

Effects of a free school meal on lunch habits in Norwegian elementary school children

The School Meal Project in Aust-Agder.

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This master's thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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Preface

This study is a result of the independent work that completes my master's program in Public Health Science. I have always been interested in food and nutrition, and wanted to continue this specialization after I completed my bachelor degree in food, nutrition and culture at the University of Agder. This is why I wanted to write my master thesis within The School Meal Project in Aust-Agder. The experience of working in an intervention study, with responsibility of data collection (together with two other master students) has taught me much about the research process that I highly value. In total, my interest in research and scientific work increased during the process with writing this thesis and collecting data on The School Meal Project.

Several people have contributed in making it possible for me to complete this study. First, I want to give a special thanks to my supervisor Frøydis Vik, for lots of advice, constructive feedback, and for helping me to stay focused on the aim of the study. Secondly, I want to thank my co-supervisor Elling Bere for good help with statistical analyses. Thirdly, thanks to Renate Høyland and Kirsten O. Petersson, who also were involved in The School Meal Project, for good cooperation and academic support. Fourth, I want to thank Ida Helgeland, Siri Thorkildsen and Julie Sigvartsen who I shared office with at “Spicheren”, for academic discussions and for social breaks. Fifth, thanks to Sten Kristian Mydland for supporting my work and always believing in me. Finally, thanks to all participating children and parents involved in The School Meal Project and to Trude Karlsen for preparation and serving of the school meal. This study could not be carried out without you.

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Abstract

Norway has no national arrangement for a free served school meal. This has led to mainly two concerns: that many children may attend school without eating a healthy meal throughout the school day, and that many children may skip their lunch. The aim of this study was to investigate if a free healthy school meal had impacts on children's intake of different foods during the lunch, and thereby contribute to a healthier diet at school.

The School Meal Project is an intervention and has a quasi-experimental study design- with an intervention and a control group. A total of 55 (96%) children in the intervention group and 109 (67%) children in the control group, all aged ten to twelve years, answered on a questionnaire at two time points with a six-month interval. Results were evaluated with a healthy food score consisting of thirteen food items, which was calculated based on a food-frequency questionnaire section. Chi-Square and Independent Samples Test was used to examine the hypothesis. The results showed that the total food score increased significantly at follow-up 1, more in the intervention group (1.7) compared to the control group (0.5), $p=0.008$. The change in the total food score was mainly due to an increase in the intake of fruit ($p<0.001$), vegetables ($p= 0.001$), and fish spread ($p=0.022$) among children in the intervention group compared to the control group. In conclusion, serving of a free healthy school meal increased children's intake of healthy food products. Further studies are needed to clarify effects on school meal and impact on health- and school-outcomes and possible long-term effects.

Keywords: meal pattern, school children, children, school meal, lunch.

Sammendrag

Det er ingen nasjonal ordning for servering av skolemat i Norge, noe som fører til at skolebarn må ta med seg nistepakke hjemmefra. Dette kan føre til at barna ikke spiser et sunt måltid i løpet av skoledagen, og/eller at de hopper over skolemåltidet. Målet for denne studien var å undersøke om et gratis sunt skolemåltid fører til at barna har et sunnere kosthold på skolen.

Skolematprosjektet har et kvasi-eksperimentelt design, med en intervensjon og en kontrollgruppe, hvor det ble servert et sunt skolemåltid. Det var totalt 55 (96%) barn i intervensjonsgruppen og 109 (67%) barn i kontrollgruppen i alderen ti til tolv år som responderte på spørreskjema. Data ble samlet inn ved to tidspunkt med seks måneders tidsintervall. Resultater ble evaluert ved en poengsum i en sunnhetsskala basert på tretten matvarer. Sunnhetsskalaen ble beregnet ut fra matvarefrekvensspørsmål som omhandlet måltidsvaner til skolemåltidet. Kji-Kvadrat og Independent Samples Test ble brukt for å undersøke forskningsspørsmålet. Resultatene fra denne studien viste at barna i intervensjonsgruppen økte den totale poengsummen (1.7) signifikant sammenlignet med kontrollgruppen (0.5) ved tid 2, $p=0.008$. Den signifikante endringen i den totale poengsummen var hovedsakelig på grunn av en økning i inntak av frukt ($p<0.001$), grønnsaker ($p=0.001$) og fiskepålegg ($p=0.022$) blant barna i intervensjonsgruppen sammenlignet med kontrollgruppen. Funn fra studien viste at servering av et gratis sunt skolemåltid økte inntaket av sunne matvarer til skolemåltidet. Det er nødvendig med mer forskning som kan tydeliggjøre effekter av et sunt skolemåltid på vekt, læringsmiljø og skoleprestasjoner samt langtidsvirkninger.

Definitions and abbreviations

The School Meal Project: Refers to the School Meal Project in Aust-Agder

Meal Pattern: The total intake of food and beverages consumed over time, and includes nutrient intake and number of meals every day (Departementene, 2007). The term meal pattern in study is based on the Norwegian governments' report "recipe for a healthier meal pattern".

School meal: Lunch meal at school

Regular meals: Eating four-five meals on an every-day basis

Skipping meals: Lack of one or more meal per day, often less than three meals per day.

FV: Fruit-and vegetable

SES: Socioeconomic status

PA: Physical activity

TV: Television

FFQ: Food-frequency questionnaire

HFS: Healthy food score

SPSS: Statistical package for social science

NSD: Norwegian Social Science Data Services

BMI: Body Mass Index

Norwegian references used in text.

Ungkost: Nation-wide dietary survey among 4th and 8th graders in Norway

Helsedirektoratet: the Norwegian Directorate of Health

Opplysningskontoret for frukt og grønt: Work to increase consumption of fruits, berries, vegetables and potatoes in Norway (an information agency).

Departementene: Refers to Norway's Government

Folkehelseinstituttet: Norwegian Institute of Public Health

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1.0 Background

There is no current national arrangement for free school meal in Norway, but the implementation has been discussed (Ask et al., 2010; Dahl & Jensberg, 2011). Free school meal including a warm meal exists in Sweden and Finland (Dahl & Jensberg, 2011; Ray et al., 2013). In England, children living in families with an income below the poverty line are offered free school meal (Gorard, 2012). A few municipalities in Norway have local arrangement for serving of a school meal, often subsidized by school and/or parents (Haugset & Nossun, 2012; Sandvik, 2015). Other countries in Europe have similar arrangements for the school meal, such as Iceland (Dahl & Jensberg, 2011) France (Dubuisson et al., 2011) and families over the poverty line in England (Gorard, 2012). Little systematic knowledge and experiences related to quality on school meals in Norway exists, and it is therefore important with new research as suggested by Ask et al. (2010).

Andresen and Elvbakken (2007) and Kainulainen, Benn, Fjellström, and Palojoki (2012) reported that children in Norway have to bring packed lunches from home, and parents are responsible for healthy lunches and children's meal habits in general. This has led to mainly two school-food issues: that many children attend in school without eating healthy foods during the day, and that many children attend in school without eating a school meal in general (Andresen & Elvbakken, 2007; Kainulainen et al., 2012). As suggested by Bertin, Lafay, Calamassi-Tran, Volatier, and Dubuisson (2012) school meals can contribute to school children's diet. Hence, Harrison et al. (2013) pointed out that school meals may have impacts on school children's overall meal pattern, which again could lead to improved health-related outcomes. A regular and healthy meal pattern in school aged children is important because (1) a regular meal pattern in a young age may protect against overweight and obesity (Franko et al., 2008; Koletzko & Toschke, 2010; Mota et al., 2008; Stea, Vik, Bere, Svendsen, & Oellingrath, 2014; Toschke, Küchenhoff, Koletzko, & Von Kries, 2005; Toschke, Thorsteinsdottir, & Von Kries, 2009; Vik et al., 2013; Vik, Øverby, Lien, & Bere, 2010), (2) a healthy meal pattern has been related with higher academic achievements (Belot & James, 2011; Stea & Torstveit, 2014; Øverby, Lüdemann, & Høigaard, 2013) and (3) there has been reported a relationship between meal pattern and concentration, behaviour and cognitive ability (Sorhaindo & Feinsein, 2006; Øverby & Høigaard, 2012). In addition, meal pattern tend to change in childhood during the transition from childhood to

adolescence specifically with more skipping of breakfast (Würbach, Zellner, & Kromeyer-Hauschild, 2009; Øvrebø, 2011), skipping of lunch (Stea et al., 2014; Würbach et al., 2009; Øvrebø, 2011) and an overall decrease in diet quality (Demory-Luce et al., 2004; Oellingrath, Svendsen, & Brantstaeter, 2011; Øvrebø, 2011).

In 2007, a school fruit scheme was offered to all schools in Norway (Dahl & Jensberg, 2011), both as a no-cost arrangement (grades 8th-10th) and as a parent-paid program. From August 2014, this program was no longer cost-free, but pre paid by parents only (with a small amount subsidized by the Norwegian government) and offered in 1st to 10th grade (Oppllysningskontoret for frukt og grønt, n.d). In addition to the school fruit program, school milk program exists. Each school decides whether they want to take part in the two programs (Dahl & Jensberg, 2011).

1.1 Aims and Research question

The School Meal Project was developed based on the assumption that a healthy free school meal may influence children to eat at school (and not skip lunch) – and to eat a meal rich in healthy nutrients and thereby contribute to healthy eating habits – which in turn may contribute to prevention of overweight and obesity. The overall purpose of The School Meal Project was to evaluate the effect of a free healthy school meal every day for one year on meal pattern, the learning environment, motivation for learning, and weight status among children ten to twelve years.

In this study, the aim was to investigate the possible effects of serving a free school meal may have on a healthy school lunch, by exploring if a free school meal could effect meal pattern at school compared to the previous school meal habits. The research question was phrased

Does serving of a free school meal every day lead to a healthier diet at school?

A healthy diet was measured on thirteen food items by a healthy food score (HFS). A healthier diet was seen if the participating children had a higher score (ranging from zero through thirteen) at follow-up 1 compared to baseline.

2.0 Introduction and theory

Norwegian children are enrolled in school at the age of six until fifteen- sixteen years of age (grade 1st-10th). Most adolescents also attend upper secondary school (year 11th and 13th) until they are eighteen-nineteen years old. About 615 000 children were registered in junior school and middle school in the school-year of 2012-2013 (Folkehelseinstituttet, 2015). This present study included children aged ten to twelve years, which constitutes an interesting age group because it is in a time where children can develop more behavioural autonomy and with that the possibility to make negative health behaviour changes (Brug et al., 2012; Lien et al., 2014).

Public health, which revolves around promoting health and wellbeing and preventive health work, should receive focus in school since children are spending a lot of their time in school. Further, because learning healthy behaviours such as eating a healthy diet throughout the life have been suggested as important steps in reducing lifestyle diseases in adulthood (WHO, 2015). Because of the great number of children enrolled in the school system, it means that intervention-based research can reach large populations with both genders and all groups of social economic position (Bere, 2004a). A review by De Bourdeaudhuij et al. (2011) suggested that combining educational components with physical activity and restricted availability and accessibility of unhealthy foods, and improved availability and accessibility of healthy foods, might give effects on reducing obesity in children (De Bourdeaudhuij et al., 2011). Another review found that school based activities can be effective in affecting a positive behaviour change (e.g. healthy eating, more physical activity) among children (Jepson, Harris, Platt, & Tannahill, 2010). Taylor, Evers, and McKenna (2005) also pointed out in a review that the school environment is an important area to influence children's eating behaviour in a healthier way. This influence could be done through increased availability of healthy foods, nutritional policies, improved school nutrition and health curricula, and peer and teacher modelling (Taylor et al., 2005).

2.1 Norwegian diet recommendations

There are no specific national diet recommendations for children in Norway. The general diet recommendations are formed by the Norwegian Directorate of Health, and apply for adults and children from two years of age (Helsedirektoratet, 2014a). Dietary fat should be between 25-40%

of the total daily energy intake, with saturated fat below 10%, protein should be between 10-20% of the total daily energy intake and carbohydrates should be around 45-60% of the total daily energy intake, with added sugar below 10% (Helsedirektoratet, 2014a). The Norwegian Directorate of Health elaborated dietary guidelines based on the national diet recommendations in 2015. The guidelines consists of the following 11 specific dietary advice; one should (1) have a varied diet with vegetables, fruits and berries, whole grain products and fish, and limit the amount of processed meat, red meat, salt and sugar, (2) have a good balance between energy ingested through foods and beverages, and energy used through activity, (3) consume at least five portions vegetables, fruits and berries each day, (4) consume whole grain products every day, (5) eat fish for dinner two-three times per week, include also fish as spread, (6) choose lean meat and meat products, limit the amount of processed meat and red meat, (7) include low-fat dairy products as a part of the daily diet, (8) choose edible oils and soft margarine rather than butter (9) choose food products with limited amount of salt and limit the use of salt in daily cooking, (10) avoid foods and beverages with added sugar, and (11) choose water as a thirst-quencher (Helsedirektoratet, 2015).

2.2 Facilitators and barriers to a healthy meal pattern

Several studies have investigated facilitators and barriers to a healthy meal pattern in children and adolescents, and the underlying factors to why they eat what they eat (Moore, Robinson, Rachel, & Boss, 2014; Scaglioni, Arrizza, Vecchi, & Tedeschi, 2011; Shepherd et al., 2006; Stevenson, Doherty, Barnett, Muldoon, & Trew, 2007; Taylor et al., 2005). Foods available at home and at school, and influences from mass media have been identified as important in affecting healthy eating in children and youth in a review (Taylor et al., 2005). Taylor et al. (2005) reported that food marketing, particularly television (TV) was important in influencing children's dietary intake. The food industry and food marketing is important because food marketing have the possibility to shape definitions in terms of what is acceptable and desirable to eat (Harris, Pomeranz, Lobstein, & Brownell, 2009). Harris et al. (2009) suggested that food marketing is a contributing factor to a high consumption of unhealthy foods and an inactive lifestyle among children. Further, Taylor et al. (2005) reported that food marketing through TV is special concern since children and youth tend to request and consume products they have seen on the TV. Other concerns are that food marketing though TV can lead to confusions, since they rarely contain

healthy foods and since marketing often are persuasive and misleading, with incomplete disclosures (Taylor et al., 2005). Taylor et al. (2005) also found that availability, especially of fruit- and vegetables (FV) in the home, were associated with children's intake of FV. The availability of healthy foods as facilitator to healthy eating is supported in a study by Moore et al. (2014) who found that access to healthy food was important in influencing children's healthy diet. The availability of healthy food at school was also important in a review on young people (Shepherd et al., 2006). Shepherd et al. (2006) found that young people's own views on unhealthy eating included that fast-foods and other fatty foods were related to health disadvantages, such as weight gain and facial appearance (pimples).

There have also been reported some barriers to healthy eating among children. Food preferences, such as disliking vegetables and taste preference for fast food seemed to be important for children's eating behaviour (Taylor et al., 2005). Taste preference for fast food and disliking vegetables as barriers to healthy eating have also been supported in a qualitative study by Stevenson et al. (2007) using focus groups, in a review by Shepherd et al. (2006) and in a review by Scaglioni et al. (2011). Stevenson et al. (2007) reported that foods perceived as healthy by adolescents, such as vegetables, was disliked due to bland or unpleasant taste. Shepherd et al. (2006) found that personal preferences for fast foods was seen as barriers to healthy eating. In addition, Scaglioni et al. (2011) reported that children tend to prefer fatty and sweet food, and suggested in their review that children have innate predispositions towards tastes.

