research, Innovation & Safety (Iceland))</p> <p>http://www.matis.is/media/matis/utgafa/Skyrsla_03-09_Vidhorf_fiskneysla_Akureyri.pdf</p>	Systematic education on the wholesomeness of fish and increased variety of fish dishes are essential to encourage increased fish consumption among young people.
<p>Pro Children.</p> <p>Promoting and Sustaining Health through Increased Vegetable and Fruit Consumption among European Schoolchildren</p> <p>Funding: EC</p> <p>http://www.prochildren.org/</p>	Aim: to develop effective strategies to promote adequate consumption levels of fruit and vegetables. Young adolescents (11 to 13 years) and their parents are the main target groups of this project
<p>Progreens</p> <p>Promotion of fruit and vegetable consumption among schoolchildren in Europe.</p> <p>Funding: EC (a following up project of Pro Children)</p> <p>http://www.progreens.org/</p>	The main objective of this project is to assess the current intake and to develop effective strategies to promote consumption of fruit and vegetables in school children across Europe. The main target group is 11-year old children
<p>Bere, E., Hilsen, M., Klepp, K-I. Effect of the nationwide free school fruit scheme in Norway. British J Nutr 2010, 104, 589 – 594.</p>	CONCLUSION: There has been a large increase in pupils eating fruit at school from 2001 to 2008 in Norway, and the school fruit programmes seem to have been effective. However, a great challenge remains in increasing vegetable intake.
<p>Understanding school children’s preferences for apple varieties in order to provide variation and promote consumption of Norwegian apples.</p> <p>Grimsby, S., Ueland, Ø., Segtnan, A., Tomic, O., Kigen, A., Angelsen, T. Understanding school children’s preferences for apple varieties in order to provide variation and promote consumption of Norwegian apples. Poster at EGEA VI Social and Health Benefits of Balanced Diet: The role of Fruit and Vegetables meeting in May, Brussels 2010</p>	<p><i>Objective:</i> To encourage consumption of local apple varieties and at the same time provide fruits in the schools that children prefer and will eat, a hedonic consumer test using an interactive response system was conducted.</p> <p><i>Conclusion:</i> New organic varieties were liked in the same way as imported and traditionally grown conventional apple varieties. An interactive response system is a good way of collecting data during a consumer test for school children.</p>
<p>Icelandic study on fruit and vegetable intake of 11-year-old children</p>	

Unit for Nutrition Research University of Iceland http://stofnanir.hi.is/rin/en	
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(3) Catering	
Healthy and tasty green meals for the future (2007 – 2010) NRC. Partners: Findus Norge AS Avd Tønsberg (vegetable company), Fjordland AS (ready-to-eat meal company), Gastonomisk institutt, Medirest Norge AS (food service), Nofima Mat AS Ås and Stavanger	Objective: Optimize health-related and sensory quality of vegetables in meals to catering and industry
How much is left of vitamin C in vegetables processed by methods used in catering and foodservices? Baardseth, P., Bjerke, F., Martinsen, B.K., Skrede, G. Vitamin C, total phenolics and antioxidative activity in tip-cut green beans (<i>Phaseolus vulgaris</i>) and swede rods (<i>Brassica napus</i> var. <i>napobrassica</i>) processed by methods used in catering. <i>J. Sci Food & Agric</i> 90(7): 1245 – 1255 (2010).	Objectives: Vitamin C is water soluble and sensitive towards heat and oxygen. The vitamin is the least stable among nutrients in vegetables and is thus often used as an indicator of the strain nutrients are exposed to during processing. Healthcare providers use nutrient data standards provided by various national and international government and nongovernment agencies. Physicians, dietitians and menu planners rely on these values for nutritional therapy. This is emphasised by the fact that many hospitalised patients today have inadequate intakes of nutrients like water-soluble vitamins. Thus, to ensure the nutritional quality of diets for healthy persons as well as for therapeutic use, it is crucial to know how the various processing steps contribute to the levels of nutrients at the time of consumption. Examples – hospitals and catering: Peas served to patients showed degradation of vitamin C at various stages of processing (frozen, steamed, trayline and delivery) at two New Jersey hospitals, and it was significant less than compared with the published standards values at both hospitals. Carrots, peas, potatoes were treated through the hospital cook-chill plate system. Raw vegetables contained 6 – 10 mg vitamin C/100g and at the end of the food service cycle the vitamin C was reduced to 1.7 – 5.8 mg/100g (mash potatoes 76% and peas 42%) causes an insubstantial presence of ascorbic acid in the food served to hospitalised patients. Green beans and swede rods were heat treated in three different ways (traditional in water, boil-in-bag and sous vide) and the vitamin C retention was 50%, 80% and 70% green beans, and 34%, 80% and 53% swede rods, respectively. Warm-holding should be avoided.
Development of Procurement Processes in Municipal Catering (2003-2006) (Finland) Project Leader: Teija Taskinen, Mikkeli University of Applied Sciences	Objective: The project enhanced the cooperation and supply chains between the local food producers and municipal catering.
Service Products (2003-2005) (Finland) Project Leader: Teija Taskinen, Mikkeli University of Applied Sciences	Objective: The project promoted the use of locally produced food in professional kitchens through the recipe development.
Culinary Heritage Europe (2003-2005) (Finland) Project Leader: Caroline Jacobsson, Carrefour South Sweden	Objective: The project promoted tourism in 8 European regions by supporting small businesses that work with local and regional foods in rural areas
Short Supply Chains to Professional Kitchens	Objective: The project supported Finnish public sector