Personal preferences are, as seen in the studies above (Scaglioni et al., 2011; Shepherd et al., 2006; Stevenson et al., 2007; Taylor et al., 2005), important for children and young people's eating behaviour. On the other hand, it exists some evidence towards that taste preferences can change over time. An important finding in the review conducted by Scaglioni et al. (2011) was that the dislike for foods could be altered and/or reversed with a combination of taste exposure and family modelling.

2.3 Meal pattern in children

Moving over from childhood to young adulthood, children tend to skip regular meals (Stea et al., 2014; Würbach et al., 2009; Øvrebø, 2011). A cross-sectional study conducted among German children reported that number of meals every day was higher among children compared to

adolescents (Würbach et al., 2009). Würbach et al. (2009) found that approximately 25% of the eight year old children ate five meals per day, compared to 4% of the fourteen year old adolescents. For school meal participation, it was reported that children ate school meal more often than adolescents, with 22% of the eight year olds and 5% of the fourteen year olds ate school meal every day (Würbach et al., 2009). Studies conducted in Norway shows some inconsistencies concerning children's and adolescents meal pattern. A study conducted by Øverby, Stea, Vik, Klepp, and Bere (2011) compared Norwegian children's meal pattern from two cross-sectional studies, one from 2001 and one from 2008. The study found no changes in meal pattern during the two time points, where 95% of the children in 6th and 7th grade reported to eat lunch, 90% reported to eat breakfast, 94% had dinner and 82% had supper (Øverby et al., 2011). Further, Øverby et al. (2011) also found that those who ate four meals had a lower intake of unhealthy snacks compared to the children eating less than four meals. However, the study only asked for what the children ate the previous day (Øverby et al., 2011). Vik et al. (2010) reported in a cross sectional study that 9th and 10th graders in total ate 3.27 meals per day, where 49% ate four meals per day. Another cross sectional study by Vik et al. (2013) among children aged 11.5 years in eight European countries (including Norway) reported that 85% of the children ate breakfast, 96% ate lunch and 93% ate dinner. Ask, Hernes, Aarek, Johannessen, and Haugen (2006) reported that that every-day lunch consumption varied from 52% to 86%, and breakfast consumption varied from 43-54% in a sample of fifty-four fifteen year old Norwegian adolescents. Øvrebø (2011) investigated food habits from thirteen years of age to fifteen years of age on children in the North of Norway, and found that the frequency of consuming breakfast, lunch and dinner decreased during the two-year period. The cohort study reported that 59% consumed lunch five days per week in the age of thirteen, while only 40% consumed lunch when reaching fifteen years of age (Øvrebø, 2011). A different cohort study conducted by Stea et al. (2014) following children in Norway from 4th to 7th grade found that intake of regular four main meals every day decreased, where 47% consumed four meals in 4th grade, whilst there in 7th grade were 38% eating four meals (Stea et al., 2014). The decrease in intake of four meals on a daily basis were significant concerning regular lunch meals (with a decrease from 81% in 4th grade to 75% in 7th grade), and evening meals (with a decrease from 67% in 4th grade to 53% in 7th grade) (Stea et al., 2014).

As these studies report, intake of regular meals varies during late childhood / early adolescence, specifically with reported lunch intake varying from 96% eating lunch every day to 40% eating lunch every day (Ask et al., 2006; Stea et al., 2014; Vik et al., 2013; Øverby et al., 2011; Øvrebø, 2011). Also, frequency of meals tend to decrease with increased age (Stea et al., 2014; Würbach et al., 2009; Øvrebø, 2011).

“Ungkost”, a nation-wide dietary survey with data from the year 2000 among 4th and 8th graders in Norway (Andersen & Øverby, 2002) are referred to in the following paragraph. This due to lack of recent studies that addresses the Norwegian children’s diet down to specific foods.

“Ungkost” is the largest study investigating specific food items among children in 4th and 8th grade in Norway (Andersen & Øverby, 2002). The study found that children in 4th grade had a relative healthier dietary profile then the adolescents in 8th grade (Andersen & Øverby, 2002). For bread, the children in 4th grade ate 30% white bread, 30% whole-grain bread and 40% mixed flour bread. The children in 8th grade ate approximately one third from each of these bread groups (Andersen & Øverby, 2002). For FV, the average intake on a daily basis among 4th graders was 250g and 255g for 8th graders. Andersen and Øverby (2002) reported at the children in general they drank mostly fat reduced milk, but whole-fat milk was more common than skimmed milk. The “Ungkost” study also showed that meat spread was more common than fish spread, and in general meat was more common than poultry in both 4th and 8th grade (Andersen & Øverby, 2002).

In addition, Andersen and Øverby (2002) found that adolescents in 8th grade had more sugar in their diet compared to 4th grade. On average, children in 4th grade ate 30g sweets and consumed 300g sugary beverages every day. Boys in 8th grade consumed about 500g sugary beverages every day and ate about 40g sweets, and the girls had a lower consumption of sugary beverages than the boys did but they ate more sweets (approximately 45g) (Andersen & Øverby, 2002). That children increases their intake of products with added sugar with increased age, is consistent with findings in the study among adolescents in the North of Norway conducted by Øvrebø (2011). Children reported an increase in intake of chocolate, snacks and fast food from thirteen to fifteen years of age (Øvrebø, 2011).

For combined food groups, Andersen and Øverby (2002) found that sugar intake was above the national diet recommendations. As much as 84-90% of the children had more than the

recommended 10% of the energy from added sugar (Andersen & Øverby, 2002). In “Ungkost”, they also found an association with high sugar intake and less intake of all nutrients, except vitamin C in 4th graders, and that children with high sugar intake in general had a low intake of FV (Øverby, Lillegaard, Johansson, & Andersen, 2004). Further, the “Ungkost” study found that more than 56-63% of the children had more than 30% of their total energy intake from fat, with an average intake of saturated fat on 13% (Andersen & Øverby, 2002). For FV, the mean intake was 250 g per day, with 6% of the children in 4th grade and 10% of the children in 8th grade eating more than the recommended five portions FV per day (Andersen, Øverby, & Lillegaard, 2004). To sum this up, children in Norway tend to have too much fat and sugar in their diet in general (Andersen & Øverby, 2002; Øverby et al., 2004).

FV intake represents food groups that have been investigated in more recent studies among Norwegian children (Bere, Hilsen, & Klepp, 2010; Vik et al., 2010; Øvrebø, 2011) compared to research on intake of other specific food items. Bere et al. (2010) reported that the average FV intake in a sample of children aged ten to twelve years was 3.07 portions FV per day in 2008 when investigating effects of the national free school fruit scheme. However, average FV intake were based on children in schools that were included in the free fruit scheme, children in a fruit subscription program and children at schools with no FV program (Bere et al., 2010). The increase of FV intake was for fruit mainly (Bere et al., 2010). A cross sectional study conducted by Vik et al. (2010) reported that children in 9th and 10th grade had a total FV intake on 13.5 portions per week, and that the intake increased with increased number of meals. Øvrebø (2011) reported in a cohort study that 20% of the boys and 24% of the girls in 8th grade ate vegetables every day, for fruit the number was respectably 28% and 38%.

2.3.2 Effects of free school meal on children’s meal pattern in Norway

Few intervention studies have investigated the effects of serving of a free school meal in primary school in Norway. Two studies are mentioned here; one with breakfast served at school and one with a served school meal (Ask et al., 2006; Ask et al., 2010), both conducted during four months. The breakfast study included low-fat milk, orange juice, whole-grain bread, fish spread, meat spread, cheese and fruits, served to fifteen year olds (Ask et al., 2006). Ask et al. (2006) reported that breakfast consumption increased for the intervention group, from 54% eating breakfast every day before intervention to almost all eating breakfast during the intervention

period. Intake of breakfast every day went back to as it was before when investigating breakfast habits one week after the intervention period. Further, Ask et al. (2006) reported that boys in the intervention group had a healthier dietary intake compared to both girls and boys in the control group and girls in the intervention group at the end of the intervention. The other intervention study with a served school meal consisted of whole-grain bread, different kinds of cheese, fish spread, lean meat spread, jam, low-fat milk, and FV served to fourteen year old adolescents (Ask et al., 2010). The study reported that the serving of a healthy school meal did not improve the children's intake of FV, low-fat milk or whole-grain bread. Further, there was not found an association with serving of a healthy free lunch meal and reduced intake of unhealthy snacks and/or sugar-sweetened beverages (Ask et al., 2010).

The effects of the Norwegian school fruit scheme has also been investigated (Bere et al., 2010; Bere, Veierød, Skare, & Klepp, 2007). Intake of fruit all day increased from 2.45 to 3.07 portions per day and intake of fruit at school increased from 0.36 to 0.71 portions per school day (Bere et al., 2010). In addition to leading to an increase in FV consumption, there was also reported a relation with receiving a free piece of fruit or vegetable every school day and reduced frequency of unhealthy snack consumption (Øverby, Klepp, & Bere, 2012). For unhealthy snack consumption (mainly soda, candy and crisps), there was found a decrease from 6.9 to 4.6 times per week (Øverby et al., 2012).

2.3.3 Meal pattern and overweight among children

As mentioned earlier (paragraph 1.1.), concerns with not having a national arrangement for school meal was that children' might skip the lunch meal, and that children' might attend in the school without healthy food. Skipping meals may lead to increased risk for overweight and/or obesity (Franko et al., 2008; Koletzko & Toschke, 2010; Mota et al., 2008; Stea et al., 2014; Toschke et al., 2005; Toschke et al., 2009; Vik et al., 2013; Vik et al., 2010; Würbach et al., 2009).

A review on meal pattern and body weight in children reported that an increased number of meals was associated with reduced risk for overweight and obesity (Koletzko & Toschke, 2010). In the review, the authors concluded that eating five meals was the most ideal amount of meals per day to prevent overweight and obesity (Koletzko & Toschke, 2010). Consistent with findings from

Koletzko and Toschke (2010), several studies indicate that increased number of meals per day can reduce the risk for overweight and obesity (Franko et al., 2008; Mota et al., 2008; Stea et al., 2014; Toschke et al., 2005; Toschke et al., 2009; Vik et al., 2013; Vik et al., 2010; Würbach et al., 2009). A cross-sectional study by Toschke et al. (2005) among German children found that the prevalence of overweight and obesity decreased with increased number of meals per day. Further, Toschke et al. (2005) reported that eating four meals or more per day had a reduced risk for overweight compared to the children eating three meals or less. Although, the dietary assessment was based on self-reported data from parents (Toschke et al., 2005). Another cross-sectional study by Toschke et al. (2009) found that the relationship between meal skipping and overweight was not explained by breakfast consumption alone, but the impact on eating regular meals in general. Vik et al. (2013) reported that children aged 11.5 not eating breakfast and dinner had higher odds of being obese compared to the children that consumed breakfast and dinner on a regular basis. The study also found that children eating zero to two meals per day had higher odds of being overweight or obese compared to the children eating three meals per day (Vik et al., 2013). A relation with intake of regular meals and reduced Body Mass Index (BMI) has also been found in a cross-sectional study conducted among German children, but there was also found that parental weight and fathers' educational level was related to weight status (Würbach et al., 2009). A cross-sectional study conducted among Portuguese children found that the proportion overweight and/or obese girls and boys who consumed zero, one or two meals on a regular basis were significantly higher compared to children in the normal range on the BMI scale (Mota et al., 2008). Further, Vik et al. (2010) reported in a cross-sectional study conducted in Norway that overweight was more prevalent among adolescents eating three meals or less on a regularly basis.

A cohort observational study following American female adolescents in ten years reported that black adolescent girls (not white girls) who ate three meals or more on more days had less probability of developing overweight compared to those with an irregular meal pattern with eating less than three meals per day (Franko et al., 2008). Another cohort study by Stea et al. (2014) found that those eating four main meals in 4th grade but not in 7th grade had higher odds of being overweight in 7th grade. The study was however based on parental self-reports of dietary intake among their children (Stea et al., 2014). Oellingrath et al. (2011) reported in a follow-up study among Norwegian children (based on parental reports) that overweight children in 4th

grade had a lower risk of remaining overweight in 7th grade if they had a diet close to the national dietary guidelines compared to overweight children who did not follow these guidelines. In addition, overweight children in 7th grade had a more irregular breakfast consumption and lower intake of vegetables compared with normal weight children in 7th grade (Oellingrath et al., 2011). A few intervention studies have also investigated the effects on meals on weight status. When investigating effects of serving a free school breakfast during a 4-month period among 10th graders, Ask et al. (2006) reported a significant increase in the BMI of the boys in control- and intervention group and girls in the control group was found, but there was no significantly change in BMI in the intervention group. Additionally, the boys in the intervention group had a healthier diet quality in their breakfast compared to the control group as a result of the intervention (Ask et al., 2006). These findings, with the participants in the intervention group not increasing their BMI significantly during the intervention, are consistent with findings from the other 4-month meal-serving intervention study conducted by Ask et al. (2010). BMI increased significantly among girls and boys among the control group and boys in the intervention group, but there were no significantly BMI increases among girls in the intervention group (Ask et al., 2010). Although these studies have some methodological weaknesses with investigating effects for a short period and using a small sample, it is noteworthy that both studies found tendencies for restricted weight gain during the intervention period. It has also been reported that consuming an extra piece of fruit or vegetable every school day could prevent future excessive weight gain, however, weight was measured with self-reported data (Bere, Klepp, & Øverby, 2014).

2.4 The School Meal

The school meal is a lunch meal where school children bring packed lunches to school, or the school provides a meal (Andresen & Elvbakken, 2007; Dahl & Jensberg, 2011). These meals provided at school could be cold (typically sandwiches), warm, or a combination of cold and warm meals (Andresen & Elvbakken, 2007; Dahl & Jensberg, 2011; Haugset & Nossun, 2012; Sandvik, 2015). As far as published scientific documentation goes, the school meal in Norway traces back to the 1890s. Andresen and Elvbakken (2007) reported that the Norwegian authorities' introduced a free warm school meal, inspired by the British school meal. However, the goal was not to in the first place enhance learning and prevent hunger as for Britain, but rather teaching children to have a meal pattern according to latest nutritional recommendations

(Andresen & Elvbakken, 2007). As the years went by, nutritionists, with Dr. Carl Schøitz, the director of school medical services in Oslo became aware of the poor nutritional compositions of the warm school meal. Andresen and Elvbakken (2007) reported that the “Oslo breakfast” was introduced in the early 1930s, a breakfast focusing on increasing children’s wellbeing, health and development in general. The breakfast included crisp bread, margarine, cheese or sausage, FV and milk. After the World War II, the welfare state grew and the school meal arrangement withdrew (Andresen & Elvbakken, 2007). Parents and the home environment was from then responsible for preparing meals and teaching healthy eating habits to the children (Andresen & Elvbakken, 2007). The home environment with parents as responsible for preparing lunch meals are maintained in today’s Norwegian society (Andresen & Elvbakken, 2007; Kainulainen et al., 2012). School meals together with guidelines for the school meals in the Nordic countries are practiced differently (Dahl & Jensberg, 2011). In Sweden and Finland, children are served a free warm lunch meal at school every day (Dahl & Jensberg, 2011). It exists clear guidelines for the meals, and the guidelines are enshrined in law in Sweden and Finland.