(2007) (Finland) Project Leader: Eija Muukka, Ekocentria	professional kitchens in their pursuit of procurement of locally produced food
A Modular Information Model for Professional Kitchens (2005-2007) (Finland) Project Leader: Teija Taskinen, Mikkeli University of Applied Sciences	Objective: The project studied food production processes and data flows in professional kitchens.
Electronic Information Systems for the In-house Control of Professional Kitchens (2007-2008) (Finland) Project Leader: Teija Taskinen, Mikkeli University of Applied Sciences	Objective: The project tracks down the possibilities of professional kitchens to use electronic information systems in their in-house control and tracing of food through the production and distribution chain

(4) Nutrition research – monitoring and intervention studies: – relationship between food, nutrition, genomics and health	
SEAFOODplus Project 1.2 YOUNG - Health of young European families and fish consumption Funding: EC / FP6 Partners: Landspítali-University Hospital & University of Iceland (LSH&HI), Iceland; National Research Institute on Agriculture and Fisheries (IPIMAR), Portugal; University of Navarra (UNAV), Spain; 15. University College Cork (UCC), Ireland; Statens Serum Institut (SSI), Denmark. www.seafoodplus.org/	Randomized intervention trial in three European countries which investigated the health effects of seafood consumption in combination with energy restriction in overweight and obese young adults. The aim is to increase knowledge of nutritional effects of bioactive components in fish that might be useful in health promotion and prevention of diseases among young European families. Unit for Nutrition Research University of Iceland http://www.seafoodplus.org/Project_1_2_YOUNG.40.0.html
Ramel, A., Jonsdottir, M. T., Thorsdottir, I. Consumption of cod and weight loss in young overweight and obese adults on an energy reduced diet for 8-weeks. Nutrition, Metabolism & Cardiovascular Diseases 2009, 19, 690 – 696	The inclusion of 150 g of lean fish five times per week results in a 1.7 kg significantly greater loss in young overweight or obese individuals than isocaloric diet without seafood.
Nordic Young Health study - Possibilities and barriers for new, healthy concepts in the fast food sector. Funding: NICE Partners: SIFO, Norway, Nofima Mat AS, Norway, University of Iceland & Landspítali-University Hospital, Unit for Nutrition Research, Iceland, National Food Institute, Department of Nutrition, Denmark, National Consumer Research Centre (NCRC), Finland, Center for Consumer Science (CFK), Sweden	The Icelandic part of the study includes an experimental setting in which taste preferences, hunger and satiety as well as postprandial metabolic responses after different types of fast food meals will be recorded
Nordic monitoring system Funding: NICE Partners: National Food Institute, Technical University, Copenhagen, Denmark, University of Oslo, Oslo, Norway, Norwegian School of Sport Sciences, Oslo, Norway, University of Iceland & Landspítali University hospital, Reykjavik, Iceland, University of Iceland, Reykjavik, Iceland, National Institute of health and Welfare, Helsinki, Finland, Finnish Institute of Occupational Health,	Development of mutual monitoring system, which can be used to observe evolution of the diet and physical activity among Nordic populations. Focus on satiety, weight management and foods, a project of the Healthier choice area. A project funded by the Nordic Innovation Centre.

Oulu, Finland, National Food Administration, Uppsala, Sweden, Swedish National Institute of Public Health. Östersund, Sweden , University of Århus, Århus, Denmark	
Nutrition in School Children – Determinants and Promotion of Healthy Eating. Ása Guðrún Kristjánsdóttir, 2008. Dissertation for the Degree of Ph.D. in Nutrition at University of Iceland.	Informs about intake and determinants of healthy choices in school children as well as the possibilities of a school based intervention. (Iceland)
New Nordic Food (2010 – 2014)	NICe Steering committee: Meyers ApS (DK), Danish Meat Association (DK), Livsmedelsindustriförbundet (FI), Jord- och skogsbruksministeriet (FI), Faroe Trade Council, Departementet for Erhverv og Arbejdsmarked (Greenland), Matis (IS), Hólar University College (IS), Nofima Mat AS (NO), Innovation Norway (NO), Jordbruksdepartementet (S), Lantbrukarnas Riksförbund (S), Ålands hotell- och restaurangskola
Food of LIFE, OPUS – healthier food, better life, new Nordic diet, Denmark www.foodoflife.dk/Opus/English	WP 5: Free healthy meals in schools – a dietary intervention in Danish schools
IDEFICS – Identification and prevention of Dietary – and lifestyle – induced health Effects In Children and Infants http://www.ideficsstudy.eu/Idefics/ Funding: European Commission under the 6th Framework Programme Partners: <i>Research Institutions:</i> Ghent University, Research and Education Institute of Child Health (Cyprus), Copenhagen Business School, National Institute for Health Development (Estonia), University Joseph Fourier (France), University of Bremen, Technologie.Transfer-Zentrum Bremerhaven, University of Glasgow, Lancaster University, University of Pecs (Hungary), University Catolica de SacroCuore, National Research Council (Italy), National Cancer Institute (Italy), University of Milan, University of Zaragoza, University IllesBalears, University of Gothenburg <i>Small and Medium Enterprises (SME):</i> The European Food Information Council (Belgium), Laboratoriumsmedizin Dortmund, Eberhard and Partner (Germany), Biotel Ltd (G.B.), Pecs TV Communication Ltd (Hungary), Agora Med srl (Italy), Gockel Design.	The IDEFICS Study is designed to run for five years, commenced in September 2006 under the coordination of the Bremen Institute for Prevention Research and Social Medicine, at the University of Bremen. The study will deliver reliable data to make an international assessment of the problem of "obesity in children" possible. The focus of the IDEFICS Study lies in exploring the risks for overweight and obesity in children as well as associated long-term consequences. In addition, the EU-wide study offers a unique possibility to measure in how far sensory perception and preferences of children influence the development of overweight. Beyond pure research, IDEFICS will offer activities for health promotion and prevention in kindergartens and schools. These prevention programmes will be developed, implemented and evaluated within the IDEFICS Study. The results of the study will be incorporated into various guidelines on nutritional, behavioural and lifestyle as well as ethical aspects in all participating countries.

(5) Lifestyle, genes and nutrition

HELENA – Healthy Lifestyle in Europe by Nutrition in Adolescence. Funding: EC FP6, http://www.helenastudy.com/	The main objective of the project was to obtain reliable and comparable data of a representative sample of European adolescents, concerning: foods and nutrients intake, food choices and preferences, obesity prevalence, dislipidemia, insulin resistance, vitamin and minerals status, immunological
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	markers for subclinical malnutrition, physical activity and fitness patterns, and variations of the nucleotide sequence in selected genes. A further objective was to develop a number of healthy foods and identify marketing strategies for consumers, in order to improve the diet of adolescents.
<p>NCoE - Systems biology in controlled dietary interventions and cohort studies (2007 – 2012) SYSDIET www.sysdiet.fi Scientific partners: University of Kuopio, Finland, Food and Health Research Centre, Finland, VTT Technical Research Centre, Finland, Karolinska Institute, Stockholm, Sweden, University of Uppsala, Sweden, University of Lund, Sweden, University College of Akershus, Norway, University of Aarhus, Denmark, University of Copenhagen, Denmark, Nofima Mat AS, Norway, Aarhus University Hospital, Denmark</p>	Objective: To study the genetic background of obesity, diabetes and metabolic syndrome as well as to identify nutritional factors (Nordic diet) which affect diseases.
<p>Diet, obesity and genes (Diogenes) (2005 – 2009) Funding: NRC - EU IP FP6 http://www.diogenes-eu.org/</p>	Objective: A pan-European Programme targeting the obesity problem from a dietary perspective: seeking new insights and new routes to prevention. The aim is to increase our knowledge about the connections between obesity, diet and genes, as well as physiological and psychological factors. www.diogenes-eu.org

Appendix III Training practices for Catering in the Nordic countries

Results from an inquiry in Finland

In order to get up-to-date information of the reality in Finnish school catering system, a web-based inquiry was sent to members of Municipal food experts in 2009.