Neither a free warm meal, nor a free cold meal are per today common among Danish and Norwegian children in primary school, although both Norway and Denmark have parent-paid programs for servings of FV and milk (Dahl & Jensberg, 2011). Some schools in Norway have local arrangements for the school meal, but these arrangements are not scientific grounded nor published in scientific journals. Evaluation only exists in reports and presentations on Norwegian language. Haugset and Nossun (2012) and Sandvik (2015) presented evaluation of two different school meal arrangements in Norway. First, Haugset and Nossun (2012) mapped school meals in Nord-Trøndelag county in Norway. They reported that 16 schools had an arrangement for school meal (breakfast and/or lunch), either organized and paid by the school (five schools), organized by the school and paid by the parents (six schools) or organized by the school and paid by the school and parents (five schools) (Haugset & Nossun, 2012). The schools lunch consisted of sandwiches, sandwiches and a variety of warm lunch (soup, stew) or warm lunch only. Haugset and Nossun (2012) found that perceived impacts of the meals, as reported by school leaders and county council, were improved social environment, better learning environment with improved concentration among children, and ensuring that all children ate at least one healthy meal throughout the day. Challenges related to organizing a school meal included poor economy, available staff that could organize the meal, and physical facilities that could make food

preparation and dining possible (Haugset & Nossun, 2012). Vinje municipality in Telemark county has since 2007 served a free school meal with sandwiches to all school children, with local project funding (and funding from a national project) from the municipality (Sandvik, 2015). A presentation at a public health conference in Norway in 2014 reported that the perceived impact of the meals were the same as in Nord-Trøndelag county, with improved eating habits and a better social- and learning environment. The facilities for dining and food preparation was improved by funding from the municipality, but challenges still exists concerning the economy: the finances are limited in relation to food prices (Sandvik, 2015).

2.5.1. Recommendations for the Norwegian school meal

As part of the national public health work, the Norwegian Directorate of Health has introduced specific guidelines for the school meals, called “The Norwegian Guidelines for school meals” (Helsedirektoratet, 2011). The guidelines are grounded in The Norwegian Education Act, which states that all children in their school environment have the right to good a physical and psychosocial environment that promotes health, wellbeing and learning. The recommendations are phrased as follows: All schools should offer the children at least 20 minutes lunch breaks, supervision by teacher (for elementary schools mainly), servings of FV, low fat or skimmed milk, sandwiches for those without packed lunches, access to cold drinking water, a pleasant eating environment and meals every three to four hours. Schools should not be offering soda, juice, chips, candy or other unhealthy sweets and pastries (Helsedirektoratet, 2011). Compared with the other Nordic countries, the Norwegian guidelines for school meals are together with the Danish nutritional guidelines, the least comprehensive guidelines for meals in schools and kindergartens (Dahl & Jensberg, 2011).

3.0 Methods and study sample

3.1 Content of The School Meal intervention

Each child in 6th grade at Birkeland elementary school was served a free school meal (cold meal) for one school year. The school meal was based on current national dietary guidelines in Norway, and consisted of whole-grain bread, spreads and FV. There was no serving of food products high in sugar or saturated fat, e.g. white bread or chocolate spread, see appendix for a list of all foods included and excluded in the serving (in Norwegian language). The bread consisted of at least 50% whole-grain. Spreads included in the serving was a variety of fish spread (mainly mackerel and salmon), cheese, ham and other meat spreads, liver paste, eggs, caviar and butter. Vegetables served at the side included salad, tomatoes and cucumber. The served school meal also included an additional piece of fruit or vegetable e.g. apples and/or carrots. Berries and yoghurt without added sugar were served occasionally. There was no serving of beverages with the meal, but the children could subscribe to school milk plan. Children not drinking milk were encouraged to drink water.

3.2. Study design

The School Meal intervention has a quantitative quasi-experimental design with one intervention group and one control group. A quasi experimental design lacks randomization, and are often inferior in terms of internal validity compared to randomized experiments (Trochim, 2006). However, as Trochim (2006) suggested, quasi-experimental designs often appear to be easier to implement, and have been implemented more frequently than randomized designs.

A convenience sample was chosen for the present intervention. Children aged ten to twelve years from Birkeland elementary school (5th – 7th grade) and Froland elementary school (6th grade) was invited to participate, together with one of every child's parent. Birkeland elementary school was chosen based on convenience, since a local cook was preparing and serving the school meal every day. Froland elementary school was chosen as part of the control group after an investigation of comparable schools in the area of Vest- and Aust-Agder counties in the south of Norway. The intervention group included 6th grade at Birkeland elementary school. The control

group included 5th and 7th grade at Birkeland elementary school and 6th grade at Froland elementary school. This was chosen in order to have a similar age group in the intervention group and the control group. Birkeland elementary school, represented with their headmaster, agreed to participate in the project in the late summer of 2013. Froland elementary school received information about the project through mail contact with their headmaster, and officially joined the project in May 2014. Participating parents were invited to join the project together with their children on parent meetings in June (5th and 6th grade at Birkeland elementary school), August (7th grade at Birkeland elementary school) and at the start of September (6th grade at Froland elementary school), where project workers and project leader explained the nature and purpose of the intervention. Parental active consent was gathered in both intervention and control group at the parent meetings and in the classroom before collection of baseline data. Written information about the project and consent information (see appendix 2 and 3) were also given to parents not present at the parent meetings. Data from participating children and one parent was coded (with numbers) based on a list of names received from the teacher. This was done to match baseline with the follow-up data (follow-up 1 and 2) and to match children with their parent. Data were collected at two time points in the main project; baseline data was conducted from August 20th to September 15th 2014, follow-up 1 was conducted from 26th to 29th of January. A third data collection, follow-up 2, are planned in June 2015.

Data collection consisted of the participating children and one parent/caretaker answered one questionnaire each, and children's height, weight and waist circumference were measured. The child questionnaire was completed within one school lesson (approximately 45 minutes). Participating children answered the questionnaire in the classroom, each time with the presence of a trained project worker (same project worker every time). First, all the participating children was given a brief introduction to the project and practical information on completing the questionnaire. Then they got information about bringing home a questionnaire to be completed by one parent. After this, the children answered the questionnaire in their own pace. The children were measured individually in a small room close to their classroom, and the same project worker measured them every time. They were weighed in light clothing (jeans and t-shirt/top) backwards on the weight to ensure that they did not see their own body-weight. The parent questionnaire was returned in a closed envelope to the child's teacher, and either gathered by project workers or sent from the participating school to the University of Agder.

Registered sponsors of the project were Trude Karlsen (local cook), Kiwi Birkeland, Bakers Lillesand, Birkenes Women's Public Healthcare Association and Aust-Agder county council. After four months of meal servings, the total cost of the meals was approximately 12 Norwegian kroners (NOK) per child per day. Bread is not included in this calculation, due to sponsored bread delivery.

Three master students from The University of Agder are conducting three different studies within The School Meal Project. This master thesis focuses on the school meal; the two other studies addresses social- and learning environment and effects of the school meal on weight status. This study includes data from baseline and follow-up 1, and the following paragraphs focuses mainly on the participating children and the children's questionnaires.

3.3 Ethical approval

Norwegian Social Science Data Services (NSD) approved the study 6th of June 2014 (project number 38980, appendix 1). Approval from the Ethical committee of Faculty of Health and Sport Sciences at the University of Agder, Norway, was received June 6th 2014. The study did not need approval from the Regional Committees for Medical and Health Research Ethics, since the project did not apply for the Health Research Act in Norway. Only children with active consent from parents were included in the study. See paragraph 5.3 on ethical considerations within the present study.

3.4 Study sample

In total, 219 children were invited to participate in the study. The project received 168 active consents. At baseline, four children did not want to participate in the project, and thus withdrew from the project. This resulted in 164 participating children at baseline and a participation rate at baseline of 75%. The study had one intervention group (N=55), and one control group (N=109). This resulted in a participation rate of 96% among the intervention group and a participation rate of 67% among the control group at baseline. Table 1 shows percentage distribution of participating children within the intervention- and the control group.

Table 1: Frequency table showing distribution of the study sample within the control group and the intervention group at baseline (N and percent of total sample).

Control		Intervention	
5th grade	39(24 %)		
6th grade	34(22 %)		
7th grade	36(21 %)	6th grade	55(34 %)

In total, 159 children participated at follow-up 1. Two children moved to another city and one child withdrew. All three belonged in the intervention group. The remaining two that withdrew in the control group were absent during data-collection for Follow-up 1, and did not return the questionnaire to their school. Figure 1 shows distribution of the study sample at baseline and at follow-up 1.

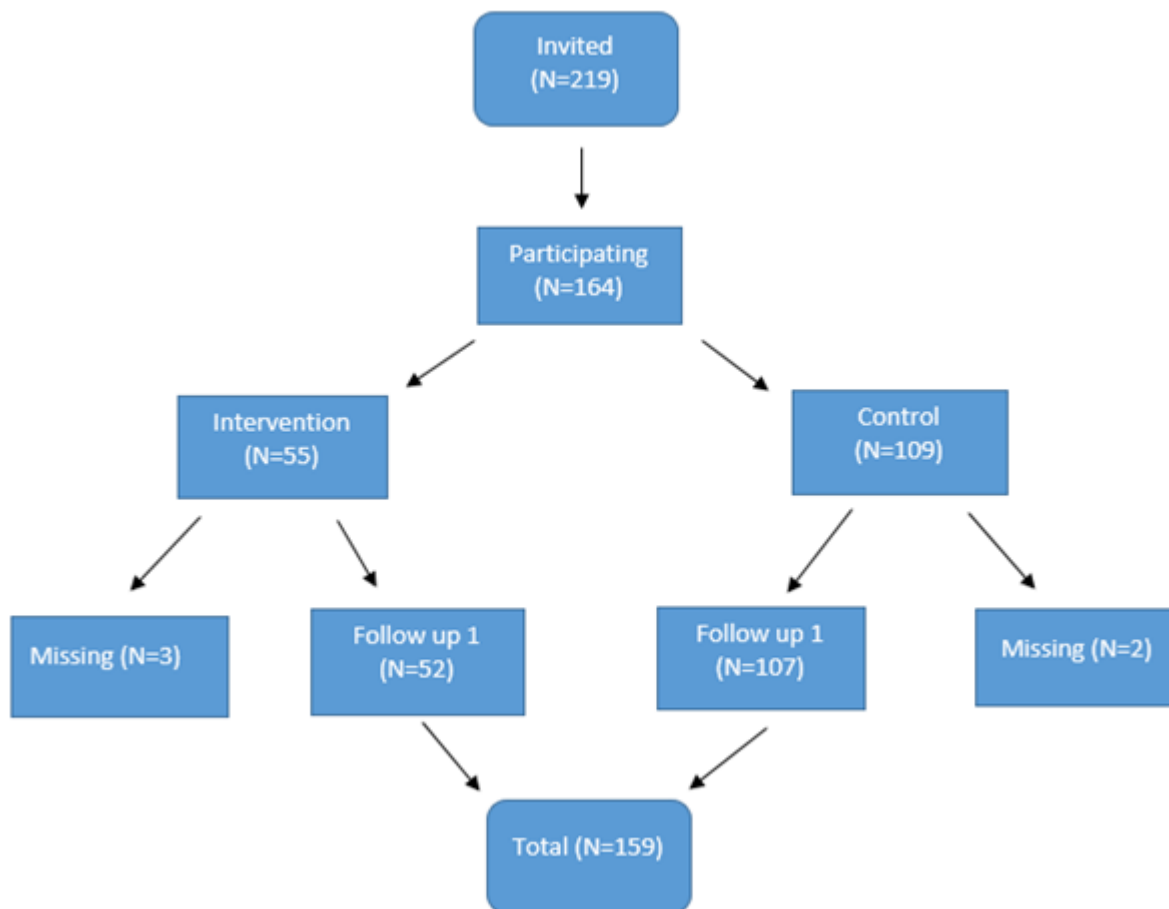


Figure 1. Flow chart showing study sample at baseline and follow-up 1.

3.5. Instruments and measures

3.5.1 Child- and parent questionnaire

Child- and parent questionnaires used in The School Meal Project was developed based on “Fruit and vegetables make the marks project” (Bere, 2004b), child- and parent- questionnaires used in the ENERGY project (Singh et al., 2012; Singh et al., 2011), questions used in “School Achievement Study” (Øverby & Høigaard, 2012) and the questionnaire used in “Ungkost 2000”, a nation-wide dietary survey in Norway among 4th and 8th graders (Andersen & Øverby, 2002). The child questionnaire was designed to measure overall meal pattern, packed school meals, snacking habits, learning environment and physical activity (PA). The children were encouraged to think back on their usual habits the last two weeks when filling out the questionnaire. See appendix for complete questionnaires (in Norwegian language). Prior to the intervention, the child- and parent questionnaires were tested for feasibility among six children and six parents.

The child questionnaire was nine pages long (ten for the intervention group at follow-up 1) and in five parts (A-E/F), also including an introduction part that addressed demographic variables. Each of the five (six) parts addressed a specific topic. Part A was about meal pattern in general, part B about frequency of consuming specific food items, part C about the school meal, part D about learning environment and part E about after-school activities. The questionnaire included an extra part at follow-up 1 (part F) for the intervention group, this part included questions about experiences from the served school meal. The parent questionnaire was divided in three parts, part A-C, with an introduction part addressing demographic variables. As for the child questionnaire, the parent questionnaire included an extra part at follow-up 1 (part D) for the intervention group. The parent questionnaire was designed to measure socio-demographic variables, meal pattern and PA level, together with experiences from the served school meal for the intervention group.

Part C in the child questionnaire was designed as a food frequency questionnaire (FFQ) and consisted of four categories organized in a matrix: Frequency of consuming specific bread related products, spreads, fruits, vegetables, yoghurt, berries, nuts (and almonds) and beverages together with the school meal. Each question had six equal alternative responses: “Never”, “Once a week”, “Twice a week”, “Three times per week”, “Four times per week” and “Every day”. The

children could only mark for one alternative. See paragraph 3.5.2 and 3.5.3 for specific questions assessed in this study.

3.5.2. Healthy food score

To evaluate the effects of the intervention on the school meal in relation to the research question, a HFS based on thirteen selected food items was developed. Questions assessed and dichotomized in the HFS included questions from several of the different categories in part C in the child questionnaire. From the category bread products, whole-grain bread, crackers, noodles, pancakes and buns, waffles, and muffins were included. Spreads dichotomized in the HFS included questions on frequency of consuming chocolate spread, fish spread and jam. In addition, the HFS included questions on frequency of consuming fruits, vegetables, berries, yoghurt, and nuts/almonds.

Table 2 illustrates the cut-off points for each of the food items in the HFS. Scores in each question concerning the respective food item were dichotomized into two categories; healthy (one) and unhealthy (zero). For example participating children consuming no unhealthy foods, e.g. chocolate spread, would score one. Nevertheless, if the child consumed chocolate spread once a week or more, the score would be zero. Similarly, children reporting to eat whole-grain bread four or five times per week would score one, but if they consumed less than this per week they would score zero.

To evaluate effect on the school meal intervention on the total food intake concerning the thirteen food items, three food score variables were made: one total food score for baseline, one total food score for follow-up 1, and one change variable which measured change in the total food score at follow-up 1 (see 3.5.4). The total food score included summed value from all of the thirteen dichotomized variables in the HFS, see table 5 for results. To avoid missing values in the total food scores at baseline and at follow-up 1, missing sub-values in the thirteen food items were set to the value of 0.5. Change in the total food score (Change SUM-score) was combined through subtracting the value in the total food score from follow-up 1 with the value in the total food score from baseline. In addition, change variables for each of the thirteen food items were made to evaluate effect of the school meal intervention on change in the specific food items. Change variables for each food item was combined through subtracting the value in each food item in the

HFS at follow-up 1 with the value in each food item in the HFS at baseline. This subtraction of the two dichotomized scores gave three possible values for the change variables. If the child did not change their intake of the respective food item at follow-up 1 compared to baseline, the score would be zero (0-0 = 0, 1-1 = 0). To have a positive change in eating behaviour (eat more healthy foods) the child would score one at follow-up 1 and zero at baseline (unhealthy eating behaviour at baseline), and thus the value of the change variable would be one (1-0 = 1). The third possibility for the change variable was the value of negative one (0-1 = -1), which means that the child had a more unhealthy eating behaviour (ate more unhealthy foods) at follow-up 1 compared to baseline. Each score from follow-up 1 was subtracted with the score from baseline to describe change in percentage points (see table 7).

Table 2: Cut-off values for healthy and unhealthy categories given to intake of 13 food items

Food item	Score 1 ("Healthy")	Score 0 ("Unhealthy")
	Times per week	Times per week
Whole-grain bread	≥4	≥3
White bread	0	≥1
Crackers	0	≥1
Noodles	0	≥1
Pancakes	0	≥1
Buns, waffles, muffins	0	≥1
Chocolate spread	0	≥1
Fish spread	≥1	0
Jam	0	≥1
Fruits	≥4	≥3
Berries	≥1	0
Vegetables	≥4	≥3
Nuts/almonds	≥1	0

0 = never, 5= every school day. Whole-grain bread included whole-grain bread rolls, white bread included white bread rolls

Selection of food items in the HFS depended on whether the children was served the food, whether the food was regularly eaten or not at baseline and whether a possible change in consume was interesting enough. The included food items in the HFS were whole-grain bread (and bread rolls), white bread (and bread rolls), crackers, noodles, pancakes, buns, waffles and muffins, chocolate spread, fish spread, jam, fruit, vegetable, berries and nuts. Whole-grain bread was selected because of the aim to have children eat more whole-grain products. Fish spread,

fruit, vegetables, berries and nuts (including almonds), were also selected because it was desirable to see an increase in the intake of all of these food items. White bread products, crackers, noodles, pancakes, buns, waffles and muffins and jam was selected because of the aim to get the children to reduce their daily intake of these products. None of these products were included in the served school meal. Excluded food items in the HFS included crisp bread, potato-cakes and wraps, pasta, yoghurt, peanut-butter, mayonnaise-based salad spreads, liver paste, meat spread, caviar, mayonnaise, egg, cheese and cream cheese, brown cheese and butter. Crisp bread, potato-cakes, wraps, pasta, which were rarely eaten (with over 70% reported to never eat these food items with the school meal at baseline), and did not include in the served school meal. Hence, these products were excluded in the HFS. Yoghurt was also excluded because the participating children rarely consumed this; 80% reported to never or once a week eat yoghurt with the school meal. Peanut-butter and mayonnaise based salad spreads were excluded because they were rarely eaten at baseline and were not included in the served school meal (92 % reported to never eat peanut-butter and 83% reported to never eat mayonnaise based salad spread with their school meal at baseline). Liver paste, meat spread, egg, cheese and cream cheese, brown cheese, caviar, mayonnaise and butter was not included because the cut-off points between healthy and unhealthy were more indistinct compared to the included food items.

3.5.3 Re-categorized variables

Gender, age, socioeconomic status (SES), FV portions per day, intake of school meal and PA level were re-categorized (see table 3) when analysing differences in the data set in the intervention group and in the control group. Data from follow-up 1 was included in table 3 to investigate if the five children lost-to-follow-up had important impacts on the total study sample. Differences within the control group on gender, SES, age and total sum score from baseline was also investigated, see table 4. Data on gender, SES and age was investigated to analyse if the participating children in the three different classes within the control group differed from each other, and thus might influence results of the study. The total sum score between classes in the intervention group was investigated to determine if the classes within the control group was different regarding frequency of consuming healthy and unhealthy products, as set in the HFS.

The proportion children eating school meal every day was assessed through the question “How often do you eat lunch during weekdays?” with the response options “Never”, “Once a week ”,

“Twice a week”, “Three times per week”, “Four times per week” and “Every day” from part A in the child questionnaire. FV intake in total was calculated based on average response options from questions combined as FV as snack and FV with meals. FV with meals were combined based on the following questions in part B: “How often do you eat vegetables with dinner?” and “How often do you eat vegetables with the sandwich?”. FV as snack was combined with “How often do you eat other vegetables (carrots etc.)?”, “How often do you eat apples, carrots, pears and bananas?” and “How often do you eat other fruits and/or berries?”. Each of the questions combined in part B had the following ten response options: “Never”, “Once a week”, “Twice a week”, “Three times per week”, “Four times per week”, “Five times per week”, “Six times per week”, “every day” and “several times every day”.

PA level was assessed through the following question in part E: “How many times per week (outside of school) are you in physical activity; to the extent that you become out of breath and/or sweat?”. The question had seven response options; “Every day”, “Four to six times per week”, “Two to three times per week”, “Once a week”, “Once per month”, “Less than once a month” and “Never”. Scores for PA level were dichotomized into low (physically active once a week or less) and moderate to high (physically active two to three times per week or more). The PA cut-off level was based on the Norwegian Directorate of Health’s national recommendations regarding PA for children aged six-twelve years, which recommends that children should be physically active at least three times per week (Helsedirektoratet, 2014b).

Age was calculated from 1st of September 2014 to assess age at baseline. Data on age only included the participating children at follow-up 1, because question on age was not included in the baseline-questionnaire. The question that assessed age asked for date of birth. Date of birth was then calculated in Microsoft Excel to investigate average age in years.

Part F included questions aimed to address experiences with the school meal. The part included questions on experiences with the school meal, e.g. how often the children ate the free school meal, and if the school meal had led to changes in class and in their meal pattern. SES was the only question in this study that was assessed through the parent questionnaire, and was based on question nine and ten in part C. The questions were phrased “What is your highest level of completed education?” and “What is your partners highest level of completed education?”. The questions had the following response options: “Primary school (elementary school and lower

secondary school)", "Upper secondary school" and "University or college". The question referring to spouses or partners had the additional response option "I do not have a spouse/partner". SES was assessed through combining scores based on the two questions on educational level, the score for parent answering the questionnaire and the score for partner/spouses, in the parent questionnaire. Both scores were dichotomized into low (both parents with low education) and high (at least one parent with high education - bachelor/masters degree or higher), as suggested in a cross-sectional study conducted by Vik et al. (2013).

3.5.4 Statistics

All analyses were conducted in the statistical program IBM SPSS Statistics version 22. Trained project workers plotted the data into SPSS by hand. A test for errors in the data set was conducted with both baseline- and follow-up data, and 10% of all data were double entered. At both baseline and follow-up, 0.3% of the data were corrected. Errors of less than 3% was accepted, as suggested by a previous validation study (Singh et al., 2011). Data cleaning was also performed with descriptive statistical analyses to correct for duplicate records, system-missing values, out-of-range values and logical inconsistencies. A total number of 164 child questionnaire was registered at baseline and 159 child questionnaire was registered at follow-up 1. Guidelines for how data should be registered in SPSS for each possible error associated with completing the questionnaire were developed with the project managers and evaluators at the University of Agder. Frequently repeated errors included that children crossed for more than one alternative, this could be adjacent and non-adjacent alternatives. The most conservative response (furthest away from the "extreme values" every day and never) was registered in all these errors. Other errors were ambiguous symbols in the squares; these cases were registered as missing value. Missing values stayed as missing data.

Continuous variables that were normally distributed were analysed with parametric tests (Independent Samples Test and One-Way ANOVA), which is suggested by Pallant (2005) when one want to make assumptions about the population distribution. Nominal and ordinal scales were analysed with non-parametric tests (Chi-Square), which Pallant (2005) points out is the most ideal technique for analysing these scales since non-parametric tests does not have as strict requirements as parametric tests.

Independent Samples T-Test was used to analyse differences in the study sample concerning FV intake and age. Both age and total FV intake were normally distributed. Pearson Chi-Square Test was used to analyse differences in the study sample concerning gender, SES, PA level and intake of school meal every day. One-way ANOVA was used to analyse differences in gender, SES, age and total food score at baseline within the three classes in the control group.

The variables SES and gender are not continuous, unlike age and total food score. However, linear analyses are approved methods to use as they are defended by Hellevik (2009). Hellevik (2009) suggested that results from linear analyses are nearly identical compared to logistic tests when using binary variables. In addition, there has been suggested that interpretations from linear analyses are more meaningful and easier to comprehend when the goal is to communicate scientific results to a broader audience (Hellevik, 2009).

The variables for the total food score at baseline and at follow-up 1 and change in the total food score were all continuous and normally distributed. An Independent Samples T-Test was used to analyse effects of the school meal serving on the total food score and change in total food score at baseline and at follow-up 1 between intervention and control group and between gender.

All the 13 food items in the HFS were categorical. Difference between intervention and control group at baseline and at follow-up 1 on the 13 food items were analysed with Pearson Chi-Square Test. In addition, Pearson Chi-Square Test was used to analyse changes between intervention- and control group in the thirteen food items separately at follow-up 1 compared to baseline.

4.0 Results

Table 3 shows distribution on gender, SES, FV intake, percentage eating school meal every day and percentage of children physically active at baseline and at follow-up 1. Proportion participating girls (54%) were significantly higher among the control group compared to the intervention group (37%) at follow-up 1 ($p=0.037$). However, it was not seen a significant difference between gender at baseline ($p=0,069$). There was no significant difference concerning age ($p=0.859$) or SES ($p=0.253$) between intervention-and control group at both time-points. Neither FV intake ($p=0.191$), percentage children eating school meal every day ($p=0.675$) nor percentage of children with moderate to high PA level ($p=0.833$) was significantly different between intervention - and control group at both baseline and follow-up 1, see table 3. For FV intake, the children reported an average intake from 3.4 portions per weekday to 3.9 portions per weekday. For school meal, the intake on an average basis varied from 91% to 98% in the total sample, increased with six percentage points in the intervention group and one percentage point in the control group.

Table 3: Independent Samples T-Test on age and FV intake (mean +/- SD). Pearson's Chi Square Test on gender distribution, SES, school meal and PA level.

Variables	Baseline			Follow-up 1		
	Control	Intervention	p-value	Control	Intervention	p-value
% Girls	53 %	38 %	0.069	54 %	37 %	0.037
Age	11.15(0.9)	11.13(0.3)	0.859			
% High SES	63 %	53 %	0.253	65 %	59 %	0.443
FV portions/weekday	3.8(1.9)	3.4(1.9)	0.191	3.9(1.9)	3.8(1.6)	0.740
% School meal every day	93 %	91 %	0.675	94 %	98 %	0.285
% Physically active	71 %	70 %	0.833	71 %	69 %	0.719

For the classes within the control group, there were not found significant differences concerning SES, gender or the total food score at baseline, see table 4. However, a significant difference was seen for age ($p<0.001$) within the different classes in the control group.

Table 4. One-Way ANOVA analysis showing differences on classes in control group at baseline on SES, gender, age and food score at baseline

	5 th	6 th	7 th	p-value
% High SES	66 %	53 %	68 %	0.454
% Girls**	54 %	44 %	62 %	0.354
Age *	10.20(0.3)	11.14(0.3)	12.30(0.3)	<0.001
Food score*	7.40(2.4)	6.57(2.0)	7.36(2.2)	0.200

** Data from follow-up 1 due to significant differences, see table 3

*Mean (+/- SD)

4.1 Results of the HFS

At baseline, children in the control group had a total food score on 7.11, and children in the intervention group had a total food score on 6.44 (see table 5). This switched at follow-up 1, with children in intervention group having total food score on 8.2 and children in the control group with a total food score on 7.66. A significant change ($p=0.008$) in the total food score was seen for the intervention group (1.7) compared to the control group (0.5) at follow-up 1.

Table 5: Independent Samples T-Test on total food score at baseline and follow-up 1, and change in the food score at follow-up 1 (mean +/- SD).

	Intervention	Control	p-value
Total food score baseline	6.44(2.35)	7.11(2.22)	0.077
Total food score follow-up 1	8.20(2.45)	7.66(2.22)	0.168
Change total food score	1.70(2.67)	0.54(2.06)	0.008

Table 6 shows that there were no significant differences between girls and boys on neither total food score at baseline ($p=0.113$), follow-up 1 ($p=0.926$) nor for change in the total food score ($p=0.172$).

Table 6: Independent Samples T-Test on total food scores at baseline and follow-up 1 between gender in the total sample (mean +/- SD).

	Boys	Girls	p-value
Total food score baseline	6.62(2.44)	7.18(2.09)	0.113
Total food score follow-up 1	7.82(2.10)	7.86(2.52)	0.926
Change total food score	1.17(2.56)	0.66(2.07)	0.172

4.1.2 Differences within the specific food items

Table 7 shows differences between intervention- and control group at baseline and at follow-up 1 in the thirteen food items in the HFS and percent change at follow-up 1. At baseline, children in the intervention group ate significantly less jam ($p=0.030$) compared to control group. The intervention group reported to continue eating less jam compared to the control group ($p=0.003$) at follow-up 1. Children in the control group ate significantly more fish spread ($p=0.012$) compared to the intervention group at baseline as table 7 shows. However, this finding was not significant at follow-up 1 ($p=0.573$). The proportion of children in the intervention group eating fish spread once a week or more was 19% in the intervention group and 39% in the control group at baseline. At follow-up 1, the proportion children eating fish spread in the intervention group was 34% and 30% in the control group. There was also found a significant difference between intervention- and control group concerning fruit intake ($p= 0.008$) at baseline. The control group ate more fruit than intervention group at baseline, with 47 % of children in the control group eating fruit four to five times per week compared to 25% among children in the intervention group. At follow-up 1, the intervention group ate significantly more fruit ($p= <0.001$) than the control group. The proportion of children in the intervention group eating fruits four to five times per week was 81% compared to 51% of the children in the control group. For vegetables, there was no significant differences at baseline ($p=0.710$), with 25% of the children in the intervention group and 22% of the children in the control group ate vegetable four to five times per week at baseline. At follow-up 1, the proportion children eating vegetables four to five times per week was significantly different ($p=0.003$) among the intervention- and control group, with 46% of the children in the intervention group and 23% of the children in the control group eating vegetables four to five times per week. There was no significant difference on the remaining nine food items when analysing differences at both time points, see table 7.

Table 7: Pearson Chi-Square Test showing distribution of thirteen food items in the HFS in intervention group and control group (sig. p-value <0,05). The percentage shows percentage healthy (as defined in the HFS) children within the intervention group and the control group.