Background information

- One hundred respondent, nearly all (90%) from municipal food services, only two from food service companies
- Kitchens are situated in different parts of Finland, yet Southern and Western Provinces of Finland were numerically best represented
- Most respondents were responsible for several kitchens. Nearly half of them were liable for more than 10 kitchens. Three out of four respondents produced daily over 2000 servings. 66 % of respondents reported that the proportion of school meals from total daily servings varied from 50 to 70 %
- Only 5 % of respondents were liable of less than 10 workers. 64 % of respondents have 10-99 workers, and 29 % have at least 100 workers

Snack service at school

- Snack was offered in 80% of schools. More than a third (36%) of those schools offering snack was on daily basis. There were only a few schools offering snack more rarely (e.g. 2-3 times/week or once/week). Since the respondents were liable for several kitchens, the practices on offering snack were variable in different schools:
 - snack was offered only on certain school level (mostly upper level of comprehensive school) or only to pupils who had a long way to school or whose school day was long
 - snack service was organized if the school wanted it
 - snack was available only on charge
- In most cases (78%) kitchen staff was liable for snack service. There was a vending machine only in five schools and a kiosk organized by pupils only in six schools.

TABLE 1 How snacks are offered to pupils?

Number of answers 84

Options	% of answers
Vending machine	2
Kitchen staff serves	77
Kiosk	5
There are several practices of serving snacks.	16

Standard of education of catering staff

- 90 % of respondents answered that at least 80 % of staff had vocational education. One third (34 %) answered that all the staff have vocational education.
- Most often education had happened in vocational school or vocational institute (43 %). Also adult educational centres were significant trainers (21 %).
- Education of superiors/managers had taken place in vocational institutes (34 %) or in universities of applied sciences (33 %).
- Nutritional competence of staff was not considered sufficient. 74 % of respondents answered that it needs updating or complement. According to respondents the extent of studies of nutritional recommendations, food choice guidance, and customer service skills are too small in vocational education.
- Further training is needed to communication and interaction skills (76 %), to technological skills (67 %) and nutrition (52 %) and also to product knowledge and taste and flavour aspects of food. In general more training to practical work, cost awareness and mastery of complexes of things is needed in catering vocational education.

Implementation of nutritional recommendations

- Two thirds of respondents answered that recommendations given on organizing school meals have been implemented. In every school pupils get special diets on healthy or ethical basis and low-fat or fat-free milk products were also available in every school. Fish as a main course was offered at least once a week in 97 % of schools and vegetable fat in 98 % of schools.
- Offering several alternative main courses was very rare, only in 17 % of schools. Also peaceful or unhurried lunchroom was rare. Meal model was of-ten on view only in half of the schools. Authorized nutritionist took part in menu planning only in 18 % of kitchens, but 85 % of kitchen had a food ser-vice soft-ware to calculate and follow nutrient contents of meals. But “calculating of nutrients is waste of time when customer takes what she/he feels like”.

TABLE 2 Have the recommendations of school meals been implemented? Number of answers 100.

Options: Yes/ no/ I don't know

An individual recommendation statement concerning organizing school meals	Yes %	No %	I don't know %
School lunch is served between 11 and 12 am	52	45	3
Duration of lunch break is at least 30 minutes	45	51	4
Surroundings of school meal is unhurried	21	76	3
Surroundings of school meal is comfortable	62	35	3
Serving temperature of meal is adequate	95	5	0
Share of energy nutrients is appropriate	82	11	7
Salads and other vegetables are served first in line	70	29	1
High-fiber bread is available	83	12	5
Low-fat/fat-free milk products are available	100	0	0
Fish dish is included in the menus at least once a week	97	3	0
Vegetable fat is available	98	2	0
Several main dishes are available	17	82	1
A pupil gets special diet for health reasons	100	0	0
A pupil gets special diet for ethic or religious reasons	96	3	1
Meal pattern is often on view	53	45	2
Feed-back is collected from customers regularly	73	25	2
Pupils take part in organizing school meals	28	69	3
At school exists a team of pupils and personnel for discussions and development of school meal serving	29	68	3
Implementation of nutritional recommendations is followed	80	17	3
Authorized nutritionist takes part in menu planning / revises the menu	18	80	2
A computer applied software is used to count nutritional content of menu	85	15	0

The effect of rise in raw-material prices on nutritional contents of menu

Changes must have been done but changes are still moderate. E.g. instead of meat people use minced meat or poultry, or instead of low-fat meat there is cheaper and more fatty meat. Alarming is also the facts that fruit have been removed and the amount of salad has been decreased in some schools. Most often the managers have pursued to more accurate and economic operations by means of menu planning and purchasing. E.g. more expensive foods have been taken away from menus and purchasing has been centralized.



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Nordic Innovation Centre

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