Food item	Baseline			Follow-up 1			Change (percentage points)	
	Intervention	Control	p-value	Intervention	Control	p-value	Intervention	Control
Whole-grain bread	56 %	60 %	0.688	69 %	61 %	0.331	13 %	1 %
White bread	42 %	47 %	0.499	52 %	59 %	0.458	10 %	12 %
Crackers	73 %	71 %	0.761	76 %	84 %	0.230	3 %	13 %
Noodles	80 %	89 %	0.111	92 %	96 %	0.264	12 %	7 %
Pancakes	72 %	73 %	0.909	82 %	84 %	0.740	10 %	11 %
Buns, waffles, muffin	74 %	79 %	0.478	74 %	86 %	0.072	0 %	7 %
Chocolate spread	59 %	67 %	0.314	76 %	77 %	0.930	17 %	10 %
Fish spread*	19 %	39 %	0.012	34 %	30 %	0.573	15 %	-9 %
Jam* **	56 %	38 %	0.030	78 %	53 %	0.003	22 %	15 %
Fruit* **	26 %	47 %	0.008	81 %	51 %	<0.001	56 %	4 %
Vegetables**	25 %	22 %	0.710	46 %	23 %	0.003	21 %	1 %
Berries	52 %	62 %	0.232	49 %	42 %	0.392	-1 %	-12 %
Nuts and almonds	10 %	21 %	0.080	18 %	22 %	0.537	8 %	1 %

*Significant difference at baseline

**Significant difference at follow-up 1

4.1.3 Change in intake in the HFS

Table 8 shows proportion children that changed their intake concerning the thirteen food items in the HFS at follow-up 1, based on the cut off points in the HFS (see table 2 for cut-off points in the HFS).

Concerning healthy food items, there was a significant change in fish spread, fruit, vegetables and berries from baseline to follow-up 1. For fruit, 60% of the children in the intervention group went from eating fruit less than four times per week (scoring zero) to eating fruit four to five times per week (scoring one) compared to 14% of the children in the control group ($p < 0.001$). Regarding change in vegetable intake, 34% of the children in the intervention group and 10% of the children in the control group went from eating vegetables less than four times per week to eating vegetables four to five times per week ($p = 0.001$). For berries, 20% of the children in the intervention group and 6% of the children in the control group went from never eating berries to eating berries once a week or more ($p = 0.024$). However, 26% of the children in both groups went from eating berries once a week or more to never eating berries at follow-up 1. In total, intake of berries decreased by one percentage point in the intervention group and 12 percentage points in the control group at follow-up 1 (see table 7). Concerning fish intake, 17% of the children in the intervention group and 6% of the children in the control group went from never eating fish spread to eating fish spread to once a week or more ($p = 0.022$).

Concerning buns, waffles and muffins, 20% of the children in the intervention group and 7% of the children in the control group went from never eating buns, waffles and muffins with the school meal to eating buns, waffles and muffins once a week or more with the school meal at follow-up 1 ($p = 0.021$).

Table 8: Pearson Chi-Square Test showing change of consumption in thirteen food items within the intervention group and the control group (sig. p-value <0,05). Value of numbers: -1 proportion children in the unhealthy group that previous was in the healthy group, 0 no change, 1 proportion children in the healthy group that previous was in the unhealthy group

Food item	Intervention			Control			p-value
	-1	0	1	-1	0	1	
Whole-grain bread	10 %	67 %	23 %	14 %	72 %	14 %	0.318
Fish spread*	4 %	80 %	17 %	16 %	78 %	6 %	0.022
Fruits*	6 %	35 %	60 %	10 %	76 %	14 %	<0.001
Berries*	26 %	54 %	20 %	26 %	69 %	6 %	0.024
Vegetables*	10 %	56 %	34 %	7 %	83 %	10 %	0.001
Nuts/almonds	2 %	87 %	11 %	11 %	77 %	11 %	0.156
White bread	11 %	70 %	19 %	11 %	66 %	23 %	0.845
Crackers	11 %	78 %	11 %	10 %	67 %	23 %	0.233
Noodles	2 %	84 %	14 %	3 %	87 %	11 %	0.765
Pancakes	12 %	65 %	22 %	8 %	72 %	21 %	0.627
Buns, waffles, muffins*	20 %	59 %	20 %	7 %	78 %	15 %	0.021
Chocolate spread	4 %	76 %	20 %	6 %	78 %	16 %	0.764
Jam	6 %	65 %	29 %	5 %	75 %	21 %	0.747

* Significant change at follow-up 1

5.0 Discussion

5.1 Discussion of results

This present study evaluated the effect of a free healthy school meal served to children in 6th grade during a six months interval. A free school meal did improve the total food score among children in the intervention group compared to the control group. In addition, children in the intervention group increased their intake of fruits, vegetables and fish spread compared to children in the control group.

An increase in intake of healthy food products followed by a meal serving intervention as seen in this study, are to some extent in contrast with the two other intervention studies with serving of meals conducted in Norway (Ask et al., 2006; Ask et al., 2010). For the breakfast study, Ask et al. (2006) reported a significant increase in healthy eating index for the intervention study with the served breakfast. However, the significant increase in healthy eating was only found among boys in the intervention group (Ask et al., 2006). Findings from this present study showed that there were no differences in terms of the total food score between girls and boys. The intervention-study that included a served school meal did not improve the food score among the intervention group (Ask et al., 2010). However, it is difficult to compare these two studies (Ask et al., 2006; Ask et al., 2010) with this present study mainly due to three reasons. The first is that the two previous intervention studies included analysis of other foods (together with different cut-off values for healthy and unhealthy) compared to this present study. Secondly, because the two previous intervention studies implemented an effect on other meals throughout the day in the measurements, and not only school meal as the present study evaluated. Thirdly, in the intervention study with a served breakfast (Ask et al., 2006), all participating children in both intervention group and in control group were educated in the importance of healthy eating. This study did not include educational components for none of the participating groups.

The finding that serving of a FV at school can increase children's fruit intake have also been showed in previous studies (Ashfield-Watt, Stewart, & Scheffer, 2009; Bere et al., 2010; Huang et al., 2013; Lin, Foland, Caito-Sipe, & Fly, 2015; Ransley et al., 2007). Results from the intervention group in this present study showed that 81% ate fruit four to five times per week, with 60% increasing their intake from unhealthy (less than three times per week) to

healthy (four to five times per week) after six months with free FV servings. Ashfield-Watt et al. (2009) found that 64% of the primary-school children who did not eat fruit at baseline ate fruit at least once a week when they were served free fruit. This present study did however not evaluate how many children that did never ate fruit, hence, only a crude comparison can be made. Bere et al. (2010) found that the proportion of children eating both FV at school four to five times per week was 59% when evaluating the school fruit scheme. The increase in FV intake seemed however to be due to fruit intake mainly (Bere et al., 2010). Similar results have been reported in other studies evaluating free servings of FV (Huang et al., 2013; Lin et al., 2015; Ransley et al., 2007). Thus, findings from this present study are in contrast with previous studies in terms of increased vegetable intake followed by free FV servings. Both (Huang et al. (2013); Lin et al. (2015)) suggested the need for future research to investigate how vegetable intake may be improved among school children. The results from this study concerning increased vegetable intake can however be due to method bias in the study, since previous research marginally supports the findings on increased vegetable intake. These potential biases are discussed in paragraph 5.2.2. Nevertheless, a more recent study conducted in USA found a slightly increase in FV intake after new standards for increased FV portion sizes was implemented in the school meal (Cohen, Rimm, Catalano, Richardson, & Parker, 2014). However, as Cohen et al. (2014) did not investigate effects of a free meal but an implementation of mandatory increased FV servings, a full comparison with this present study is difficult.

The national recommendations for FV intake in Norway are five portions per day, and half of these five daily portions should be vegetables (Helsedirektoratet, 2015). Effects of serving of a free FV at school as found in this present study can therefore contribute to an increase in both fruit- and vegetable intake and thus reach national FV recommendations. Table 3 shows that the average FV intake for the children in the School Meal Project were slightly under four portions per day, which falls below national recommendations. The FV intake for participating children in the present study was however higher (at both baseline and follow-up 1 and for both groups) compared to Bere et al. (2010) who reported average FV intake on approximately three portions per day among Norwegian school children. Still, this present study did not split vegetables from fruits when analysing the total daily FV intake, thus it is difficult to compare total FV intake from this present study with other studies.

Concerning fish spread, few studies have evaluated effects of free servings among school children. The national recommendations for fish intake in Norway are to eat fish for dinner

two-three times per week and use fish spread, which in total is equivalent to approximately 300-450 grams fish per week (Helsedirektoratet, 2015). Two intervention studies conducted in Norway (Ask et al., 2006; Ask et al., 2010) served fish spread with the meal, but did not include fish spread in the healthy eating index, which was used to calculate study results. “Ungkost” showed that the children ate on average two grams fish as spread per day (Andersen & Øverby, 2002). A study among Danish adolescents found that their median fish intake was 10.7 g/day (Lauritzen et al., 2012). In addition, Lauritzen et al. (2012) found that 30% of the adolescent’s fish intake came from fish spread (typically consumed with lunch), but that fish products primarily were eaten for dinner. This present study did not evaluate effects on total fish intake, but as the Norwegian Directorate of Health includes fish spread in the recommendations (Helsedirektoratet, 2015), it shows that fish spread with the school meal can be an important contributor to increase children’s overall intake of fish. Further studies are needed to investigate if servings of a school meal including fish spread have effects on total weekly consumption of fish.

Food groups, such as fat and sugar intake among children in this present study are hard to compare to other studies, since this study only evaluated changes in thirteen food items with the school meal. Another reason is that the thirteen food items had cut-off values between healthy and unhealthy values. There are some tendencies however, e.g. when comparing this present study to the “Ungkost” study (Andersen & Øverby, 2002). When analysing the thirteen food items in the HFS, a trend seen at baseline was that children in this present study seemed to eat more white bread (53-58% ate white bread once per weekday or more) than suggested in the «Ungkost» study (Andersen & Øverby, 2002), see table 7. In addition, intake of chocolate spread (33-41% ate chocolate spread once per weekday or more), jam (44-62% ate chocolate spread once per weekday or more) and buns, waffles and muffins (26-21% ate this once per week or more) with the school meal were relatively high at baseline for both intervention- and control group (see table 7 and 8). The national recommendations for added sugar in Norway is less than 10%, and sugar intake has previously tended to exceed these recommendations among school children (Andersen & Øverby, 2002; Øverby et al., 2004; Øvrebø, 2011). Chocolate spread, jam, buns, waffles and muffins are food items that typically are rich in added sugar. Some children also had white bread, crackers, noodles and pancakes with their school meal once per week or more (see table 7), that also often consists of added sugar. This indicates that school children have great potential in improving their school meal in general. Consuming food products consisting of added sugar with the school meal is

intriguing because children in general tend to have more sugar in their diet during weekends (Rothausen et al., 2012). In this way, a high sugar intake with the school meal can lead to an overall high and/or increased intake of added sugar and thus contribute to a total energy imbalance. Since Øverby et al. (2004) reported that children with high sugar intake had lower FV intake, and thus suggested an association with high sugar intake and low FV intake, it could be argued that a served school meal focusing on plenty of FV can be a contributing factor in reducing sugar intake among children.

5.2 Methodological considerations

Analyses showed that the school meal intervention was successful in achieving an increase in intake of healthy food products with the school meal.

The School Meal Project has quasi-experimental design, which is seen as a practical method according to Polit and Beck (2014), and preferred when research is located in natural settings. One of the main reasons are because it may be difficult, both practically and ethically, to deliver a treatment randomly to some people and not to others. However, as Polit and Beck (2014) points out, a disadvantage of using a quasi-experimental study without randomizing is that causal effects almost always have alternative explanations. This refers to an effect not due to intervention (only), but interfered with other factors as well that are difficult to adjust for (Polit & Beck, 2014). As for other quasi-experimental designs, this present study cannot draw a complete causal conclusion. Reasons for this are discussed below.

5.2.1 Reliability

A goal when evaluating measurements suggested by John and Benet-Martinez (2000), is that measures could be reproduced and that we can trust that the measurements have a meaning. In research practice, reliability means if the research instrument measures what it is set to measure, if the measure produces similar results under similar conditions and to what extent researchers agree about scoring on the instrument, known as equivalence (Polit & Beck, 2014).

There is no current gold standard to measure dietary intake in large research populations (Collins, Watson, & Burrows, 2010; Singh et al., 2011). Methods to assess dietary intake, such as FFQ, 24-hour recall and food records all suffers from bias due to over and underreporting. Further, these methods of measuring sensitive personal characteristics often

includes self-reported data, which has been found to suffer from social desirability bias (also called pleasing bias) (Klesges et al., 2004; Lien et al., 2014). Since the children in The School Meal Project were aware that the project concerned healthy eating, they could report what they think the project workers would want them to report, and thus result in reporting that they eat healthier food than they actually do. However, Podsakoff, Mackenzie, Lee, Podsakoff, and Zedeck (2003) suggested several methods to reduce these biases, and included informing participants about how anonymity are ensured and to assure that the participants are aware that there are no right or wrong answers. Both these suggestions were followed in the data collection procedures in the present study.

Self-reported data does also have other methodological challenges, with girls having a tendency to underreport dietary intake compared to boys (Vance, Woodruff, McCargar, Husted, & Hanning, 2009). In addition, it is found that school children initially have a tendency to overestimate energy intake when conducting a FFQ compared to records, recalls, diet history and observations (McPherson, Hoelscher, Alexander, Scanlon, & Serdula, 2000). Overestimation in FFQ compared to record in children is supported in a study conducted among Dutch participants, where they found that FV consumption was overestimated in a FFQ compared to 7-diet records (Van Assema, Brug, Ronda, Steenhuis, & Oenema, 2002). Additionally, Livingstone, Robson, and Wallace (2004) reported that assessing dietary intake among children are prone to reporting errors. However, it is difficult to analyse overestimation and other reporting errors of energy intake in the present study. This is because the present study did not objectively measure reporting errors, but it is likely to assume that reporting errors also could apply for the participating children in The School Meal Project. There was for example seen differences in terms of gender distribution, with significantly more participating boys in the intervention group compared to the control group (see table 3), which could impact study findings. On the other hand, boys and girls in this sample was not significantly different concerning the total food scores, which can indicate that these potential reporting biases are small.

Other disadvantages associated with conducting a FFQ is that it requires a good memory (Collins et al., 2010; Singh et al., 2011; Willett, 2013). In addition to this, diets often change from time to time, for example from season to season (Willett, 2013). Further, there is always a chance that a restricted food list can fail to include all food items, and thus resulting in serious loss of information (Willett, 2013). The FFQ used in this study included twenty-eight different food items (see appendix 5 and 6). The twenty-eight food items covered much, but

there were also food items not included, e.g. salads, omelettes, that resulted in a restricted food list, which could affect the children's responses. Other factors that resulted in to a restricted food list was that the FFQ did not account for healthier options such as fat- and sugar reduced products, e.g. different sorts of spreads could be both fat- and sugar reduced.

There is also a lack of evidence in terms of investigating how certain factors, such as age, cognition, social background, body weight, perceived portion size and complexity of questions can influence outcome when assessing dietary intake among children (Collins et al., 2010; Livingstone et al., 2004; Singh et al., 2011). It has been debated whether children in general have satisfactory understanding and capacity to fill out a questionnaire. Polit and Beck (2010) suggested that young children simply can't fill out a questionnaire. On the other hand, Staksrud (2013) pointed out that research have good experiences in having relatively young children (from seven years old) answer long and comprehensive questionnaires about their everyday life. Still, there has been reported specific problems concerning children's understanding of concepts. Bere (2004a) indicated that many children are unable to distinguish concepts when differing for example fruit from vegetables. For the present study, there were seen that many of the participating children had difficulties with distinguishing whole-grain bread from white bread, and they were not aware of what type of bread their meals consisted of, since parents often packed their meals. Each child in the intervention group received information on what type of bread they were served with the school meal (which was at least 50% whole-grain) before handing out the questionnaire at follow-up 1. The data showed that 94% of the children in the intervention group reported to eat the free school meal every day, while only 69% of the children in the intervention group reported to eat whole-grain bread four or five times per week. Thus, this could lead to reporting bias. Concerning questions on FV in the child questionnaire in the present study, there were added examples of specific fruits and specific vegetables to make it easier to the children to distinguish fruits from vegetables. Hence, this could reduce possible reporting bias in the study.

Concerning the HFS, the present study evaluated effects of the school meal based on a total food score, and thirteen single items (see paragraph 3.5.3). Bias concerning loss of specific information could occur when scoring the food items to unhealthy and healthy categories as done in the HFS. Another limitation with the HFS was that the term "healthy meal pattern" was defined based on thirteen food items, not on the children's overall lunch habits. Hence, one cannot draw conclusions about the lunch habits in general, and the restriction in the HFS

could lead to a child unfairly being placed in an unhealthy category. For example, children eating chocolate spread once a week is considered as unhealthy as those children eating chocolate spread five times per week, and children eating fruit three times per week is according to the HFS just as unhealthy as those who never ate fruit with the school meal. In addition, the HFS did not account for what they consumed on the remaining days, for example if they eat whole-grain bread three times per week (and per definition in this study are unhealthy), they might eat something healthy or unhealthy on the remaining two days.

Limitations concerning reliability in general is that a healthy school meal was evaluated based on thirteen food items, with strict cut-off values, and not the children's overall school meal habits. To strengthen reliability in this present study, a larger pilot study (conducted in a larger scale than the present study) could help with understanding how children interpreted the questions and could also contribute to ensure objectivity (Staksrud, 2013). Strengths concerning reliability is that the questionnaire was based on questionnaires tested and used in previous scientific work, indicating that the children's questionnaire used in The School Meal Project has satisfying equivalence. Internal consistency can be measured with coefficient alpha (Polit & Beck, 2014), this is although not measured in this present study due to this study measuring specific behaviour (what the children ate), as opposed to behaviours that are hard to measure explicit (such as psychological behaviours) and are composed in several subparts (Bland & Altman, 1997; Polit & Beck, 2014).

5.2.2 Validity

Validity refers to the degree to which research results coincide with reality (Shadish, Cook, & Campbell, 2002). Internal validity refers to whether a causal relationship are plausible, and external validity refers to whether results of a study can be generalized to other samples or settings than the once being studied (Polit & Beck, 2014). Validity in the present study are mainly evaluated based on sample size, statistics used and data collection procedure as suggested in a study evaluating quality in dietary intake validation studies (Serra Majem et al., 2010).

The sample in this present study represented 168 children at baseline. Participation rate in total was 75%. The intervention group had a high participation rate (96%) compared to the control group (67%), which is similar to the school meal intervention study with a served school lunch conducted in Norway (Ask et al., 2010). A study conducted by Shaw, Cross, Thomas, and Zubrick (2015) found that researchers who obtain active consent, as done is this

present study, often have a poorer participation rate. Thus, a participation rate of 75% is seen as sufficient in this study. On the other hand, the participation rate on 67% for the control group was rather small. A randomized control trial study conducted by Junghans, Feder, Hemingway, Timmis, and Jones (2005) reported that a low recruitment rate could affect representativeness and the ability for generalisation of the study findings.

Another aspect within the study sample is that the present study cannot determine if the fifty-eight children (who primarily belonged in the control group) that did not deliver consent, could represent an interesting group to analyse. This can be a concern, since Monaghan, Jones, and Morgan (2011), suggested that parents tend to avoid giving active consent if the research topic is sensitive. Other factors concerning the distribution of the study sample is that when analysing the study findings, the control group in this present study had a tendency to eat a healthier school meal (7.11) than intervention group (6.11) at baseline. This tendency may be due to a larger participating sample in the control group compared to the intervention group ($p < 0.001$). In addition, the children in the intervention group could, due to convenient based selection procedure, represent a group who are more unhealthy than a larger and more representative samples. Further, children within the control group were significantly different regarding age ($p < 0.001$). Difference concerning age is interesting because previous mentioned studies (Oellingrath et al., 2011; Stea et al., 2014; Würbach et al., 2009; Øvrebø, 2011) reported a relation with increased age and increased irregular meal pattern.

Concerning data collection, the same project workers collected all data in The School Meal Project. The same project worker was responsible and present at each time the children conducted the questionnaire. This was done so that all the children could have the same replies for their answers. Nevertheless, the teachers were also present, and they helped especially the children with concentration problems in conducting the questionnaire. Staksrud (2013) suggested that physical presence of others, e.g. adults could affect the children's response on the questionnaires, especially regarding whether or not trust was achieved. This present study did not measure trust or similar. Therefore, it is difficult to consider the impact the presence of the project worker or teacher had on the children's response, but it can be assumed that this could affect the children's response.

Data in the present study were collected with a six-month interval. An advantage of this short period of time was a low drop-out rate, as Polit and Beck (2014) suggested that a serious challenge in longitudinal data collections are loss of participants over time. Concerning

exposure of the intervention for the control group, the present study adjusted for this to the extent possible. Serving of the school meal to 6th grade at Birkeland elementary school took place in the children's classroom. The classrooms in 6th grade were located on another floor and away from the control group in Birkeland elementary school, and far away from the control group at Froland elementary school. This was done to prevent direct exposure of the intervention and thus bias in data in the control group. There is however no measurement on whether, or to what degree, children and/or parents (who usually are responsible for packed lunches) in the control group altered their meal pattern since they knew that they were part of the intervention. It is important to adjust for exposure, because it can lead to alteration of food habits among children in the control group. Fernald, Coombs, DeAlleaume, West, and Parnes (2012) reported that this could occur as a result of being in an intervention, often called the Hawthorne effect. The results in the present study shows however, that control group did not significantly change their intake of food products in the HFS, indicating that the intervention had little impact on the control groups' intake of the food products in the HFS.

For the statistical analysis, analysing data with Pearson Chi-Square Tests as used in the present study has limitations. A small p-value, as seen in this study e.g. regarding fruit intake, provides little information about the association strength (Agresti, 2002). Further, Agresti (2002) points out that the test also requires a large sample. Thus, one cannot rely only on results from the Pearson Chi-Square Test alone. According to Serra Majem et al. (2010), it is useful to compare means. However, they recommended to analyse with correlations that could adjust for other variables that could interfere with study results, such as gender, age, energy intake (Serra Majem et al., 2010). To increase the statistical power in this present study, an idea would be to use linear regression analyses to adjust for e.g. SES, gender, overweight and age.

In summary, main limitation of this present study are the small sample size and non-randomisation of the different groups, together with self-reported data. The children at the two schools may be different; this was for example seen for age in table 4 within the classes in the control group. However, the trends and results reported in the present study are clear, and it is likely to assume that a potential change in meal pattern in control group due to exposure are small. Another limitation is the restricted settings in the study, and the convenient choice of the participating schools. Further, a limitation is that the analyses in this present study did not adjust for variables that possibly could interfere the study results. Restricted settings, non-randomized groups, and not adjusting for interfering variables had implications on the

representativeness of this study, thus the study results are hard to generalise. Strengths of the present study are that it is an intervention study; with data collected at two time points with few lost to follow-up and that the same project workers collected all data. In addition, the intervention lasted for six months, and will last one year altogether. The study also contributes to evaluate impact of a free school meal on children at school in a natural setting, which in today's society is a hot topic.

5.3 Ethical considerations

The United Nations Association of Norway adopted in 1989 the Convention on the Rights of the Child. The 12th article in the convention says that every child capable of forming their own views and beliefs, should concerning all matters affecting the child, be heard, weighted in accordance to age and maturity, as the child has the right to express their views and beliefs freely (United Nations Human Rights, 1996). This has previously been interpreted as an argument stating that children have the right to participate in research so that their views emerges (Backe- Hansen, 2009). Another argument when conducting research on children is that children hold the ability to communicate credible knowledge, as well as information about their own lives. This information is important when assessing children's life and lifestyles (Backe- Hansen, 2009). Even though arguments for including children in research exist, there are several ethical principles to obey, especially important in the present study with topics that could be considered as sensitive for children.

The Belmont Report are widely used when evaluating ethics in research (Backe- Hansen, 2009), and was formed by the National Commission, U.S Department of Health and Human Services (1979). The report is aimed to protect human subjects of biomedical and behavioural research (U.S Department of Health and Human Services, 1979) and includes beneficence, justice and respect for human beings (Sims, 2010). Polit and Beck (2014) suggested procedures to adhere the ethical principles for protecting the study participants based on the Belmont Report. The ethical principles based on the Belmont Report included risk/benefit assessments, informed consent, confidentiality procedures, debriefings and referrals, treatment of vulnerable groups, external reviews and the protection of human rights (Polit & Beck, 2014). The following paragraph discusses the principles for adhering the ethical principles in this present study.

In the risk/benefit assessment, a benefit for the intervention group was that they got a free served meal every day for a whole year. Together with the nutritional benefit for each child, this was also a financial benefit for families of the children in the intervention group. However, all the children (and parents) got information about volunteering in the research project: it was not mandatory to join the research surrounding the project even though they ate the meal they were served. They were not forced to eat the meal either; the children had the opportunity to continue with the packed meals just as before. Information about free volunteering and the opportunity to bring packed meals contributed not to use the meal as an indirect coercion for participating in the research study.

A benefit for all participating groups was that they might get increased knowledge about their meal pattern, which could be considered a benefit since previous research suggested that diet quality (Oellingrath et al., 2011; Øvrebø, 2011) tends to decrease with age. On the other hand, increased knowledge on meal pattern could also be considered as a risk for an increased unhealthy view on their own meal pattern, and result in unhealthy dieting behaviours. Another risk in the risk/benefit assessment could be a risk for being teased or bullied for eating in certain ways: some of the children reported in the FFQ that they were teased for eating fish spread because of the distinct smell of the spread. For height and weight measures (full assessment not included in this thesis), a risk could be in children comparing themselves to each other (for height, weight not shown to the participating children, see 3.2).

In The School Meal Project, the risks mentioned above with dieting behaviour, teasing and comparisons are considered as a minimal risk. A minimal risk is a risk expected to be equal to or below the risk the children ordinarily are encountered to in daily life during routine tests or procedures (Polit & Beck, 2014). The children in The School Meal Project are for example allowed to bring what they want in their packed meals both during and outside the intervention period. This means that teasing other children eating in a certain way cannot be explained by the intervention alone, and can occur outside of the intervention period. In addition, school children in Norway are measured with weight and height during health check-up by the school-nurse in 1st, 3rd and 8th grade (Helsedirektoratet, 2010), indicating that this is a procedure that school-aged children are familiar with. Concerning the principle respect and concern for children's wellbeing, this were maintained by having as much transparency as possible in the research project. The children in The School Meal Project were given the possibility to ask questions through all data collection time points. The project workers also came to visit the intervention group several times during the intervention period,

giving the participating children the possibility to further ask questions and optionally come with complaints regarding the project. All participants were offered a sharing of study findings after the data had been analysed (after all three time points).

The relationship between children's competence and children's vulnerability are central concerning research ethics (Backe- Hansen, 2009). In research, children do not legally or ethically have the competence to give informed consent according to Polit and Beck (2014). Active consent from parents was therefore gathered in The School Meal Project. All parents were informed that they could return their written consent to the class teacher later on, to give them time to reflect on participation in the study. The participating children in this study received information about the nature of the project before handing out the children's questionnaire at data collection time points. The questionnaire included, in writing, information about free volunteering and the possibility to withdraw from the project.

Confidentiality was obtained through identification numbers. According to Polit and Beck (2014), an identification number is an appropriate procedure to ensure confidentiality when anonymity is impossible;

A promise of confidentiality is a pledge that any information participants provide will not be publicly reported in a manner that identifies them and will not be made accessible to others. Researchers may develop elaborate confidentiality procedures. These include maintaining identifying information in locked files; substituting identification (ID) numbers for participants' names on records and files, to prevent an accidental breach of confidentiality; and reporting only aggregate data for groups of participants, or taking steps to disguise a person's identity in a research report (Polit & Beck, 2014, p.89).

Anonymity was impossible in this project since the project required matching children with the right parent at all three time points; baseline, follow-up 1 and follow-up 2. A coded list was used to combine ID with each participant, and was stored in a locked cabinet. Only project workers working in the project had access to the coded lists. The results of this study were presented in groups (e.g. control-/intervention group, girls/boys, within control group), and results of the study could not reveal the children's identities.

Project workers in this project did not exploit or use information against the participants in any way. The aim of the study was to produce benefits for society as a whole or for groups in the society. There is no fabrication or plagiarism in this study.

The project was external reviewed by two ethical committees: Norwegian Social Science Data Services (NSD) and the Ethical committee of Faculty of Health and Sport Sciences at the University of Agder.

5.4 Conclusions and future implications

Serving of a free healthy school meal resulted in a healthier meal pattern at school regardless of gender, through an increased intake of healthy food products, especially- FV and fish spread. This indicates that a served school meal might be healthier than the packed lunch meals. In Norway, there is no national free school meal arrangement, but the introduction of a school meal is a widely discussed political issue. This study, with a significant change in intake of healthy food, could contribute to the discussion, both with regards to resuming the free school fruit scheme, which was discontinued in 2014, and also with regards to implementing a healthy school meal on a national level.

Further studies are needed to investigate the effects of a free school meal and FV servings on health- and school outcomes, and whether intake of healthy food products have long-lasting effects.

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Appendix

Appendix 1

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES



Harald Hårfagres gate 29
N-5007 Bergen
Norway
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nsd@nsd.uib.no
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Org.nr. 985 321 884

Frøydis Nordgård Vik
Institutt for folkehelse, idrett og ernæring Universitetet i Agder
Serviceboks 422
4604 KRISTIANSAND S

Vår dato: 25.06.2014

Vår ref: 38980 / 3 / LT

Deres dato:

Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 06.06.2014. Meldingen gjelder prosjektet:

38980 *Skolematprosjektet i Aust-Agder*
Behandlingsansvarlig *Universitetet i Agder, ved institusjonens øverste leder*
Daglig ansvarlig *Frøydis Nordgård Vik*

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, <http://www.nsd.uib.no/personvern/meldeplikt/skjema.html>. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://pvo.nsd.no/prosjekt>.

Personvernombudet vil ved prosjektets avslutning, 01.07.2016, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77

Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Avdelingskontorer / District Offices

OSLO: NSD, Universitetet i Oslo, Postboks 1055 Blindern, 0316 Oslo. Tel: +47-22 85 52 11. nsd@uio.no
TRONDHEIM: NSD, Norges teknisk-naturvitenskapelige universitet, 7491 Trondheim. Tel: +47-73 59 19 07. kyrr.svarva@svt.ntnu.no
TROMSØ: NSD, SVF, Universitetet i Tromsø, 9037 Tromsø. Tel: +47-77 64 43 36. nsdmaa@svt.uib.no

Appendix 2

Forespørsel om deltakelse i forskningsprosjektet

Skolematprosjektet i Aust-Agder

En tiltak studie med servering av et daglig sunt skolemåltid i ett år

Bakgrunn og formål

Dette er en forespørsel til deg og ditt barn om å delta i en forskningsstudie hvor 6. trinn ved Birkeland skole vil få servert et gratis sunt skolemåltid daglig i skoleåret 2014/2015. Hensikten med denne studien er å evaluere i hvilken grad et sunt skolemåltid hver dag i ett år kan ha positive effekter på vektutvikling, læringsmiljø og motivasjon for læring. Per i dag eksisterer det lite systematisk kunnskap og erfaringer knyttet til skolemåltider i Norge, og det er derfor viktig at ny forskning gjennomføres. Helse- og omsorgsminister Bent Høie er orientert om prosjektet, og har støttet prosjektet i et eget brev. Han uttaler: «Dette vil kunne gi nyttig kunnskap i arbeidet med å styrke det forebyggende helsearbeidet og stimulere til et sunnere kosthold, slik det er slått fast i regjeringsplattformen. Gode vaner legges tidlig, og barnehage og skole er viktige aktører i folkehelsearbeidet der ikke minst dialog med foreldrene og skolehelsetjenesten er viktig».

Birkeland skole og Froland skole i Aust-Agder er valgt ut som deltagende skoler, hvor 6. trinn ved Birkeland skole vil få servert et gratis sunt skolemåltid gjennom skoleåret 2014-2015 av Trude Karlsen ved Kylland Gård. Det vil bli tatt høyde for allergier og religiøse hensyn. Alle elever i 5. 6. og 7. klassetrinn ved Birkeland skole, samt en av elevens foreldre/foresatte, inviteres til å delta i prosjektet. Femte og 7. trinn vil være kontrollklasser, samt 6. trinn ved Froland skole hvor skoleåret forløper som normalt. Alle klassetrinn er like viktige for at prosjektet skal kunne evalueres på en god måte.

Det skal i første omgang skrives tre mastergradsoppgaver i prosjektet. Prosjektleder og studenter er tilknyttet mastergradsprogrammet folkehelsevitenskap ved institutt for folkehelse, idrett og ernæring ved Universitetet i Agder.

Hva innebærer deltakelse i studien?

For elevene:

Elevene svarer på et spørreskjema om kosthold og måltidsvaner, med særlig vekt på skolemåltidet, samt kjønn og alder. I tillegg måles vekt, høyde og livvidde hos elevene. Målingene utføres i lett innetøy (bukse og T-skjorte/topp) og elevene får ikke vite sine egne mål. Dette foregår i løpet av en skoletime i august 2014, og i januar og juni 2015. En prosjektmedarbeider er tilstede for å svare på eventuelle spørsmål fra elevene. De elevene som ikke skal delta i prosjektet, vil få annet opplegg av skolen mens klassen svarer på spørreskjemaet.

For foreldre/foresatte:

En av elevens foreldre/foresatte inviteres til å svare på et spørreskjema om kosthold, utdanningsnivå og selvrapportert vekt og høyde. Det vil ta ca. 20 minutter å svare, og spørreskjemaet sendes hjem i skolesekken på de tre tidspunktene som elevene svarer på sin undersøkelse. Dette returneres med eleven til kontaktlærer på skolen i lukket konvolutt, og foreldreskjemaene sendes til Universitetet i Agder.

Mulige fordeler og ulemper

Studien vil ikke føre til noen ulemper for deg eller ditt barn, utover punktene som er skissert over. Fordelen med studien er at den vil gi ny og nyttig kunnskap i arbeidet med å styrke det forebyggende helsearbeidet og stimulere til et sunnere kosthold i skolen.

Hva skjer med informasjonen om deg?

All informasjon angående barn og foreldre/foresatte vil utelukkende bli brukt til forskning i henhold til gjeldende nasjonal lovgivning. Opplysningene som innhentes i denne studien er konfidensielle og ingen uvedkommende vil få tilgang til dem. Studien er basert på aidentifiserte opplysninger. Med dette menes opplysninger der navn og andre personlige kjennetegn er fjernet. Kun deltagere i forskningsteamet har adgang til navnelister. Disse oppbevares innelåst og separat fra datafilen, og vil ikke bli brukt på noen måte i resultatene fra undersøkelsen eller frigitt på noen annen måte. Det vil ikke være mulig å identifisere verken foreldre/foresatte eller barn i resultatene av studien når disse publiseres. Prosjektet skal etter planen avsluttes juli 2016.

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du har spørsmål til studien, ta kontakt med førsteamanuensis Frøydis Vik (prosjektleder) på telefon/mail: 38141855/froydis.n.vik@uia.no eller mastergradsstudenter/prosjektmedarbeidere: Kristine Engebretsen Illøkken: 93865630, Renate Høiland: 91521167, Kirsten Olstad Petersson: 47632573

Studien er meldt til Personvernombudet for forskning, Norsk Samfunnsvitenskapelig Datatjeneste AS.

Prosjektleder: Førsteamanuensis Frøydis N. Vik, UiA

Mastergradsstudenter: Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad Petersson

Samtykke til deltakelse i studien (returneres med eleven til kontaktlærer)

Jeg har mottatt informasjon om studien, og er villig til å la mitt barn delta i skolematprosjektet.

Jeg har blitt informert om at mitt barns deltagelse og foreldre/foresattes deltagelse er frivillig. Jeg kan når som helst trekke meg selv og/eller mitt barn fra studien uten å oppgi noen grunn. Hvis jeg og mitt barn ikke velger å delta, eller trekker oss fra studien, så vil det ikke medføre noen form for ulemper.

Barnets navn (store bokstaver) og klasse

Forelders/foresatts navn (store bokstaver)

Sted og dato/Underskrift til forelder/foresatt

Førstemanuensis Frøydis N. Vik, UiA

Mastergradsstudenter: Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad
Petersson

Appendix 3

Forespørsel om deltakelse i forskningsprosjektet

Skolematprosjektet i Aust-Agder

Bakgrunn og formål

Dette er en forespørsel til deg og ditt barn om å delta i en forskningsstudie kalt *skolematprosjektet* som skal foregå i skoleåret 2014/2015. Hensikten med denne studien er å evaluere i hvilken grad et sunt skolemåltid hver dag i ett år kan ha positive effekter på vektutvikling, læringsmiljø og motivasjon for læring. Per i dag eksisterer det lite systematisk kunnskap og erfaringer knyttet til skolemåltider i Norge, og det er derfor viktig at ny forskning gjennomføres. Helse- og omsorgsminister Bent Høie er orientert om prosjektet, og har støttet prosjektet i et eget brev. Han uttaler: «Dette vil kunne gi nyttig kunnskap i arbeidet med å styrke det forebyggende helsearbeidet og stimulere til et sunnere kosthold, slik det er slått fast i regjeringsplattformen. Gode vaner legges tidlig, og barnehage og skole er viktige aktører i folkehelsearbeidet der ikke minst dialog med foreldrene og skolehelsetjenesten er viktig».

Birkeland skole og Froland skole i Aust-Agder er valgt ut som deltagende skoler. Alle elever i 5., 6. og 7. klassetrinn ved Birkeland skole og 6. trinn ved Froland skole, samt en av elevens foreldre/foresatte, inviteres til å delta i prosjektet. Femte og 7. trinn ved Birkeland skole og 6. trinn ved Froland skole vil være kontrollklasser i prosjektet, som betyr at normal aktivitet vil foregå i løpet av skoleåret. Alle klassetrinnene i prosjektet er like viktige for at prosjektet skal kunne evalueres på en god måte. Kontrollklassene vil få en gjennomgang av sin skoles resultater ved skoleårets slutt, sånn at alle får vite hva som kommer ut av prosjektet.

Det skal i første omgang skrives tre mastergradsoppgaver i prosjektet. Prosjektleder og studenter er tilknyttet mastergradsprogrammet folkehelsevitenskap ved institutt for folkehelse, idrett og ernæring ved Universitetet i Agder.

Hva innebærer deltakelse i studien?

For elevene:

Studien innebærer at elevene i kontrollgruppen svarer på et spørreskjema om kosthold og måltidsvaner, med særlig vekt på skolemåltidet, samt kjønn og alder. I tillegg måles vekt, høyde og livvidde hos elevene. Målingene utføres i lett innetøy (bukse og T-skjorte/topp) og elevene får ikke vite sine egne mål. Dette foregår i løpet av en skoletime i august 2014, og i januar og juni 2015. En prosjektmedarbeider er tilstede for å svare på eventuelle spørsmål fra elevene. De elevene som ikke skal delta i prosjektet, vil få annet opplegg av skolen mens klassen svarer på spørreskjemaet.

For foreldre/foresatte:

En av elevens foreldre/foresatte inviteres til å svare på et spørreskjema om kosthold, utdanningsnivå og selvrapportert vekt og høyde. Det vil ta ca. 20 minutter å svare, og spørreskjemaet sendes hjem i skolesekken på de tre tidspunktene som elevene svarer på sin undersøkelse. Dette returneres med eleven til kontaktlærer på skolen i lukket konvolutt, og foreldreskjemaene sendes til Universitetet i Agder.

Mulige fordeler og ulemper

Studien vil ikke føre til noen ulemper for deg eller ditt barn, utover punktene som er skissert over. Fordelen med studien er at den vil gi ny og nyttig kunnskap i arbeidet med å styrke det forebyggende helsearbeidet og stimulere til et sunnere kosthold i skolen.

Hva skjer med informasjonen om deg?

All informasjon angående barn og foreldre/foresatte vil utelukkende bli brukt til forskning i henhold til gjeldende nasjonal lovgivning. Opplysningene som innhentes i denne studien er konfidensielle og ingen uvedkommende vil få tilgang til dem. Studien er basert på aidentifiserte opplysninger. Med dette menes opplysninger der navn og andre personlige kjennetegn er fjernet. Kun deltagere i forskningsteamet har adgang til navnelister. Disse oppbevares innelåst og separat fra datafilen, og vil ikke bli brukt på noen måte i resultatene fra undersøkelsen eller frigitt på noen annen måte. Det vil ikke være mulig å identifisere verken foreldre/foresatte eller barn i resultatene av studien når disse publiseres. Prosjektet skal etter planen avsluttes juli 2016.

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du har spørsmål til studien, ta kontakt med førsteamanuensis Frøydis Vik (prosjektleder) på telefon/mail: 38141855/froydis.n.vik@uia.no eller mastergradsstudenter/prosjektmedarbeidere: Kristine Engebretsen Illøkken: 93865630, Renate Høiland: 91521167, Kirsten Olstad Petersson: 47632573

Studien er meldt til Personvernombudet for forskning, Norsk Samfunnsvitenskapelig Datatjeneste AS.

Prosjektleder: Førsteamanuensis Frøydis N. Vik, UiA

Mastergradsstudenter: Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad Petersson

Samtykke til deltakelse i studien (returneres med eleven til kontaktlærer)

Jeg har mottatt informasjon om studien, og er villig til å la mitt barn delta i skolematprosjektet.

Jeg har blitt informert om at mitt barns deltagelse og foreldre/foresattes deltagelse er frivillig. Jeg kan når som helst trekke meg selv og/eller mitt barn fra studien uten å oppgi noen grunn. Hvis jeg og mitt barn ikke velger å delta, eller trekker oss fra studien, så vil det ikke medføre noen form for ulemper.

Barnets navn (store bokstaver) og klasse

Forelders/foresatts navn (store bokstaver)

Sted og dato/Underskrift til forelder/foresatt

Førsteamanuensis Frøydis N. Vik, UiA
Mastergradsstudenter: Kristine Engebretsen Illøkken, Renate Høiland og Kirsten Olstad
Pettersson

Appendix 4

Hva skal serveres	Hva skal IKKE serveres		Merknad
Frukt			Hver dag – oppkuttet (f. eks banan til å ha på skiva som en variasjon til pålegg)
Bær			Hver dag/innimellom
Grønnsaker			Hver dag, f.eks. oppkuttet gulrot en dag, noe annet en annen dag (salat, kåltor, selleri, blomkål, etc.)
Grovbrød, mellomgrovt brød Grove rundstykker	Loff, fine rundstykker		Minst 50% grovt
Grove knekkebrød	Fine knekkebrød (f.eks. type «frokost»)		Kan være en variasjon til brød
Smør	Lomper/tortillalefser		To typer: Bremykt og vita hjertegod
Nøtter, mandler	Kjeks		
Kjøttpålegg	pannekaker		
Makrell i tomat	Nudler		
Fiskekaker som pålegg	Syltetøy		
Røykelaks el annet fiskepålegg	Boller, muffins, vafler		
Egg	Pasta		

Kaviar	Sjoko-pålegg, mm		
Gulost/smøreost	Rekesalat, italiensk		
	yoghurt		Mange er tilsatt sukker, og derfor tenke vi at det bør droppes. Men det går an m naturell m/friske bær som en variasjon
Brunost/prim	Majones		
Leverpostei	peanuttsmør		
	Snop, godteri		
	Potetgull, salt snacks		
Vann			
Melk	Brus		
	Juice		

Appendix 5



Institutt for folkehelse, idrett og ernæring
v/ Frøydis N. Vik
Postboks 422
4604 Kristiansand

Telefon 38 14 1855

Skolematprosjektet 2014/15

Elevspørreskjema om skolemat og kosthold og motivasjon for læring

Kjære elev

Vi håper at du kan svare på dette spørreskjemaet om hva du pleier å spise. I tillegg er det noen spørsmål om hvordan du lærer best, og noen spørsmål om deg. Det tar omtrent en skoletime. Det er kun forskerne som jobber med prosjektet som vil få vite hva du har svart, så du trenger ikke tenke på at hverken læreren din, foreldre eller andre elever får se hva du har svart. Det er ingen rette eller gale svar. Bare fyll ut det som passer best for deg og svar så ærlig du kan. Det er frivillig å delta. Hvis du ikke vil fylle ut spørreskjemaet, så kan du si ifra.

Hvordan skal du besvare spørreskjemaet?

Bruk en blå eller svart penn.

Svar med en tydelig i svaralternativet.

Du skal bare svare *ett svar* per spørsmål for de fleste spørsmålene.

Noen spørsmål kan besvares med mer enn ett svar (da står det skrevet i selve spørsmålet).

TAKK FOR HJELPEN!

Kristine
Engebretsen
Illøkken
Masterstudent, UiA

Renate Høiland
Masterstudent,
UiA

Kirsten Olstad
Petersson
Masterstudent,
UiA

Frøydis Vik
Førsteamanuensis,
UiA Prosjektleder

Spørsmål om deg

Er du jente eller gutt?

- Jente
- Gutt

Hvilke voksne bor du sammen med?

(Du kan svare mer enn ett svar)

- Både min mor og min far hele tiden
- Bare min mor
- Bare min far
- Min mor og hennes nye partner
- Min far og hans nye partner
- Besteforeldre
- Andre voksne

Bor du sammen med brødre og/eller søstre?

(Du kan svare mer enn ett svar)

- Ja, en eller flere eldre brødre
- Ja, en eller flere yngre brødre
- Ja, en eller flere eldre søstre
- Ja, en eller flere yngre søstre
- Nei, jeg bor ikke i samme hus som min bror/brødre eller søster/søstre
- Jeg har ikke brødre eller søstre

Når er du født? (f.eks. 5. mai 2004)

Del A

De neste spørsmålene er om måltider. Når du fyller ut disse spørsmålene skal du tenke på hvor ofte du vanligvis spiser måltidene det spørres om. Tenk på de siste ukene. Kryss av i den ruten du føler passer best for deg.

Hvor ofte spiser du frokost i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- Hver dag

Hvor ofte spiser du frokost i helgene?

- Jeg spiser ikke frokost i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Hvor ofte spiser du lunsj/skolemat i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken

Hver dag

Hvor ofte spiser du lunsj i helgene?

- Jeg spiser ikke lunsj i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Hvor ofte spiser du middag i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken

Hver dag

Hvor ofte spiser du middag i helgene?

- Jeg spiser ikke middag i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Hvor ofte spiser du kveldsmat i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken

Hver dag

Hvor ofte spiser du kveldsmat i helgene?

- Jeg spiser ikke kveldsmat i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Del B

Hva spiser du vanligvis? Når du fyller ut disse spørsmålene skal du tenke på hva du vanligvis spiser og drikker både hjemme, på skolen og på fritiden. Kryss av i den ruten du føler passer best for deg.

Hvor ofte spiser du grønnsaker til middag?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du grønnsaker på brødsnivene?
(f.eks. agurk, paprika, tomat)

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver eneste dag
- Flere ganger hver dag

Hvor ofte spiser du andre grønnsaker (f.eks. gulrot?)

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du eple, appelsin, pære og banan?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du annen frukt og bær (andre frukter og bær enn eple, appelsin, pære og banan)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du potetgull?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du godterier (sjokolade, smågodt osv.)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du nudler (som f.eks. Mr Lee)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du boller, muffins, kake eller annen søt gjærbakst?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du juice?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du saft?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du melk?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du brus MED sukker (f.eks. Solo, Pepsi, Fanta, Coca-Cola)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du brus UTEN sukker (f.eks. Solo lett, Solo pluss, Pepsi MAX, Coca-Cola light, Tab X-tra)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du vann?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Del C

De neste spørsmålene handler KUN om det du spiser og drikker til skolemat i matfriminuttet på skolen.

1. Hvor ofte spiser du følgende *til skolemat*? (sett ett kryss for hver linje)

Brød og annet	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Grovbrød/grove rundstykker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fint brød (f.eks. loff)/fine rundstykker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mørkt knekkebrød	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lyst knekkebrød	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lomper/tortilla lefser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjeks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurtignudler (f.eks. Mr. Lee)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pasta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pannekaker/lapper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boller, vafler, muffins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pålegg	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Sjokoladepålegg (f.eks. Nugatti, Nutella, Nøtte)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peanøttsmør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rekesalat, italiensk salat e.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leverpostei	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjøttpålegg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fisepålegg (f.eks. makrell i tomat, røykelaks)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Syltetøy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kaviar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Majones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Egg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gulost, smøreost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brunost, prim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smør på skiva	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. Hvor ofte spiser du følgende *til skolemat*? (sett ett kryss for hver linje)

Frukt, grønt og annet	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Frukt (f.eks. eple, pære, banan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bær (f.eks. blåbær, jordbær)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grønnsaker (f.eks. agurk, tomat, paprika, gulrot)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nøtter/mandler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hvor ofte drikker du følgende *til skolemateren*? (sett ett kryss for hver linje)

	Aldri	1 gang i uken	2 ganger i uken	3 ganger i uken	4 ganger i uken	Hver dag
Melk, vanlig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Melk med smak (sjokolade eller jordbær)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saft/iste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brus MED sukker (f.eks. Fanta, Coca-Cola, Solo, Pepsi)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brus UTEN sukker (f.eks. Solo Super, Pepsi MAX, Coca-Cola light)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vann	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Del D

De neste spørsmålene handler om hvordan du har det på skolen (sett ett kryss for hver linje)

Din oppførsel i timene	Aldri	Sjelden	Noen ganger	Ofte	Svært ofte
Bråker du i timene slik at du får tilsnakk fra lærer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blir du utvist fra timer fordi du bråker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Får du anmerkninger for dårlig oppførsel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forstyrrer du i timene slik at andre ikke kan følge med	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Synes du det er ubehagelig å snakke høyt i timene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rekker du opp hånda for å svare på spørsmål	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Føler du at du er sjenert i klassen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hvor ofte skjer det at du ikke har sagt noe i timene en hel dag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Når jeg skal si noe i timene er jeg redd for å si noe dumt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hvor ofte føler du at du er sjenert overfor personer med det motsatte kjønn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hender det at du ikke rekker opp hånda selv om du vet svaret fordi det er ubehagelig å snakke høyt i klassen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Din trivsel på skolen	Aldri	Sjelden	Noen ganger	Ofte	Svært ofte
Jeg liker å være på skolen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skolen er interessant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg gleder meg til å gå på skolen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg liker skoleaktiviteter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vi gjør mye gøy på skolen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg skulle ønske jeg ikke måtte gå på skolen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg liker ikke skoleaktiviteter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg lærer mye på skolen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det er mange ting på skolen jeg ikke liker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lærerne hjelper meg når jeg trenger det.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Om skolearbeidet	Helt usant for meg	Ganske usant for meg	Delvis sant for meg	Ganske sant for meg	Helt sant for meg
Jeg kan mestre fagene det blir undervist i på skolen dette året.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan utføre selv det tyngste skolearbeidet hvis jeg prøver.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hvis jeg har nok tid kan jeg gjøre en god jobb med alt skolearbeidet mitt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan gjøre nesten alt arbeid på skolen hvis jeg ikke gir opp.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Selv om skolearbeidet er tungt, kan jeg lære det.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er sikker på at jeg kan finne ut hvordan man kan gjøre det vanskeligste arbeidet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Elevene i min klasse	Aldri	Sjelden	Noen ganger	Ofte	Alltid
Elevene i klassen min liker å være sammen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flesteparten av elevene i klassen min er snille og hjelpsomme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andre elever godtar meg som jeg er.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Når en klassekamerat er lei seg trøster de andre ham/henne.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Del E

Pleier du å spise eller drikke noe *etter* skolen og *før* middag?

Ja

Nei

Hvis ja, skriv det her:

.....

.....

Er du med i melkeordningen?

Nei

Ja, jeg drikker vanlig melk

Ja, jeg drikker melk med smak (f.eks. sjokolade eller jordbær)

Er du med i noen form for organisert trening eller idrett utenom skoletid?

Ja

Nei

Hvis ja, skriv ned hva:

Hvor mange GANGER i uken driver du idrett eller aktivitet så mye at du blir andpusten og/eller svett *utenom skoletid*?

Hver dag

4 - 6 ganger i uken

2 - 3 ganger i uken

En gang i uken

En gang i måneden

Mindre enn en gang i måneden

Aldri

Hvor mange timer per dag pleier du å se på TV *utenom skoletid*?

- Ingen
- Mindre enn en ½ time om dagen
- ½ - 1 time
- 2 - 3 timer
- 4 timer
- Mer enn 4 timer

Hvor mange timer per dag pleier du å sitte foran PC'en og bruke spillkonsoll (ta også med tid til I-pad og spille på mobilen) *utenom skoletid*?

- Ingen
- Mindre enn en ½ time om dagen
- ½ - 1 time
- 2 - 3 timer
- 4 timer
- Mer enn 4 timer

Hvor ofte ser du på TV mens du spiser?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Del F

Hva synes du om å få gratis skolelunsj hver dag?

- Jeg liker det veldig godt
- Jeg liker det ganske godt
- Jeg liker det ikke så godt
- Jeg liker det ikke i det hele tatt

Hvor ofte spiser du gratis skolelunsj som er blitt servert i klassen?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- Hver dag

Har du likt maten som blir servert til skolelunsjen i klassen?

- Ja, veldig godt
- Ja, ganske godt
- Sånn passe
- Nei, ikke så godt
- Nei, ikke i det hele tatt

Har skolelunsj hver dag ført til noen endringer i klassen? **(du kan svare mer enn et svar)**

- Ja, det er hyggelig å sitte sammen rundt bordet med de andre elevene
- Ja, vi snakker mer sammen mens vi spiser enn før
- Har ikke merket noe forskjell

Har skolelunsj hver dag ført til noen endringer hjemme, f.eks. at du spiser andre ting til frokost og kveldsmat enn før? **(fyll inn hva endringene er)**

- Ja, jeg spiser mer av _____ enn før

- Ja, jeg spiser mindre av _____ enn før

- Nei, jeg spiser omtrent det samme

- Har ikke merket noe forskjell

Takk for hjelpen!

Er det noe du vil legge til så kan du skrive det her:

Appendix 6



Institutt for folkehelse, idrett og ernæring
v/ Frøydis N. Vik
Postboks 422
4604 Kristiansand

Telefon 38 14 1855

Skolematprosjektet 2014/15

Foreldrespørreskjema om kosthold

Takk for at du vil delta i Skolematprosjektet.

I dag har elevene i din datter/sønns klasse svart på et liknende spørreskjema. Det er kun en av elevens foreldre/foresatte som skal fylle ut dette spørreskjemaet. **Det er viktig at det er den samme som fylte ut spørreskjema sist (august/september) som også fyller ut nå.**

Alle svarene behandles konfidensielt. Er det spørsmål du ikke kan eller vil svare på kan du la det være.

Det ferdig utfylte skjemaet legges i den konvolutten det kom i og sendes med din sønn/datter tilbake til kontaktlærer.

Vi gir gjerne mer informasjon: Frøydis N. Vik: froydis.n.vik@uia.no

Hvordan skal du besvare spørreskjemaet?

- Bruk en blå eller svart penn.
- Svar med en tydelig i svaralternativet.
- Du skal bare svare *ett svar* per spørsmål for de fleste spørsmålene.
- Noen spørsmål kan besvares med mer enn ett svar (da står det skrevet i selve spørsmålet).

TAKK FOR HJELPEN!

Kristine
Engebretsen
Illøkken
Masterstudent, UiA

Renate Høiland
Masterstudent,
UiA

Kirsten Olstad
Petersson
Masterstudent, UiA

Frøydis Vik
Førsteamanuensis,
Prosjektleder, UiA

Spørsmål om ditt barn

I hvilket klassetrinn går ditt barn (som hadde med spørreskjemaet hjem)? Har du flere barn med i prosjektet, kan sette flere kryss, og du skal da bare fylle ut ett skjema.

- 5. trinn Birkeland skole
- 6. trinn Birkeland skole
- 7. trinn Birkeland skole
- 6. trinn Froland skole

Er ditt barn jente eller gutt?

- Jente
- Gutt

1. Spørreskjemaet besvares av...

- Mor
- Stemor/partner til far
- Far
- Stefar/partner til mor
- Annen

Del A

De neste spørsmålene er om måltider. Når du fyller ut disse spørsmålene skal du tenke på hvor ofte du vanligvis spiser måltidene det spørres om. Tenk på de siste ukene. Kryss av i den ruten du føler passer best for deg.

Hvor ofte spiser du frokost i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- Hver dag

Hvor ofte spiser du frokost i helgene?

- Jeg spiser ikke frokost i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Hvor ofte spiser du lunsj i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- Hver dag

Hvor ofte spiser du lunsj i helgene?

- Jeg spiser ikke lunsj i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Hvor ofte spiser du middag i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- Hver dag

Hvor ofte spiser du middag i helgene?

- Jeg spiser ikke middag i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Hvor ofte spiser du kveldsmat i ukedagene?

- Aldri
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- Hver dag

Hvor ofte spiser du kveldsmat i helgene?

- Jeg spiser ikke kveldsmat i helgene
- Lørdag *eller* søndag
- Både lørdag og søndag

Del B

Hva spiser du vanligvis?

Når du fyller ut disse spørsmålene skal du tenke på hva du *vanligvis* spiser/drikker. Tenk på hva du har spist/drukket de siste ukene både hjemme, på arbeid og i fritiden. Kryss av i den ruten du føler passer best for deg.

Hvor ofte spiser du grønnsaker til middag?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag

Hvor ofte spiser du grønnsaker på brødsnivene?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver eneste dag
- Flere ganger hver dag

Hvor ofte spiser du andre grønnsaker (f.eks. gulrot til lunsjen)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du eple, appelsin, pære og banan?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du annen frukt og bær (andre frukter og bær enn eple, appelsin, pære og banan)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du godterier (sjokolade, smågodt osv.)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du nudler
(som f.eks. Mr Lee)?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte spiser du boller, muffins, kake eller annen søt gjærbakst?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du juice?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du saft?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du melk?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du brus

MED sukker?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du brus
UTEN sukker?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Hvor ofte drikker du vann?

- Aldri
- Sjeldnere enn 1 gang i uken
- 1 gang i uken
- 2 ganger i uken
- 3 ganger i uken
- 4 ganger i uken
- 5 ganger i uken
- 6 ganger i uken
- Hver dag
- Flere ganger hver dag

Del C

Noen spørsmål om deg:
Trener/mosjonerer du regelmessig?

- Ja
 Nei

Hvis ja, skriv hva:

Utenom arbeidstid: Hvor mange GANGER i uken driver du idrett eller mosjonerer du så mye at du blir andpusten og/eller svett?

- Hver dag
 4 - 6 ganger i uken
 2 - 3 ganger i uken
 En gang i uken
 En gang i måneden
 Mindre enn en gang i måneden
 Aldri

Utenom arbeidstid: Hvor mange timer per dag pleier du å se på TV og/eller sitte foran PC'en?

- Ingen
 Mindre enn en ½ time om dagen
 ½ - 1 time
 2 - 3 timer
 4 timer
 Mer enn 4 timer

Hvor ofte ser du på TV mens du spiser?

- Aldri
 Sjeldnere enn 1 gang i uken
 1 gang i uken
 2 ganger i uken
 3 ganger i uken
 4 ganger i uken
 5 ganger i uken
 6 ganger i uken
 Hver dag
 Flere ganger hver dag

Hva er din alder?

_____ år

1. Hva er din sivile status?

- Singel
 Gift
 Samboende (bor med min partner, men er ikke gift)
 Separert
 Skilt
 Annet

2. Hvor mye veier du?

_____ kg

3. Hvor høy er du?

_____ cm

4. Hva er din høyest fullførte utdanning?

- Grunnskole (barneskole og ungdomsskole)
 Videregående skole (allmennfag (teori) eller yrkesfag (praktisk))
 Høyskole/Universitet (3-4 år – tilsvarende cand.mag. eller bachelor)
 Høyskole/Universitet (5 år eller mer – tilsvarende hovedfag, master, PhD)

5. Hva er din ektefelle/partners høyest fullførte utdanning?

- Grunnskole (barneskole og ungdomsskole)
 Videregående skole (allmennfag (teori) eller yrkesfag (praktisk))
 Høyskole/Universitet (3-4 år – tilsvarende cand.mag. eller bachelor)
 Høyskole/Universitet (5 år eller mer – tilsvarende hovedfag, master, PhD)
 Jeg har ikke ektefelle/partner

Del D

Noen spørsmål om skolematprosjektet så langt:

1. Hva synes du om at ditt barn har fått gratis skolelunsj hver dag?

- Jeg liker det veldig godt
- Jeg liker det ganske godt
- Jeg liker det ikke så godt
- Jeg liker det ikke i det hele tatt

2. Hvilke erfaringer har du etter et halvt år med servering av skolelunsj hver dag til ditt barn?

Mine positive erfaringer er:

Mine negative erfaringer er:

3. Har skolematprosjektet ført til at ditt barn (som deltok) har endret noen av sine matvaner hjemme?

Ja, mitt barn spiser mer av _____

Ja, mitt barn spiser mindre av _____

Nei, det er omtrent som før

4. Har skolematprosjektet ført til at du eller ektefelle/partner/søsken har endret noen av matvanene hjemme? (du kan svare flere svar)

Ja, jeg spiser mer av _____

Ja, jeg spiser mindre av _____

Nei, det er omtrent som før

Annet: _____

TAKK FOR HJELPEN!

Har du noen kommentar til spørreskjemaet eller prosjektet, skriv det gjerne her!